Technical Tracks

Track 1: Pipeline Safety Management Systems

Track Chair: Joshua Johnson, US DOT/PHMSA
Track Co-Chair: Iain Colquhoun, National Energy Board
Track Co-Chair: Phillip Nidd, Dynamic Risk USA, Inc.
Track Co-Sponsors:
The National Energy Board of Canada
The US Pipeline and Hazardous Materials Safety Administration

**Time: 11:30**

IPC2016-64176, A Practical Approach to Drive Consistency in the Pipeline Industry: CEPA Integrity First
- C. Lukaniuk, Canadian Energy Pipeline Association

13:30

IPC2016-64554, Adapting Safety Culture Assessments to the Pipeline Industry
- K. Maddin, DNV GL – Oil and Gas, D. Shank, DNV GL

**Time: 14:00**

IPC2016-64397, Findings from 16 Years of Auditing Pipeline Integrity Management Systems
- G. Hodgson, Penspen, D. Keen, M. Toff, Penspen

IPC2016-64625, Assurance Management Implementation Within a Large Organization
- R. Sporns, Enbridge Pipelines Inc., S. Fader, Enbridge Pipelines Inc.

Session 1-1-3: Insights & Methodologies from Other Industries

Session Chair: Joshua Johnson, US DOT/PHMSA
Room: TELUS MacLeod E1
Date: Thursday, September 29
Time: 13:30 - 15:00

**Time: 10:30**

IPC2016-64070, “We’re Still Hitting Things”: The Effectiveness of Third Party Processes for Pipeline Strike Prevention
- V. McDermott, J. Hayes, RMIT University

IPC2016-64025, Ensuring Risk Model Usability
- T. Afrano, M. Weichel, DNV GL

IPC2016-64528, Practical IMP Performance Metrics

**Time: 11:00**

IPC2016-64227, A Collaborative Approach to Safety: Applying Lessons Learned from Other High Risk Industries
- J. Munro, Enbridge Pipelines Inc., G. Sommer, Enbridge Liquids Pipeline

IPC2016-64243, Use of Bowties for Pipeline Safety Management
- G. Pettitt, Environmental Resources Management, P. Pennicott, North Caspian Operating Company N.V.

IPC2016-64512, The Case for Systemic Changes to Integrity Management: Power Law Analysis Implications of the San Bruno Pipeline Failure
- K. Oliphant, We Bryce, W. Luft, JANA Corporation

Session 1-1-4: Training & Competency

Session Chair: Robert Smith, US DOT/PHMSA
Room: TELUS MacLeod E1
Date: Tuesday, September 27
Time: 10:30 - 12:00

10:30

IPC2016-64500, Training and Education: The Great Competence Divide?
- M. Unger, ROSEN GROUP, P. Hopkins, Phil Hopkins Limited

11:00

IPC2016-64195, Competency Assurance for Pipeline Integrity Professionals: A Model and a Toolkit

11:30

IPC2016-64589, A Practical Approach for Updating and Improving Integrity Management Process Documents
- A. Lutz, DNV GL, C. Maier, J. Godfrey, T. McMahan, DNV GL, P. Moreno, DNV GL

Session 1-1-5: Regulatory Activities

Session Chair: Iain Colquhoun, National Energy Board
Room: TELUS MacLeod E1
Date: Tuesday, September 27
Time: 13:30 - 15:00

13:30

IPC2016-64043, Early Successes for Pipeline Safety Research Partnerships with Universities
- J. Merritt, U.S. Department of Transportation, R. Smith, US DOT/PHMSA

14:00

IPC2016-64161, Knowledge Gained from A Five Year Regulatory Compliance Assurance Process for Operators’ Pipeline Integrity Management Programs
- B. Waineed, BC Oil and Gas Commission, K. McAuliff, University of British Columbia Okanagan, G. Bhuyan, BC Oil and Gas Commission

14:30

IPC2016-64464, An Assessment of State Regulatory Oversight of Pipeline Systems in Alaska
- D. Norton, Hawk Consultants, J. L. Ovens, USDOT PHMSA Office of Pipeline Safety, G. Annis, Independent Author
Technical Tracks

Session 1-1-6: Development of Pipeline Procedures
Session Chair: Tamara Bews, Bews Consulting Services Inc
Room: TELUS MacLeod E1
Date: Thursday, September 29
Time: 10:30 - 12:00

10:30
IPC2016-64083, Risk Based Strategy for the Development of an Emergency Pipeline Repair System (EPRS)
A. Alani, Penspen, G. Goodfellow, Penspen, D. Keen, Penspen

11:00
IPC2016-64385, System-Wide Response to Incidents: Case Study
S. Zhang, TransCanada Pipelines, S. Kariyawasam, TransCanada Pipelines, R. Sutherby, Agile Integrity Engineering Ltd., J. Upadhyaya, University of Calgary

Session 1-1-7: Pipeline Studies & Analysis
Session Chair: Benjamin C. Mittelstadt, Dynamic Risk Assessment Systems, Inc.
Room: TELUS MacLeod E1
Date: Wednesday, September 28
Time: 10:30 - 12:00

10:30
IPC2016-64534, Root Cause Analysis of 8" FRP Pipeline Failure that Resulted in a Spill and Fire
A. Tatarov, F. Gareau, Skystone International LP

11:00
IPC2016-64640, Unlocking the Power of Incident Investigation: Building a Strong Pipeline Safety Management System from a Solid Foundation
M. Weichel, DNV GL

Session 2: Project Management, Design, Construction & Environmental Issues
Track Chair: Rod Trefanenko, Pipeline Solutions
Track Co-Chair: Jason Smith, CH2M Hill
Track Co-Sponsors: ATCO & WorleyParsons Canada

Topic 2-1: Project Management

Session 2-1-1: Project Execution, Tools & Social Considerations
Session Chair: Thomas H. Greaves, CH2M Hill Canada
Room: TELUS Glen 205
Date: Tuesday, September 27
Time: 10:30 - 15:00

10:30
IPC2016-64175, A Staged Approach for Managing Terrain and Geohazards on New Pipeline Projects
M. Leir, A. Baumgard, K. Johnston, BGC Engineering Inc.

11:00
IPC2016-64003, Pump Replacement at a Critical 63 Year Old Pump Station
T. H. Greaves, CH2M Hill Canada

11:30
IPC2016-64116, Capturing Best Practices for Third Party Inspections of Pipeline Construction
D. Montemurro, TransCanada Pipelines, R. Hoffmann, INGAA Foundation, K. McCaig, CEPA Foundation, R. Salney, PBOK Technical Training Ltd.

13:30
IPC2016-64607, Socio-Economic Effects Monitoring and Pipelines: Moving Towards a Practical and Project-Specific Framework

14:00
IPC2016-64015, Sustaining Capital Cost Contingency Assessments
M. Schoenhardt, MS Consulting

14:30
IPC2016-64205, Value of Reliability, Availability and Maintainability (RAM) Simulation Models in Pipeline Systems
B. M. Jones, Enbridge Pipelines Inc., A. Ferrari, Enbridge Pipelines Inc.

Topic 2-2: Design & Construction

Session 2-2-1: Geotechnical Considerations
Session Chair: Jim Kenny, Stantec
Room: TELUS Glen 206
Date: Thursday, September 29
Time: 08:30 - 11:30

08:30
IPC2016-64235, Use of Advanced Processing Techniques of High Density LiDAR in Place of Survey for Cost and Schedule Reductions on Early Phase Pipeline Projects: Capital Project Results
J. Hiday, Aventine Consulting, D. Parker, SNC-Lavalin

09:00
IPC2016-64285, Re-Introducing the Benefits of Terrain Mapping for Pipeline Routing and Design

10:30
IPC2016-64306, Enhancing Pipeline Project Management with Refined Rock Excavation Forecasting

11:00
Student Paper Publication. IPC2016-64546, A Comparative Study Between Lateral and Upward Anchor-Soil and Pipe-Soil Interaction in Dense Sand
K. Roy, B. Hawlader, Memorial University of Newfoundland, S. Kenny, Carleton University, Department of Civil and Environmental Engineering and Design, I. D. Moore, Queen’s University

Session 2-2-2: Pipeline Networks
Session Chair: Prabhu Mishra, ARYA Engineering and Consulting Inc.
Room: TELUS Glen 205
Date: Tuesday, September 27
Time: 15:30 - 17:00

15:30
L. Teng, Y. Li, H. Han, P. Zhao, D. Zhang, China University of Petroleum
Session 2-2-3: Design Methodologies
Session Chair: Jim Kenny, Stantec
Room: TELUS Glen 205
Date: Wednesday, September 28
Time: 09:30 - 17:00

9:00
Student Paper Publication. IPC2016-64101, Integrity of Small Angle Mitered Joints
G. Zhang, University of Waterloo; I. Colquhoun, J. Pavignani, National Energy Board

9:30
IPC2016-64009, Current Land and Waterborne Geophysical Methods for Guiding Horizontal Directional Drilling and Trenching Along Pipeline Right-of-Ways
P. Bauman, WorelyParsons; L. Woods, E. Ernst, A. McClymont, WorelyParsons/Advisian

10:00
IPC2016-64032, Towards Greener Alternatives in Pipeline Concrete Coatings
M. Jain, Gujarat Gas Ltd; R. Bhandwaj, Gujarat Gas Ltd

10:30
IPC2016-64081, Valve Characteristics and their Effect on Transient Surge Pressures in Delivery Terminals
E. Perez, Enbridge Pipelines Inc.; A. Bi-Bayumi, Enbridge Pipelines Inc.

11:00
IPC2016-64084, The Reliability Estimation of Simplified Natural Gas Pipeline Compressing Station Based on Statistics Principles
M. Fan, Y. Wu, W. Kong, China University of Petroleum Beijing; J. Gong, China University of Petroleum Beijing

Session 2-2-4: Construction Methodologies
Session Chair: Prabh Kush, ARYA Engineering and Consulting Inc.
Room: TELUS Glen 205
Date: Thursday, September 29
Time: 13:30 - 17:00

13:30
IPC2016-64090, Current Land and Waterborne Geophysical Methods for Guiding Horizontal Directional Drilling and Trenching Along Pipeline Right-of-Ways
P. Bauman, WorelyParsons; L. Woods, E. Ernst, A. McClymont, WorelyParsons/Advisian

14:00
IPC2016-64092, Current Land and Waterborne Geophysical Methods for Guiding Horizontal Directional Drilling and Trenching Along Pipeline Right-of-Ways
P. Bauman, WorelyParsons; L. Woods, E. Ernst, A. McClymont, WorelyParsons/Advisian

15:00
IPC2016-64097, Pipeline Bridge Design and Construction for Pipeline Bridges in the Chinips Slope Pipeline Crossing
A. Napolitano, Sapem SpA; G. Guidotti, Sapem SpA; A. Marsili, Sapem; A. Fabbrì, Sapem SpA; M. Menichetti, University of Urbino “Carlo Bo”, Urbino, F. Troiani, Sapienza University of Rome

16:00
IPC2016-64065, Determining the Stress in Buried Pipes under Surface Loading
F. Zhang; N. Branam, Kiefner and Associates Inc.; B. Zaid, Kiefner and Associates; M. Van Auker, Kiefner and Associates Inc.

Session 2-3: Environmental Issues
Session Chair: Jason Smith, CH2M Hill
Room: TELUS Glen 205
Date: Friday, September 30
Time: 08:30 - 09:30

08:30
IPC2016-64370, The Advantages of Integrating Major Accident Hazards and ESIA for Pipeline Projects
G. Pettitt, S. Westfall, Environmental Resources Management

09:00
IPC2016-64390, The Importance of Using Fluvial Geomorphological Risk Assessments Along Proposed and Existing Pipelines when Crossing Waterways
M. Vukman, Stantec; B. Fairley, J. Mulfred, Stantec

Topic 2-4: Project Management, Construction, Design & Environmental Issues Posters

Session 2-4-1: Track 2 Poster Sessions
Session Chair: Mark Piazza, Colonial Pipeline Company
Room: TELUS Macleod A
Date: Poster Session 1 - Tuesday, September 27, 15:30 - 17:00
Date: Poster Session 2 - Wednesday, September 28, 10:30 - 12:00

IPC2016-64132, Investigation of Zinc- and Carbon-Nanoparticle-Based Nanocomposite Coatings
S. Park, M. TabakPaz, University of Calgary; D. Park, Cameron Materials

IPC2016-64081, Valve Characteristics and Their Effect on Transient Surge Pressures in Delivery Terminals
E. Perez, Enbridge Pipelines Inc.; A. Bi-Bayumi, Enbridge Pipelines Inc.
Technical Tracks

Track 3: Pipelines & Facilities Integrity
Track Chair: Stephen Gromack, TransCanada Pipelines
Track Co-Chair: Jerry Rau, RCP Inc.
Track Co-Chair: Jennifer Klementis, Spectra Energy Liquids
Track Co-Chair: Garry Sommer, Enbridge Pipelines Inc.
Track Co-Chair: Jerry Rau, RCP Inc.
Track Chair: Stephen Gromack, TransCanada Pipelines

Topic 3-1: Prevention

Session 3-1-1: Integrity Management Plan
Session Chair: Mary Banack, Enbridge Pipelines Inc.
Room: TELUS MacLeod Hall D
Date: Friday, September 30
Time: 08:30 - 12:00

08:30
IPC2016-64513, Integrity Management of Movement Ground Hazards

09:00
IPC2016-64352, Stress Corrosion Cracking (SCC) Integrity Management Plan for Onshore Liquid and Gas Pipelines: Saudi Aramco Comprehensive Study

11:00
IPC2016-64609, Next Generation Integrity Management Framework

Session 3-1-2: Methods
Session Chair: Todd Porter, Geospatial Corp.
Room: MacLeod Hall C
Date: Tuesday, September 27
Time: 10:30 - 16:30

10:30
IPC2016-64095, Experimental and Numerical Investigation Into the Behaviour of Buried Steel Pipelines under Strike-Slip Fault Movement
S. H. J. Van Es, A. M. Greernt, Delft University of Technology

11:00
IPC2016-64142, Review of Phase II for the Comprehensive Study to Understand Longitudinal ERW Seam Failures
B. A. Young, Battelle Memorial Institute, S. Nenney, DOT - PHMSA, J. M. O’Brian, Battelle Memorial Institute

11:30
IPC2016-64334, Full-bore Pipeline Decompression as ‘Transient Fanno’ Flow
A. Godbole, G. Michal, C. Lu, University of Wollongong, P. Venton, Venton and Associates Pty Ltd, P. Colvin, Jemena

13:30
IPC2016-64490, Evaluating Dents with Metal Loss Using Finite Element Analysis

14:00
IPC2016-64651, AIIV and FLIV in Pipelines, Plants, and Facilities
C. B. Harper, BETA-Machinery Analysis - A Wood Group Company

14:30
IPC2016-64627, Retarding Crack Growth by Static Pressure Hold for Pipeline Steel Exposed to a Near-Neutral pH Environment

15:30
IPC2016-64315, Development Towards a Novel Approach for Assessment of Corroded Pipe

16:00
IPC2016-64668, Rational Stress Limits and Load Factors for Finite Element Analyses in Pipeline Applications Part III—Elastic Plastic Load Factor Development

Topic 3-2: Assessment

Session 3-2-1: Time Dependent Threats (Corrosion & Dents)
Session Chair: Nima Tajallipour, Spectra Energy Liquids
Room: MacLeod Hall B
Date: Thursday, September 29
Time: 08:30 - 15:00

08:30
IPC2016-64030, Failure Along Spiral Welds in Gas Pipeline
S. Safit, Kuwait Oil Co, S. Al-Sulaaiman, Kuwait Oil Company, A. Salim, Kuwait Oil Comapny, C. Lee, TWI Ltd.

09:00
IPC2016-64061, Numerical Simulations of Burst of Corroded Pipes with Thermally Induced Compressive Axial Strain
S. Cunha, UERJ - Universidade do Estado do Rio de Janeiro, M. Pacheco, A. Brigard da Silva, ESSS

09:30
IPC2016-64072, Applying Corrosion Growth Rates Derived from Repeat III Runs to Predict Future Severity
J. Dawson, PLL Pipeline Solutions, L. Ganim, PLL Pipeline Solutions

10:30
IPC2016-64136, Assessment of In-Line Inspection Performance and Interpretation of Field Measurements for Characterization of Complex Dents
L. Torres, Enbridge Pipelines Inc., M. J. Fowler, J. G. Stenerson, Enbridge Liquids Pipeline

11:00
IPC2016-64181, Experimental Validation of a Finite-Element Model to Simulate An Impact On Pipeline due to Vehicles or Heavy Object Fall
C. Fernandez, M. Bertin, P. Cadin, ENGIE - CARGEN, Saint-Denis, France
11:30
IPC2016-64424, Corrosion Growth and Remnant Life Assessment—How to Pick the Right Approach for Your Pipeline
M. Smith, ROSEN Group, C. Argent, ROSEN Group, A. Wilde, ROSEN Group

13:30
IPC2016-64345, Non-linear Corrosion Growth—A more Appropriate and Accurate Model for Predicting Corrosion Growth Rate
M. Al-Amri, TransCanada Pipelines, S. Karjyawaasam, TransCanada Pipelines, S. Zhang, TransCanada Pipelines, W. Zhou, University of Western Ontario

14:00
IPC2016-64501, Development of Key Performance Indicators for Assessing Underdeposited Corrosion

Session 3-2-2: Time Dependent Threat (Crack)
Session Chair: Thomas A. Bubnik, DNV GL
Session Co-Chair: Ivan Hubert, Enbridge Pipelines Inc.
Room: Hyatt Stephen
Date: Thursday, September 29
Time: 08:30 - 15:00

08:30
IPC2016-64098, Effect of Crack Depth on Burst Strength of X70 Linepipe with Dent-Crack Defect
H. Ghaednia, University of Windsor, S. Das, Univ Of Windsor, J. Zolotorayderla, University of Windsor, R. Wang, R. Kania, TransCanada Pipelines

09:00
IPC2016-64340, Assessing the Benefits of Hydrotests for Pipelines with SCC History Post Crack Detection ILI Runs
N. Afotabi, Saudi Aramco, H. M. Al-Muslim, Saudi Aramco, T. A. Bubnik, DNV GL, W. Harper, Otterbein University, W. A. Al-Usaini, Saudi Aramco

09:30
Student Paper Publication. IPC2016-64478, The Effects of Pressure Fluctuations on Hydrogen Embrittlement in Pipeline Steels
X. Xing, M. Yu, O. Tehrise, W. Chen, H. Zhang, University of Alberta

10:30
IPC2016-64486, Evaluation of Fatigue in Gas Pipelines
V. Semiga, S. Tiku, BMT Fleet Technology Limited, A. Dinovitzer, BMT Fleet Technology Ltd., W. Wagster, Interstate Natural Gas Association of America

11:00
IPC2016-64603, A Study of Crack Interaction Criteria
C. Scott, Enbridge Pipelines Inc.

11:30
IPC2016-64348, Susceptibility of Stress Corrosion Cracking in Liquid and Gas Pipeline: Saudi Aramco Study Using Statistical Approach
N. Alotaibi, Saudi Aramco, H. M. Al-Muslim, Saudi Aramco, T. A. Bubnik, DNV GL, A. Alatbani, Saudi Aramco, W. Harper, Otterbein University

14:00
IPC2016-64688, A Review of Rules and Analysis Models for Interaction Of LF-ERW Manufacturing Linear Features in Pipelines
H. Li, Stantec, J. Prescott, Stantec, H. Zhang, A. T. Viveros, Stantec, J. Ferguson, Stantec

14:30
IPC2016-64605, Review of Engineering Fracture Mechanics Model for Pipeline Applications
S. J. Polsaek, C. E. Jaske, DNV GL, T. A. Bubnik, DNV GL

16:30
IPC2016-64618, Estimating J-R Curve from CVN Upper Shell Energy and its Application

11:00
IPC2016-64346, Probabilistic Assessment of Crack Detection ILI Effectiveness for Managing Stress Corrosion Cracking on Buried Pipelines

10:30
IPC2016-64626, ILI to Field Data Comparisons—What Accuracy Can You Expect?
M. Elingher, DNV GL, T. A. Bubnik, DNV GL, P. Moreno, DNV GL

11:00
IPC2016-64547, ILI to ILI Comparisons—Quantifying the Impact of Multiple Inspections
P. Moreno, DNV GL, M. Elingher, DNV GL, T. A. Bubnik, DNV GL

Session 3-2-3: InLine Inspection (All Technologies)
Session Chair: Stephen Westwood, OnStream Pipeline Solutions
Room: MacLeod Hall B
Date: Wednesday, September 28
Time: 08:30 - 12:00

08:30
IPC2016-64126, Relative Statistical Calibration of ILI Measurements

15:30
IPC2016-64420, Material Properties and Flaw Characteristics of Vintage Girth Welds
K. Kolian, Center for Reliable Energy Systems, Y. Wang, CRES (Center for Reliable Energy Systems)

16:00
IPC2016-64587, Girth Welds Integrity Evaluation on a Vintage Gas Pipeline
P. M. Hryciuk, J. A. Minellino, Transportadora de Gas del Norte - TGN, V. Dominguez, Tengo Ingenieria

16:30
IPC2016-64618, Estimating J-R Curve from CVN Upper Shell Energy and its Application
Session 3-2-5: Assessment Research & Developments
Session Chair: Alasdair Clyne, ROSEN Canada Ltd.
Room: Hyatt Stephen
Date: Tuesday, September 27
Time: 10:30 - 16:30

10:30
IPC2016-64284, New Classification Approach for Dents with Metal Loss and Corrosion Along the Seam Weld

11:00
IPC2016-64224, The Development and Use of an Absolute Depth Size Specification in ILI-Based Crack Integrity Management of Pipelines.
G. Foreman, GE PI Pipeline Solutions, S. Bott, Enbridge Pipelines Inc., S. Tappert, PI Pipeline Solutions, J. Sutherland, GE PI Pipeline Solutions

11:30
IPC2016-64363, De Facto Hydrostatic Test Pressures: A Study in Double Stroking
D. Warman, N. Gruzdzewich, H. Kleeman, S. Boardman, U. Duruке, Enterprise Products

14:00
IPC2016-64479, Improvement of Pipeline Fatigue Life Estimation
A. Dinovitzer, BMT Fleet Technology Ltd., S. Tiku, V. Semigja, BMT Fleet Technology Limited, M. Piazza, Colonial Pipeline Company, T. Jones, Marathon Pipe Line LLC

14:30
IPC2016-64499, Development and Implementation of a Risk Based Prioritization Methodology for MAOP Reconfirmation of Gas Transmission Facilities
W. SloteGerk, DNV GL Oil & Gas, M. Hommes, DNV GL Oil & Gas, Groningen, R. Coster, DNV GL, S. Herbert, Exponent, T. Rozella, Pacific Gas and Electric

15:30
IPC2016-64548, Study of a Plastic Strain Limit Damage Criterion for Pipeline Mechanical Damage Using FEA and Full Scale Denting Tests

16:00
IPC2016-64680, Finite Element Modeling and Quantification of Mechanical Damage Severity in Pipelines
X. Zhu, EWI, B. Leis, B N Leis Consultant, Inc.

Session 3-2-6: Assessment (3rd Party, Weather, Outside Force, etc.)
Session Chair: Prabhu Mishra, ARYA Engineering and Consulting Inc.
Room: TELUS MacLeod Hall D
Date: Thursday, September 29
Time: 08:30 - 14:30

08:30
IPC2016-64146, Findings from an Investigation of Hydrotest Protocols
R. Olson, Battelle Memorial Inst, B. Leis, B N Leis Consultant, Inc., B. A. Young, Battelle Memorial Institute

09:00
IPC2016-64333, Thermal Response of Gas Pipeline Metal to Gas Decompression
A. Godbole, G. Michal, C. Lu, University of Wollongong, P. Venton, Venton and Associates Pty Ltd, P. Colvin, Jemena

09:30
IPC2016-64383, Failure Pressure Ratios and Impaired Reliability Levels for Corrosion Anomalies on Gas Transmission Pipelines
W. Zhou, University of Western Ontario, C. Gong, The University of Western Ontario, S. Karlyawaaram, TransCanada Pipelines

10:30
IPC2016-64460, A Life-Cycle Approach to The Assessment of Pipeline Defects
M. Turnquist, I. Smith, Quest Integrity

11:00
IPC2016-64511, Integrity of Buried Gas Pipeline Subjected to an Adjacent Pipe Rupture Event

13:30
IPC2016-64387, Pipeline Operator Perspective in Use of Hydrostatic Testing as an Integrity Management Tool

14:00
IPC2016-64064, Formulation and Experimental Validation of a New Erosion Flow Model
R. Owston, D. McKeon, Southwest Research Institute

Topic 3-3: Mitigation

Session 3-3-1: Repair
Session Chair: Laura Kennett, Enbridge Pipelines Inc.
Session Co-Chair: Damir Grmek, Enbridge Pipelines Inc.
Room: MacLeod Hall B
Date: Tuesday, September 27
Time: 10:30 - 17:00

10:30
IPC2016-64213, Full-Scale Elevated Temperature Testing of Composite Repairs in Bending and Compression
C. Sheets, Stress Engineering Services, Inc., R. Rettew, Chevron, C. Alexander, Stress Engineering Services, Inc., T. Avenova, Tengizchemoil

11:00
Student Paper Publication. IPC2016-64662, Application of Load Sequence to Control Crack Growth in Steel Pipelines Under Near Neutral pH SCC

11:30
IPC2016-64214, Finite Element Analysis of Composite Repairs with Full-Scale Validation Testing

13:30
IPC2016-64350, Mitigation for Infilling Around Pipelines with Cyclic Lateral Deflections
R. Phillips, C-CORE, R. Mcafeee, C-CORE, S. Dooley, C-CORE, M. Martens, TransCanada Pipelines

14:00
IPC2016-64436, Pipeline Failures Resulting from Interacting Integrity Threats
G. T. Quicke, J. A. Beavers, DNV GL

14:30
IPC2016-64467, Restored Crossings: Applying Stream Restoration Techniques to Protect Exposed Pipelines
D. Salesa, A. Steker, Cardno

15:30
IPC2016-64040, Risk-Based Mitigation of Mechanical Damage
J. Ma, Kiefner and Associates Inc., F. Zhang, Kiefner and Associates Inc., G. Desjardins, Desjardins Integrity Ltd
Session 3-4-2: Validation & Performance of ILI Tools for Crack Detection
Session Chair: Asim Khan, Spectra Energy Liquids
Room: TELUS MacLeod Hall C
Date: Thursday, September 29
Time: 08:30 - 16:30

08:30
IPC2016-64216, Detection of Crack-Related Features Within Dented Pipe Using Electromagnetic Acoustic Transduction (EMAT) Technology

09:00
IPC2016-64189, Comparing the Performance of Liquid and Tape Coating Systems Using In-Line Inspection Measurements
H. Tsapralis, Enbridge Liquids Pipeline, M. Abdelsalam, Enbridge Pipelines Inc., J. Liang, Enbridge Liquids Pipeline

10:00
IPC2016-64409, Continuous Depth Sizing of ILI Ultrasonic Crack Detection
M. Grigat, ROSEN Technology and Research Center, A. Atto, J. Voss, ROSEN Technology and Research Center GmbH

10:30
IPC2016-64421, Graded EMAT Performance Specification Validated in Blind Test

11:00
IPC2016-64429, Shear-wave Ultrasonic Crack Inspection Tool Performance for Cracks Associated with Metal Loss
P. S. Mendoza, Enbridge Pipelines Inc., S. Bott, Enbridge Pipelines Inc., Y. Hubert, Enbridge Pipelines Inc.

11:30
IPC2016-64433, Detection of Crack Initiation Based on Repeat In-Line Inspection
M. Palmer, C. Davies, ROSEN, P. Palmer-Jones, Rosen Group, M. Grinten, ROSEN

13:30
IPC2016-64666, The Use of Hydrotesting and EMAT Inline Inspection Technology for the Integrity Management of Stress Corrosion Cracking (SCC) in Gas Pipelines
P. M. Hryciuk, E. Carczoglo, J. A. Miriello, L. Martinetto, Transportadora de Gas del Norte - TGN, P. M. Guillen, Macaw Engineering, J. Grollenberger, RTRC Germany
Technical Tracks

11:00
IPC2016-64697, Development of the UKOPA Strategy for the Management of Ageing Pipelines
G. Goodfellow, Penspen, J. Haswell, Pipeline Integrity Engineers, G. Pallor, SABIC UK Petrochemicals, P. Davis, British Pipeline Agency Ltd., R. McConnell, Pipeline Integrity Engineers

Topic 3-5: Pipeline & Facilities Integrity Posters

Session 3-5-1: Track 3 Poster Sessions
Session Chair: Mark Piazza, Colonial Pipeline Company
Room: TELUS MacLeod A
Date: Poster Session 1 - Tuesday, September 27, 15:30 - 17:00
Date: Poster Session 2 - Wednesday, September 28, 10:30 - 12:00
IPC2016-64518, Analysis of Pressure Test Failure Performance by Vintage Pipe

Track 4: Operations, Monitoring & Maintenance

Track Chair: Robert Hadden, Kinder Morgan Canada
Track Co-Chair: Renan Baptista, Petrobras R&D Centre
Track Co-Sponsors: merjent & Saskatchewan Energy Liquids

Topic 4-1: Operations and Maintenance

Session 4-1-1: Pipeline Isolation
Session Chair: Tran Mah-Paulson, T. D. Williamson Inc.
Session Co-Chair: Celine Mah, T.D. Williamson Inc.
Room: TELUS MacLeod E3
Date: Tuesday, September 27, 10:30 - 12:00
IPC2016-64154, Pipeline Double Block Isolation: What are the Options?
K. Whiteis, T.D. Williamson Inc., F. Dum, TD Williamson Inc.

Session 4-1-2: Pipeline Repair & Reinforcement
Session Chair: Neil Bolger, Fortis BC
Room: TELUS MacLeod E3
Date: Tuesday, September 27, 13:30 - 15:00
IPC2016-64104, An Experimental Study to Evaluate the Performance of Competing Filler Materials Used with Type B and Stand-Off Steel Sleeves
C. Alexander, Stress Engineering Services, Inc., A. Bickett, Ayleska Pipeline Service Company

Session 4-1-3: Inspection & Testing
Session Chair: Peter Tanchak, Enbridge Pipelines Inc.
Session Co-Chair: Shannon Krochenski, TransCanada Pipelines
Room: TELUS MacLeod E3
Date: Tuesday, September 27, 14:30 - 16:00
IPC2016-64311, Experimental Study of Elevated Temperature Composite Repair Materials to Guide Integrity Decisions

IPC2016-64311, Reinforcing Large Diameter Elbows Using Composite Materials Subjected to Extreme Bending and Internal Pressure Loading

Session 4-1-3: Inspection & Testing
Session Chair: Peter Tanchak, Enbridge Pipelines Inc.
Session Co-Chair: Shannon Krochenski, TransCanada Pipelines
Room: TELUS MacLeod E3
Date: Tuesday, September 27, 15:30 - 17:00
IPC2016-64127, Statistical Relevance of ILI and Field Trending
M. Abourezaghi, Enbridge Pipelines Inc., Y. Hubert, Enbridge Pipelines Inc., S. Hassanieh, Enbridge Liquids Pipeline
### Technical Tracks

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<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Session Chair/Co-Chair</th>
<th>Location</th>
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<tbody>
<tr>
<td>08:30</td>
<td>IPC2016-64262, Study of Uneven Distribution in Parallel Petroleum Processing Pipes</td>
<td>R. Liu, China National Oilfield Corp. Research Institute, H. Zhu, Q. Li, CNOC Research Institute, Y. Wan, Tianjin Branch, CNOC Ltd., Tianjin, K. Fan, China University of Petroleum</td>
<td>TELUS MacLeod E3</td>
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<tr>
<td>09:00</td>
<td>IPC2016-64268, Fundamental Research on Method of Characteristics Based on Cubic Interpolated Profile Scheme in Water Hammer Analysis</td>
<td>Y. Tanaka, National Institute for Rural Engineering, K. Tsuda, Graduate School of System and Information Engineering, University of Tsukuba, A. Mukai, Kanto-Western Region National Agricultural Research Center, H. Taruya, NARO National Institute for Rural Engineering</td>
<td>TELUS MacLeod E3</td>
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<tr>
<td>11:00</td>
<td>IPC2016-64076, Technical Evaluation of the Consequence of HCDP Upsets from Gas Producers along Pipeline Laterals</td>
<td>C. Hartloper, NOVA Chemicals Centre for Applied Research, K. Botros, NOVA Chemicals, K. Tittermore, TransCanada Pipelines</td>
<td>TELUS MacLeod E2</td>
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<tr>
<td>11:30</td>
<td>IPC2016-64521, Backfilling Abandoned Pipelines with Paste</td>
<td>S. Longo, Golder Associates Ltd., J. Cull, Golder Associates Ltd.</td>
<td>TELUS MacLeod E2</td>
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<tr>
<td>11:30</td>
<td>IPC2016-64208, Benefits of Variable Frequency Drives on Pumping Systems in Enbridge Liquids Pipelines</td>
<td>A. Ferran, Enbridge Pipelines Inc.</td>
<td>TELUS MacLeod E3</td>
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<td>12:00</td>
<td>IPC2016-64687, Overpressure Protections in Liquid Pipeline Hydraulic Design</td>
<td>A. Zhou, Worley Parsons, D. Yu, WorleyParsons Canada, V. Cabrero, TransCanada Pipelines</td>
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**Session 4-1-4: Pipeline System Modeling**

**Session Chair:** Karl Blank, Enbridge Pipelines Inc.

**Room:** TELUS MacLeod E3

**Date:** Wednesday, September 28

**Time:** 08:30 - 10:00

**Topic 4-2: Automation and Measurement**

### Session 4-2-1: Pipeline Leak Detection

**Session Chair:** Juan Gil, TransCanada Pipelines

**Room:** TELUS MacLeod E2

**Date:** Thursday, September 29

**Time:** 08:30 - 14:30

- **08:30** IPC2016-64675, Leak Detection for Shut-In Pipelines
  - N. Rostam, F. Vejvahat, N. Norooci, Enbridge Pipelines Inc.

- **09:00** IPC2016-64488, Leak Detection and Operations Management in Offshore Pipelines
  - J. Zhang, Atmos International Ltd, A. Kane, Atmos International
**Technical Tracks**

**Session 4-2-3: SCADA, Automation & Measurement**

**Session Chair:** Dion Dube, Enbridge Pipelines Inc.  
**Room:** TELUS MacLeod E2  
**Date:** Friday, September 30  
**Time:** 08:30 - 11:30

- **IPC2016-64160, CyberSecurity from Field to Host**

- **IPC2016-64193, Pipeline Diagnostics with Ultrasonic Meters**
  - N. L. Galley, FMC Technologies, N. Rasool, Enbridge Pipelines Inc.

**Session 4-3-2: Geohazard Management II**

**Session Chair:** Joel Van Hove, BGC Engineering Inc.  
**Room:** TELUS MacLeod E2  
**Date:** Wednesday, September 28  
**Time:** 08:30 - 10:00

- **IPC2016-64378, Monitoring Ground Slumping Across a Natural Gas Distribution Network with Satellite Radar**
  - M. D. Henschel, B. Dechamps, G. Robert, MDA, D. Zukowski, TransGas Limited

- **IPC2016-64515, The Cheecham Landslide Event**
  - J. P. Barlow, BGC Engineering Inc., J. Richmond, Enbridge Pipelines Inc.

- **IPC2016-64594, Technical and Operational Guidelines When Using Strain Gauges to Monitor Pipelines in Slow Moving Landslides**
  - D. Dewar, Spectra Energy Transmission, G. Van Boven, A. K. Tong, Spectra Energy

**Session 4-4-1: Track 4 Poster Sessions**

**Session Chair:** Mark Piazza, Colonial Pipeline Company  
**Room:** TELUS MacLeod A  
**Date:** Poster Session 1 - Tuesday, September 27, 15:30 - 17:00  
**Date:** Poster Session 2 - Wednesday, September 28, 10:30 - 12:00

- **IPC2016-64210, Considerations for Gas Pipeline Blowdown**
  - D. Galatro, ILF Consultants Inc.

**IPCP2016-64267, Apparatus for Testing Drag Reducing Agents in Gas Transmission Pipelines**

- J. Chen, Fushun Research Institute of Petroleum and Petrochemicals, SINOPEC, W. Zhao, SINOPEC, Y. D. X. Solar, Dept, SINOPEC, B. Jia, Pipeline Storage & Transportation Co., Ltd, SINOPEC, J. Wang, Chemical Sales Co., Ltd, SINOPEC, H. Li, Pipeline Storage & Transportation Co., Ltd, SINOPEC

**IPCP2016-64320, Waveform Pattern Recognition Applied to Rapid Detection of Wall-Thinning in Pipes: A Simulation-Based Case Study**

- W. Alabadi, E. Sandgren, H. Al-Rizzo, University of Arkansas at Little Rock

**IPCP2016-64150, Optimization of Planning and Scheduling of Refinery Product Based on Downstream Requirements**

- G. He, China University of Petroleum (Beijing), Y. Liang, China University of Petroleum at Beijing, L. Fang, China University of Petroleum (Beijing), Q. Zheng, Drilling & Production Technology Research Institute, PetroChina Pipeline Company, L. Sun, China University of Petroleum (Beijing)

**IPCP2016-64118, Robust Direct Hydrocarbon Sensor Based on Novel Carbon Nanotube for Leakage Detection**

- K. Parmar, S. Park, C. Park, University of Calgary

**IPCP2016-64065, Geotechnical Instrumentation: Monitoring Longitudinal Stress of High Pressure Pipeline during Longwall Mining Operations—A Case Study in West Virginia**


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**Track 5: Materials & Joining**

**Track Chair:** Millan Sen, Enbridge Pipelines Inc.  
**Track Co-Chair:** Dr. Xian-Kui Zhu, Edison Welding Institute  
**Track Co-Chair:** Aaron Dinovitzer, BMT Fleet Technology Ltd.

**Track Co-Sponsors:** Acuren & BMT Fleet Technology Ltd.

**Session 5-2-1: Mechanical Anisotropy**

**Session Chair:** J. Barry Wiskel, University of Alberta  
**Room:** TELUS Glen 201/202  
**Date:** Tuesday, September 27  
**Time:** 10:30 - 12:00

- **IPCP2016-64147, Anisotropic Material Characterization and Its Effect on Structural Integrity**
  - O. Hilgert, Salzgitter Mannesmann Forschung, C. Kalwa, Europe
Technical Tracks

Session 5-2-2: Fracture Tests & Fracture Design
Session Chair: Melissa Gould, DNV GL
Room: TELUS Glen 201/202
Time: 13:30 - 15:00

13:30
IPC2016-64021, Single Edge Notched Tension (SENT) Testing at Low Temperatures
P. Moore, TWI Ltd. A. Grintea, NSIRC (Brunel University & TWI)

14:00
IPC2016-64310, HISC in Onshore Pipelines: Design Considerations
A. Lockeey, Penspen, A. Young, Penspen, T. Turner, B. Kelly, Penspen

14:30
IPC2016-64299, Experimental Study on Inverse Fracture in Drop-Weight Tear Test and Other Laboratory Test—Current Activities in HLP Committee, Japan Report 2
T. Tagawa, JFE Steel Corporation, T. Fujishiro, Nippon Steel & Sumitomo Metals Corporation, T. Amano, Nippon Steel & Sumitomo Metal Corporation, S. Aihara, The University of Tokyo, Bukiyo, S. Iga, JFE Steel Corporation

Session 5-2-3: Pipe Production—Special Applications
Session Chair: Muhammad Rashid, Evraz NA
Room: TELUS Glen 203/204
Date: Tuesday, September 27
Time: 10:30 - 12:00

10:30
IPC2016-64192, HFI Welded Steel Pipes for Low Temperature Pipelines

11:00
IPC2016-64108, Characterization of Anisotropic Yield Surface of X70 Pipeline Steel Using a Multi-DIC Setup
K. Derys, S. Coppéliers, R. Van Hecke, KU Leuven, S. Cooreman, ArcelorMittal Global R&D Gent, D. Debruyne, KU Leuven

11:30
IPC2016-64695, Mechanical Properties Anisotropy in X80 Line Pipes
A. Gervasiev, Ghent University, A. Struin, I. Pyskimtsev, RosNITI, R. Petrov, Ghent University, B. Leis, B N Leis Consultant, Inc.

Session 5-2-4: Pipe Forming—Effect on Mechanical Properties
Session Chair: Justin Crapps, ExxonMobil
Upstream Research
Room: TELUS Glen 201/202
Date: Tuesday, September 27
Time: 15:30 - 17:00

15:30
IPC2016-64553, Effect of Residual Forming Stresses on Fracture in ERW Pipe
T. Anderson, Team Industrial Services, G. Brown, Quest Integrity USA

16:00
IPC2016-64143, The Effect of Spiral Cold-Bending Manufacturing Process on Pipeline Mechanical Behavior
G. Chatzopoulos, University of Thessaly, P. Anees, G. C. Sarvari, C. I. Papadaki, University of Thessaly, S. A. Karamanos, Univ of Thessaly

16:30
IPC2016-64183, Experimental and Numerical Study on the Evolution of Mechanical Properties during Spiral Pipe Forming

Session 5-2-5: Mechanical Properties
Session Chair: Sreekanta Das, Univ Of Windsor
Room: TELUS Glen 201/202
Date: Wednesday, September 28
Time: 08:30 - 10:00

08:30

09:00
IPC2016-64157, Material Characterization of Pipeline Steels: Inspection Techniques Review and Potential Property Relationships

09:30
IPC2016-64632, Considerations in Modern Linepipe Specifications and Girth Welding Practice for Balanced Performance
Y. Wang, CRES (Center for Reliable Energy Systems), D. Horsey, Horsey Consulting, S. Rapp, P.E., Spectra Energy

Session 5-2-6: Pipe/Plate Production
Session Chair: Robert Mackenzie, Enbridge Pipelines Inc.
Room: TELUS Glen 201/202
Date: Wednesday, September 28
Time: 10:30 - 12:00

10:30
IPC2016-64179, Development of Grade X80 High Charpy Energy Linepipe by MA Formation Control
H. Kimura, JFE Steel Corporation, N. Ishikawa, JFE Steel Corporation, S. Kakehara, JFE Steel Corporation, J. Kondo, JFE Steel Corporation, T. Yokota, JFE Steel Corporation

11:00
IPC2016-64099, Integrated Process- And Quality Control to Secure the Production of Slabs for Plates for Line Pipe Application
H. Meuser, Salzgitter Mannesmann Grobblech, M. Weinberg, Hüttenerweite Krupp Mannesmann

11:30
IPC2016-64302, Effects of Segregation on the Formability of API Grade Pipeline Steel Produced on a Compact Strip Production (CSP) Line
L. Collins, Evraz North America, S. Nafisi, P. Wei, EVRAZ Inc. NA, J. B. Wiskel, P. Wang, University of Alberta

Session 5-2-7: Pipe/Plate Production
Session Chair: Cindy Guan, TransCanada Pipelines
Room: TELUS Glen 203/204
Date: Tuesday, September 27
Time: 13:30 - 15:00

13:30
IPC2016-64153, Evaluation of Toughness Characteristics of API Grade Pipeline Steel Produced on a Compact Strip Production (CSP) Line
B. Frye, V. Kendrick, A. Sudolffie, Nucor Steel, J. Rodriguez-Ibabe, CET, D. Stalheim, DGS Metallurgical Solutions, Inc.
14:00  
IPC2016-64399, Effect of Rolling Parameters on the Low-Temperature Toughness and Microstructure of High-Strength Linepipe Steel  

14:30  
IPC2016-64509, The Effect of Niobium in Solution on Austenite Decomposition in Line Pipe Steels  
I. D. G. Robinson, T. Garcia, University of British Columbia, W. J. Poole, The University of British Columbia, M. Militzer, University of British Columbia

Topic 5-3: Welding

Session 5-3-1: Welding Materials  
Session Chair: Mohamad Chehatani, TWI  
Session Co-Chair: Philippa Moore, TWI Ltd  
Room: TELUS Glen 201/202  
Date: Thursday September 29  
Time: 08:30 - 09:30

08:30  
Student Paper Publication. IPC2016-64549, Effect of Cold-wire Addition in the TSAW Process on Microstructure and Mechanical Properties of the HAZ of X70 Microalloyed Pipeline Steel  
M. Mohammadnejad, University of Alberta, S. Kenny, Evraz Inc. NA., L. Collins, Evraz North America, H. Henein, D.G. Ivey, University of Alberta

09:00  
IPC2016-64361, New FCAW Electrode for Producing Ultra-Clean High-Toughness Welds in X-60 and X-100 Steel  
S. Fiore, Hobart Brothers

Session 5-3-2: Weld Failure Assessment  
TELUS Convention Centre,  
Session Chair: Sanjay Tiku, BMT Fleet Technology Limited  
Room: TELUS Glen 203/204  
Date: Tuesday, September 27  
Time: 15:30 - 17:00

15:30  
IPC2016-64564, Implementation of CSA Z662-15 Annex K Option 2 on a 914 mm Liquid Pipeline  
D. Sarafchian, R. Belanger, SGS Canada

16:00  
IPC2016-64596, Fracture Toughness of Axial Seam Welds using As-Welded-Geometry/ Snt Specimens  
M. Uddin, Engineering Mechanics Corporation of Columbus, G. M. Wilkowski, EMC2

16:30  
IPC2016-64491, Development of Pipeline Sleeve End Fillet Weld Stress Intensity Factor and Reference Stress Solutions for Fatigue and Failure Assessment  
V. Semipa, BMT Fleet Technology Limited, A. Dinovitzer, BMT Fleet Technology Ltd., A. Estraghi, BMT Fleet Technology Limited, R. Lazer, TransCanada Pipelines

Session 5-3-3: Weld Integrity Management  
Session Chair: Luke Ludwig, Enbridge Pipelines Inc.  
Room: TELUS Glen 203/204  
Date: Wednesday, September 28  
Time: 08:30 - 10:00

08:30  
IPC2016-64390, Evaluation of Back-Bevel and Counterbevel-Taper Unequal Wall Thickness Transition Joint Designs  
Xiaotong Huo, Memorial University of Newfoundland, Shawn Kenny, Carleton University, Department of Civil and Environmental Engineering and Design, Amtgard Hussein, Memorial University of Newfoundland, Michael Martens, TransCanada Pipelines

09:00  
IPC2016-64614, Minimum Counterbore Length and Taper Angle Criteria for Transition Welds  
M. Liu, CRES (Center for Reliable Energy Systems), M. Martens, TransCanada Pipelines

09:30  
IPC2016-64152, Region-Specified Cyclic Behavior of API X80 Welded Joints under Uniaxial Cyclic Loading  
H. Lu, Tianjin University, Y. Yang, PetroChina Pipeline Company, CNPC, G. Chen, X. Chen, Tianjin University, X. Wang, Carleton University

Session 5-3-4: Weld Procedure Development  
Session Chair: Robert Lazor, TransCanada Pipelines  
Room: TELUS Glen 201/202  
Date: Thursday, September 29  
Time: 14:00 - 16:00

14:00  
IPC2016-64305, Effect of Weld Thermal Cycles on Microstructure and Properties of Simulated Heat Affected Zone in Thick-Wall X80 Pipe Steels  
J. Gianetto, Canmet Materials, Natural Resources Canada, F. Fazioli, Canmet Materials, B. Shalchi-Amirkhiz, J. Li, Canmet Materials, Natural Resources Canada

11:00  
IPC2016-64321, Microstructure and Mechanical Properties of Girth Weld HAZ in X80 Line Pipe with High Deformability for Strain Based Design Applications  
Y. Liu, China Petroleum Pipeline Research Institute, Y. Li, S. Li, Z. You, Z. Yin, CPRR
Technical Tracks

Topic 5-4: Crack Propagation & Arrest

Session 5-4-1: Rich Gases, CO2 & Fracture Control
Session Chair: Gery M. Wilkowski, EMC2
Room: TELUS Glen 203/204
Date: Thursday, September 29
Time: 08:30 - 10:00

08:30
IPC2016-64011, Measurements of Decompression Wave Speed in Natural Gas Mixtures Containing 2-8% (Mole) Hydrogen by a Shock Tube
K. Botos, NOVA Chemicals, S. Igi, JFE Steel Corporation, J. Kondo, JFE Steel Corporation

08:00
IPC2016-64365, Am I Too Rich? Determining Limits for Gas Composition to Ensure Crack Arrest in an Existing Pipeline
R. Andrews, MACAW Engineering, M. Smith, ROSEN Group

09:30
IPC2016-64456, Analysis of a Dense Phase CO2 Full-Scale Fracture Propagation Test in 24” Diameter Pipe

Session 5-4-2: Fracture Toughness Testing
Session Chair: Timothy Weeks, National Institute of Standards and Technology
Room: TELUS Glen 201/202
Date: Thursday, September 29
Time: 15:30 - 17:00

15:30
IPC2016-64610, Comparison of J-integral Measurement Methods on Clamped Single-Edge Notched Tension Specimens

16:00
IPC2016-64058, CTOA Test Method Using Drop-Weight Tear Test (DWTT): Background, Standard Development and Application

Session 5-4-3: Fracture Arrest Tests of Full-Scale High-Strength Pipelines
Session Chair: Satoshi IGI, JFE Steel Corporation
Session Co-Chair: Xian-Kui Zhu, Edison Welding Institute
Room: TELUS Glen 203/204
Date: Friday, September 30
Time: 08:30 - 11:30

08:30
IPC2016-64317, Modified West Jefferson Burst Test for Assessment of Brittle Fracture Arrest in Thick-Wall TMPC Line Pipe Steel with High Charpy Energy
S. Igi, T. Sakimoto, JFE Steel Corporation, J. Kondo, JFE Steel Corporation, Y. Hice, Engineering Mechanics Corporation of Columbus, G. M. Wilkowski, EMC2

09:00
IPC2016-64308, Fracture Behavior in West Jefferson Test under Low-Temperature Condition for X65 Steel Pipes with High Charpy Energy—Current Activities in HLP Committee, Japan, Report 1
T. Amano, Nippon Steel & Sumitomo Metal Corporation, S. Igi, T. Sakimoto, JFE Steel Corporation, T. Inoue, Nippon Steel & Sumitomo Metal Corporation, S. Afkara, The University of Tokyo

09:30
IPC2016-64017, Specifications Dilemma Posed by High Toughness Line Pipe Steels
B. Leis, B N Leis Consultant, Inc., J. Gray, Microalloyed Steel Institute, F. Barbaro, Barbaro & Associates

10:30
IPC2016-64112, Full Scale Burst Validation Tests for Crack Arrestor Designs for NPS 48 Grade 550 Rich Gas Pipeline
C. Guan, TransCanada Pipelines, B. Rothwell, Brian Rothwell Consulting Inc., J. Kondo, JFE Steel Corporation, M. Murata, NSSMC, K. Armstrong, DNV-GL–Spadeadam Test Site

Session 5-4-4: Running Fracture Arrest Analysis & Prediction
Session Chair: Su Xu, Canmet Materials
Session Co-Chair: Xian-Kui Zhu, Edison Welding Institute
Room: TELUS Glen 208/209
Date: Wednesday, September 28
Time: 08:30 - 12:00

08:30
IPC2016-64052, Microstructure Engineering of Thicker Gage Niobium Microalloyed Line Pipe Steel with Enhanced Toughness by High Temperature Processing Using TiN-Nbc Composite Precipitate
S. Subramanian, X. Ma, McMaster University, C. Miao, Shouyang, X. Zhang, Shagang, L. Collins, Evraz Inc. NA

09:00
IPC2016-64119, Analysis of Data from a Full-Scale Burst Test on 1219 mm OD Grade 550 Pipe—Implications for the Prediction of Fracture Velocity
B. Rothwell, Brian Rothwell Consulting Inc., C. Guan, TransCanada Pipelines, S. Igi, JFE Steel Corporation

09:30
IPC2016-64240, Investigation of Crack Propagation Characteristics Using Instrumented Charpy and Dwt Tests for Full-Scale Burst Tested 1219 mm OD Grade 550 (X80) Linepipe
S. Igi, JFE Steel Corporation, C. Guan, TransCanada Pipelines, B. Rothwell, Brian Rothwell Consulting Inc., T. Hiraide, JFE Steel Corporation

10:30
IPC2016-64466, An Operator’s Perspective on Fracture Control in Dense Phase CO2 Pipelines
J. Barnett, National Grid Carbon, R. Cooper, National Grid

11:00
IPC2016-64561, Simulation of Dynamic Crack Propagation and Arrest Using Various Types of Crack Arrestor
M. Uddin, Engineering Mechanics Corporation of Columbus, G. M. Wilkowski, EMC2
11:30
IPC2016-64585, Modified Two-Curve Model for Predicting Fracture Arrest Toughness and Arrest Distance of Full-Size Burst Tests
X. Zhu, EWM

11:30
Student Paper Publication. IPC2016-64100, Some Observations on Soil-Pipe Interface Shear Strength in Direct Shear Under Low Effective Normal Stresses and Large Displacements
R. S. Amansinghe, D. Wijewickrema, University of British Columbia, H. T. Esl, Department of Civil and Architectural Engineering, Qatar University

13:30
IPC2016-64249, Physical Modelling on Buried Pipeline Response in Elasto-Viscoplastic Soils
C.K. Wong, R.G. Wan, R. Wong, University of Calgary, B. Liu, TransCanada Pipelines

14:00
IPC2016-64432, Effect of Soil Variability on Strain Demand Associated with Moving Slopes
A. M. Fraser, S. D. Koduru, C-FER Technologies

Session 6-1-2: Strain Capacity
Session Chair: Yong-Yi Wang, CRES (Center for Reliable Energy Systems)
Session Co-Chair: Satoshi IGI, JFE Steel Corporation
Room: TELUS Glen 208/209
Date: Thursday, September 29
Time: 10:30 - 16:30

10:30
IPC2016-64151, Strain Capacity of Large Diameter Pipes: Full Scale Investigation with Influence of Girth Weld, Strip End Weld and Ageing Effects
S. Hoehler, H. Karbasian, A. Gering, Salzgitter Mannesmann Forschung GmbH, C. Kalwa, Europipe, B. Oualassa, Salzgitter Mannesmann Großrheinfeld GmbH

11:00
IPC2016-64628, Tensile and Compressive Strain Capacity of Pipelines with Corrosion Anomalies
M. Liu, CRES (Center for Reliable Energy Systems), B. Ayton, J. Bergman, C-FER Technologies, S. Nanney, DOT - PHMSA

11:30
IPC2016-64349, Strain Capacity and Deformation Behavior of HFW Linepipe
S. Igi, JFE Steel Corporation, S. Yabumoto, JFE Steel Corporation, T. Sadasue, JFE Steel Corp, H. Tajika, K. Oi, JFE Steel Corporation

13:30
IPC2016-64191, Full-Scale Pipe Strain Test Quality and Safety Factor Determination for Strain-Based Engineering Critical Assessment

Session 6-1-3: Material Testing & Welding
Session Chair: Timothy Weeks, National Institute of Standards and Technology
Session Co-Chair: Marie Quintana, Lincoln Electric Co.
Room: TELUS Glen 208/209
Date: Thursday, September 29
Time: 08:30 - 10:00

09:00
IPC2016-64472, Advanced Pipeline Welding Technologies for Strain-Based Design

09:30
IPC2016-64497, Standardization of SENT (or SE(T)) Fracture Toughness Measurement: Results of a Round Robin on a Draft Test Procedure
Track 7: Risk & Reliability

Session 7-1-1: Consequence Assessment
Session Chair: Graham Goodfellow, Penspen Ltd.
Room: TELUS MacLeod E4
Date: Tuesday, September 27
Time: 11:00 - 14:30

11:00
IPC2016-64314, Prediction of Blowdown Forces and Impingement Pressures from a Partial Pipe Rupture for Hazard Analyses
G. M. Wilkowicki, EM2C, E. Kurth,
Engg Mech Corp Of Columbus, C. Sallaberry,
Engineering Mechanics Corporation of Columbus, J. Miheil,
Dynamic Risk Assessment Systems

13:30
IPC2016-64604, Effect of Block Valve and Crack Arrestor Spacing on Thermal Radiation Hazards Associated with Ignited Rupture Incidents for Natural Gas Pipelines
B. Rothwell, Brian Rothwell Consulting Inc., T. Dessein,
C-FER Technologies, A. Collard, TransCanada Pipelines

Session 7-1-2: Failure Rate Assessment
Session Chair: Albert van Roosdaal, Chevron
Session Co-Chair: Guy Desjardins, Desjardins Integrity Ltd.
Room: TELUS MacLeod E4
Date: Thursday, September 29
Time: 08:30 - 12:00

08:30
IPC2016-64071, Vulnerability of Buried Pipelines to Landslides
G. Ferris, S. Newton, BGC Engineering Inc., M. Porter,
BGC Engineering Inc.

09:00
IPC2016-64085, Updated Estimates of Frequencies of Pipeline Failures Caused by Geohazards
M. Porter, BGC Engineering Inc., G. Ferris,
BGC Engineering Inc., M. Leir, BGC Engineering Inc.,
M. Leach, BGC Engineering Inc., M. Haderspock,
YFP Transporte SA

10:00
IPC2016-64381, Equipment Impact Rate Assessment Using Bayesian Networks
S. D. Koduru, D. Lu, C-FER Technologies

10:30
IPC2016-64450, How Many Pipelines in North America Have Failed by Fatigue and Why?
A. Cosham, Ninth Planet Engineering Limited, P. Hopkins,
Phil Hopkins Limited

11:00
IPC2016-64503, Long Term (1970 to 2014) Trending of the Nine Prescriptive Pipeline Threats
J. J. Chen, D. Williams,
Dynamic Risk Assessment Systems Inc., K. Leewis,
Leewis and Associates, M. Barnum, PG&E

11:30
IPC2016-64611, Analyzing the Effectiveness of Prevention and Protection Measures for Third-Party Damage to Underground Pipelines Using a Hierarchical Fault Tree Model
D. Lu, M. Stephens, C-FER Technologies

Session 7-1-3: Uses of Structural Reliability
Session Chair: Andrew Cosham, Ninth Planet Engineering Limited
Room: TELUS MacLeod E4
Date: Friday, September 29
Time: 08:30 - 12:00

08:30
IPC2016-64430, Effect of Calibration of Measurements on Integrity Reliability Analysis
K. Cheng, Enbridge Pipelines Inc., M. Abdolrazaghi,
Enbridge Pipelines Inc., S. Hassanien, C. Watt,
Enbridge Liquids Pipeline

09:00
IPC2016-64423, Pipeline Integrity Reliability Analysis Levels
S. Hassanien, Enbridge Liquids Pipeline, L. LeBlanc,
J. Cuervo, Enbridge Pipelines Inc., K. Cheng,
Enbridge Pipelines Inc.

09:30
IPC2016-64186, Assessment on Design Factors of China’s Natural Gas Pipeline Based on Reliability-Based Design Method
Z. Zhang, Y. Zhou, J. Zhang,
China Petroleum Pipeline Engineering Corporation

10:00
IPC2016-64341, A Case Study on the Application of Structural Reliability Analysis to Assess Integrity for Internal Corrosion of Unpiggable Pipelines
K. Taylor, S. Turner, Penspen, G. Goodfellow, Penspen

11:00
IPC2016-64470, On the Use of Surrogate Models in Reliability-Based Analysis of Dented Pipes
S. Hassanien, Enbridge Liquids Pipeline, M. Karrut,
S. Adeeb, University of Alberta, D. Langer,
Enbridge Liquids Pipeline

11:30
IPC2016-64250, The Effect of Corrosion Growth Model Assumptions on the Reliability Estimates of Corroded Pipelines
M. Dann, University of Calgary, L. Huse,
Chevron Energy Technology Company

Session 7-1-4: Risk Assessment
Session Chair: James Mihell, Dynamic Risk Assessment Systems
Room: TELUS MacLeod E4
Date: Thursday, September 29
Time: 13:30 - 16:30

13:30
IPC2016-64128, Utilizing Modern Data and Technologies for Pipeline Risk Assessment
D. Mangold, Integrity Plus, R. Huntley, Integrity Plus

14:00
IPC2016-64376, Calculation of Additional Risk of Wind Turbines Near Pipelines or Facilities
R. Coster, M. Middel, DNV GL, M. Drige,
N.V. Nederlandse Gasunie

14:30
IPC2016-64635, Improving Safety through Engineering Assessments for Change in Location Class
S. Kanyawasam, TransCanada Pipelines, M. Al-Amin,
H. Wang, TransCanada Pipelines

15:30
IPC2016-64638, Optimizing Preventative and Mitigative Measure Selection
J. Lackay, DNV GL, K. Vanderlee, R. Jewell, AGL Resources,
T. Alfano, DNV GL

16:00
IPC2016-64580, Implementing a Quantitative Geohazard Frequency Analysis Framework as a Component of Risk Assessment of New Pipelines
A. Baungard, BGC Engineering Inc., M. Beaupre,
BGC Engineering Inc., M. Leir, BGC Engineering Inc.
Session 7-1-5: Risk Management & Acceptance Criteria

Session Chair: Shahani Kariyawasam, TransCanada Pipelines
Session Co-Chair: Danielle Demers, Danielle Demers Consulting
Room: TELUS MacLeod E4
Date: Wednesday, September 28
Time: 09:00 - 11:30

09:00
IP2016-64356, Critical Review of Risk Criteria for Natural Gas Pipelines
A. Tomic, TransCanada Pipelines; S. Kariyawasam, TransCanada Pipelines

09:30
IP2016-64425, Towards An Acceptable Pipeline Integrity Target Reliability
S. Hassanien, Enbridge Liquids Pipeline; L. LeBlanc, Enbridge Pipelines Inc.; A. Nemeth, Enbridge Pipelines Inc.

10:30
IP2016-64173, Risk Profiling for the Pipeline Industry: Application of Best Practices from the Aviation Industry
L. Harron, Enbridge Liquid Pipelines; K. Turner, Aerospace Risk Management

11:00
IP2016-64700, Transitioning a Relative Risk Model to Absolute
J. Murray, Williams

Technical Tracks

Track 8: Northern Offshore & Production Pipelines

Track Chair: Shawn Kenny, Carleton University, Department of Civil and Environmental Engineering and Design
Track Co-Chair: Ken Macdonald, Department of Structural Engineering, University of Stavanger
Track Sponsor: Thumber Engineering Ltd

Topic 8-1: Northern Offshore & Production Pipelines

Session 8-1-1: Flow Assurance

Session Chair: Ken Macdonald, Statoil ASA
Room: TELUS Glen 206/209
Date: Tuesday, September 27
Time: 10:30 - 12:00

10:30
IP2016-64296, Viscosity Variation of Ice Suspensions Formed from Water-In-Oil Emulsions
H. Zheng, Q. Huang, W. Wang, China University of Petroleum Beijing

The Calgary Pipeline Award

IBP and IPC have a reciprocal arrangement and the best paper (and winner of the Calgary Award) at IBP 2015 in Rio was authored by Daniella R. Pissanti, Filip Kroetz, Luciano M. Santana, Atho O. da Costa, Luis F. Kanri, Fabiana Matelí, Giovoni Dalpiaz, Teilo R. Strohaecker, and Marianna Chludzinski.

Their paper, entitled “Development of a Friction Welding Machine for Pipes with Rotary Ring and Evaluation of a Stainless Steel Duplex UNS32205 Pipe Weld Joint” will be presented by Daniela R. Pissanti at 1:30 PM on Thursday September 29, 2016.

Abstract

The Oil and Gas industry needs efficient and economical transportation of their products. In this context, transport through pipeline is a viable and effective alternative. A concern for the pipeline construction is the union of the pipe segments by arc welding, because it may decrease mechanical properties and corrosion resistance. Friction welding is a method of joining metals in which there is no fusion of them, providing less microstructural modification and better mechanical and corrosion properties. A type of friction welding of pipes is performed by rotating an intermediate ring between two pipes which are forced against the ring. This friction generated by the contact is responsible for generation of heat, which together with the pressure of the pipe against the ring, promotes the joining of components. In the present study, friction welding of Duplex Stainless Steel UNS 32205 pipes was performed. These welds were executed to analyze the quality of the weld and the repeatability of the process. Tensile and hardness tests, phases proportion and the presence of intermetallic compounds were analyzed. All tests performed attended the international standards and were not observed any feature could compromise the weld quality. Thus, it is possible to imply that the friction welding is a viable alternative for pipeline construction with advanced materials such as Duplex Stainless Steel.

ASME Pipeline Systems Division Best Paper Award (The Rio Pipeline Award)

The IPC 2016 will carry the tradition started in 2002, when the Pipeline Systems Division (PSD) introduced the Rio Pipeline Award to honour the best paper presented at the International Pipeline Conference (IPC). Selected from among all papers presented during the IPC 2016 technical sessions, the winner shall receive the Rio Pipeline Award at the final luncheon of the Conference on Friday September 30, 2016.

Apart from gaining recognition of having authored the best paper, the PSD has agreed to provide airfare and expenses for the winning author to present his/her paper at the Rio Pipeline Conference & Exposition sponsored by the Brazilian Petroleum Institute (IBP) in Rio de Janeiro in Fall 2017.

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Special / Panel Sessions

Special Sessions: David J. Horsley Distinguished Lecture Series
Room: TELUS Macleod Hall D
Date: Wednesday, September 28
Time: 13:45 – 15:00

Purpose:
To recognize the technical contributions of individuals that have stood the test of time.

Background
The goal of the Distinguished Lecture Series is to present technical content that was produced over the past several decades that have provided a foundation for modern pipeline technology.

IPC is proud to present the Distinguished Lecture Series in honor of David J. Horsley to recognize his significant technical contribution to the pipeline industry. Mr. Horsley has been a significant contributor to the International Pipeline Conference as an author, track chair, and Technical Committee Chairman. He is also a contributor to many industry organizations such as API, ASME, CSA, EWI, PRCI, and others. Mr. Horsley will be presenting a lecture summarizing some of his IPC contributions in line with the conference theme of Leading and Innovating.

Panel Presenters
Panel Facilitator:
• Taylor Shie, Shell Oil Company

Special Session: Executive Panel
Room: TELUS Macleod Hall D
Date: Wednesday, September 28
Time: 15:30 - 17:30

Background:
As part of this panel session, the focus will be around how organizations can change the mindset of incremental improvements to a culture that is focused on disruptive innovation.

The purpose of the Executive Panel Session is to provide the IPC Delegates with an opportunity to engage in an open dialogue with Senior Executives actively engaged in aspects of the pipeline industry. In addition, this Executive Panel Session further demonstrates the commitment by industry leadership to promote knowledge sharing that will help to reduce pipeline failures and increase the safe and economic reliability of our very important pipeline infrastructure.

The theme for IPC 2016 is Leading and Innovating so this Executive Panel Session will be in alignment with this theme.

Panel Presenters
Panel Facilitators:
• 2016 IPC Conference Chair Patrick H. Vieth, Senior Vice President, Technical Services - Dynamic Risk
• Chris Yoxall, Vice President - ROSEN USA, Mexico & Central America

Panel Participants
• Milton Altenberg, Founder & Chairman - Quest Integrity Group, a Team Industrial Services company, CEO - Quest Integrated (QI2)
• Jason Sharpe, Senior Vice President & General Manager - ATCO Pipelines
• Ken Paulson, Executive Vice President, Chief Operating Officer - BC Oil and Gas Commission
• Chris Bloomer, President and CEO - Canadian Energy Pipeline Association (CEPA)
• Honorable Christopher A. Hart, Chairman - National Transportation Safety Board (NTSB)
• Walter Kresic, Vice President of Pipeline Integrity - Enbridge Pipelines Inc.

Panel 1: Pipeline Lifecycle Integrity Assurance
Room: TELUS Glen 201/202
Date: Monday, September 26, 2016
Time: 08:00 - 11:30

Panel Presenters
• Mark Yeomans, VP - TransCanada
• Walter Kresic, VP Pipeline Integrity - Enbridge Pipelines Inc.
• Hugh Hardon, VP Operations, Engineering and EHS - Kinder Morgan Canada
• Richard Jensen, Executive Vice President of Operations of Plains - Midstream Canada

Moderators
• Keith Leewis - Independent
• Chuong Ngo - TransCanada Pipelines

Description:
Infrastructure age is not the only consideration in asset performance, other factors such as original design, construction, maintenance, and operational practices can have an equal, or greater, influence. Through public discourse, it has become clear that one of the prevalent misconceptions is that aging infrastructure is an issue. In reality, pipeline operators must assure integrity throughout the lifecycle of an asset. This panel will discuss:
• Advancements in pipeline integrity throughout the years through regulatory involvement, industry lessons learned and regulatory commitments on new projects
• Areas in industry where significant pipeline integrity challenges remain
• Leadership in the areas of prevention, monitoring and mitigation to achieve high performance
Panel 1: Innovation as a Mechanism for Redefining Industry Leadership

Room: TELUS Glen 206
Date: Monday, September 26, 2016
Time: 08:00 – 11:30

Panel Presenters
• Rania Gani, President, Coronation Capital
• Rhettwich Best, President, Nepean Engineering
• Roisín Fegan, Senior Director, BNP Paribas

Description:
The finance community’s role in the redefinition of the oil sands industry can provide valuable lessons for the oil sands industry in terms of communicating complex technical concepts to a broader stakeholder group. This panel will discuss:
• How the role of finance can lead to improved communication
• The impact of culture on financial transactions
• The importance of transparency and communication in business decisions

Moderators
• Lisa Fuhr, President - AXIOM Consulting
• Todd Park, President - Energo Consulting

Panel 2: Innovation as a Mechanism for Redefining Industry Leadership

Room: TELUS Glen 206
Date: Monday, September 26, 2016
Time: 13:15 – 16:45

Panel Presenters
• Amanulla Khan, Senior Manager, Integrated Projects - Suncor Energy
• Brian Wagi, Vice-President, Business Development - Precision Services

Description:
The financial sector needs to learn from other industries in terms of improving stakeholder relations; however, there is currently no single spokesperson for the industry. There is an opportunity to improve the communication and demonstrate leadership, how we come up with a “single voice” external to the industry, opportunities for demonstrating leadership through effective use of management systems, and industry performance measures being used as a mechanism for aligning efforts and messaging.

Moderators
• Alain Colquin, BSc, Ph.D, Professional Leader/Chief Engineer - NEB


Room: TELUS Glen 201/202
Date: Monday, September 26, 2016
Time: 13:15 – 16:45

Panel Presenters
• Kim Hamill, Senior Communications Advisor, Digital Communications - CEPA
• Dr. Phil Hopkins, Principal - Phil Hopkins Ltd.
• Shawn Howard, Business Unit Communications - TransCanada
• Jennifer Sowa, Libraries and Cultural Resources - University of Calgary (former CBC TV reporter and anchor)
• John Carlson, Head of Sproule Academy, Sproule

Description:
In light of recent public relations challenges, a significant number of organizations (industry groups, individual corporations) have ramped up efforts in terms of improving stakeholder relations; however, there is currently no single spokesperson for the industry. There is an opportunity to improve the communication and demonstrate leadership, the challenge becomes, how do we come up with a single industry voice? This panel will discuss:
• Challenges of providing a “single voice” external to the industry
• Opportunities for demonstrating leadership through effective use of management systems
• Industry performance measures being used as a mechanism for aligning efforts and messaging

Moderators
• Iain Colquhoun, BSc, Ph.D, Professional Leader/Chief Engineer - NEB


Room: TELUS Glen 206
Date: Monday, September 26, 2016
Time: 13:15 – 16:45

Panel Presenters
• Gandeephan Ganeshalingam, Innovation Leader - GE
• Steve Koles, President and CED - Hifi Engineering
• Nick Tzonev, CEO - Sycor Controls and Automation
• Gary Littlestar - SmartPipe Company Canada Ltd.
• Robert Smith, R&D Manager - Pipeline and Hazardous Materials Safety Administration
• Brian Wagi, Director, Business Development and Planning - C-FER Technologies

Description:
In light of recent public relations challenges, a significant number of organizations (industry groups, individual corporations) have ramped up efforts in terms of improving stakeholder relations; however, there is currently no single spokesperson for the industry. There is an opportunity to improve the communication and demonstrate leadership, how we come up with a “single voice” external to the industry, opportunities for demonstrating leadership through effective use of management systems, and industry performance measures being used as a mechanism for aligning efforts and messaging.

Moderators
• Heather Campbell, Regional Director - Sustainable Development Technology Canada (SDTC)

Panel 5: Environmental Factors Influencing Pipeline Design

Room: TELUS Glen 208/209
Date: Monday, September 26, 2016
Time: 13:15 – 16:45

Panel Presenters
• Paul Anderson, EVP, Canada Country Manager - RPS Energy, Canada
• Robert Steedman, Professional Leader / Chief Environment Officer - NEB
• Jason Smith, Vice-President, Client Services - CH2M
• Terri-Lee Oleniuk, Partner - Osler, Hoskin & Harcourt LLP

Description:
With environmental considerations at the forefront of the global psyche (e.g. climate change, water quality etc.), it is timely to consider the impact of the environment and how to address these challenges in the context of new pipeline construction. This panel explores the broad range of viewpoints on the environment as it relates to pipeline projects through discussion of a number of topics and perspectives that may include:
• NGO’s and their perspective on a sustainable approach
• The current environmental review process
• Expected changes with the change in government
• Challenges in the environmental review process (Operator’s perspective)
• Balancing the environmental concerns with the realities / economics of pipeline projects

Moderators
• Joe Muraca, Partner and Environmental Planner - Dillon Consulting
• Jennifer Petruniak, Associate and Biologist - Dillon Consulting

Tutorials
Monday, September 26, Full Day Tutorials
Time: 08:00 – 17:00

Tutorial #1: Pipeline Integrity Evaluations & Engineering Assessments
Presenter: Andrew Cosham, Ninth Planet Engineering Limited
Room: Hyatt Imperial Ballroom 6
Description:
An introduction to the assessment of defects in pipelines. Defect types will be discussed, with emphasis on their potential to result in failure. The background to the commonly applied defect assessment methods will be presented, ranging from simple, quick assessments, to more detailed ‘fitness-for-purpose’ analyses.
• Introduction to pipeline defects, and why pipelines fail
• Fundamental pipeline defect failure relationships
• How to assess corrosion defects
• How to assess gouges and dents
• How to assess weld defects
• Pipeline integrity

Tutorial #2: Fracture Mechanics
Presenter: Carl Jaske, DNV GL;
Tom Bubenik, DNV GL;
Steven Polaski, DNV GL
Room: Hyatt Imperial Ballroom 4
Description:
An overview of fracture mechanics principles including:
• Basic materials properties and their application to design
• Linear elastic fracture mechanics
• Elastic-plastic fracture mechanics
• Fracture-toughness testing
• Fracture behavior of steels
• Fatigue crack growth
Tutorials

**Tutorial #3: Pipeline Materials 101**
*Presenter: Stephen Rapp, Spectra Energy*
*Room: Hyatt Neilson 2*

**Description:**
An overview of the mechanical properties of pipeline materials and how they relate to pipeline integrity:

1) **Vintage Materials**
- Historical Overview of Manufacturing Processes
- Chronology of API 5L
- US Regulatory Advisory Notices of Vintage Pipe (Liquids/Gas)
- Current Industry Activities With Respect to Vintage Pipelines
- Chronology of Field Joining Practices

2) **Modern Materials**
- Overview of applicable specifications
- Pipeline Materials Selection and Design
- Responsible Procurement Practices, Legacy Problems
- Purchasing Specification Enhancements

**Tutorial #4: An Engineering Overview of Off-Shore Pipeline Design**
*Presenters: Mark Marley, DNV GL; Ken Macdonald, Statoil/UiS*
*Room: Hyatt Walker*

**Description:**
An overview of offshore pipeline engineering. Topics include:

- Risk-based design principles
- Review of design codes
- Load calculation and limit state design
- Pipeline materials, welding and corrosion protection
- Offshore pipeline construction: lay barge, reeling, tow, trenching and burial
- On-bottom stability and span assessment and correction
- Undersea/planar buckling
- Operation, inspection, requalification and repair

**Tutorial #5: Pipeline Design & Construction**
*Presenters: Alan Murray, Principia Consulting*
*Room: Hyatt Imperial Ballroom 2*

**Description:**
Overview of the following fundamentals:

- Hydraulic design considerations for gas, liquid and two phase systems
- Route selection, water crossings and geotechnical issues
- Criteria for materials and coating selection
- Design loads on buried pipe

**Tutorial #6: Geohazard Concerns in Pipeline Design & Operation**
*Presenters: Alex Baumgard, BGC Engineering; Mark Leir, BGC Engineering*
*Room: Hyatt Stephen*

**Description:**
The purpose of this workshop is to emphasize the importance of identifying and managing the impact of geohazards, such as landslides and river erosion on pipeline feasibility and operations. This course is intended for engineers and project managers involved in pipeline routing, design, and operations and pipeline integrity. Major themes will include:

- Introduction to geohazards
- The significance of geohazards on pipeline integrity
- Pipeline regulations concerning geohazards
- How to identify and avoid geohazards
- How to prioritize and manage geohazards
- Monitoring Strategies — Determining when to monitor a site
- Mitigation Strategies — How to protect the pipeline against geohazards

**Tutorial #7: Management of Interactive Threats**
*Presenter: Jenny Been, IRISNDT*
*Room: Hyatt Imperial Ballroom 3*

**Description:**

**Session 1: Threat Identification**
- 08:00 – 08:10: Introduction
- 08:10 – 08:40: Screening for Interacting Threats with Multiple ILI Tools
- Paul Huddleston, Kinder Morgan Canada
- Discuss company experience screening for interactive threats on pipeline segments inspected with multiple tool technologies. Our main success has been related primarily to shallow dents.
- 08:40 – 09:00: Threat Description, Influencing Factors, Threat Interaction, Threat Level
- Jenny Been — IRISNDT
- 09:00 – 09:30: Root Cause Analysis of Upstream Failures with Interacting Threats
- Jenny Been — IRISNDT
- Identification of the dominant threats and impact on threat management strategies

**Session 2: Threat Assessment of Individual and Interactive Threats**
- 10:00 – 10:30: Direct Assessment and Above-Ground Inspections, Data Alignment
- Shamus McDonnell, PureHM
- Alignment of coating defects with ILI features using tight GPS. Examples of industry threat management and PHM System examples of data integration.
- 10:30 – 11:00: Operator Experience in Identifying and Managing Interactive Threats
- Aaron Dmochowicz, BMT Fleet Technology Ltd.
- Management of the risk of potential interactive threats through data alignment as well as testing and technology development programs with BMT Fleet Technology and Blade Energy Partners through PRCI.
- 11:00 – 11:25: In-line Inspection for Individual and Interactive Threats
- Mike Nisio, ROSEN Canada Ltd.
- Management of the risk of potential interactive threats through data alignment as well as testing and technology development programs with BMT Fleet Technology and Blade Energy Partners through PRCI.
- 11:25 – 11:50: Multiple datasets for the assessment of interacting threats
- Chuck Harris
- Overcoming individual technology limitations. Mechanical damage and crack assessment case studies

**Session 3: Threat Assessment of Individual and Interactive Threats — continued**
- 13:15 – 13:45: In-Line Inspection Case Studies of Interactive Threats
- Alexiaar Clyne, ROSEN
- ILI Experiences with Interactive Threats
- 13:45 – 14:15: Identification of Interacting Threats
- Saheed Akoroki, Enbridge Pipelines Inc.
- Use of data alignment and assessment in the management of interactive threats
- 14:15 – 14:45: Composite Reinforcement Solution to Interactive or Changing Threats
- Richard Kenia, TransCanada Pipelines
- Chris Alexander, Stress Engineering Services
- The use of full-scale testing and FEA to provide design guidance for composite reinforcement of large-diameter elbows in service pipelines

**Session 4: Risk Management / Panel Discussion:**
- 15:15 – 15:45: Assessment of Risk and Management of Risk
- Hong Wang, National Energy Board
- Considerations of threat interaction in the risk assessment and risk management process
- 15:45 – 17:00: Panel Discussion
- This panel will discuss the challenges presented by the interaction of threats, their identification, the risks they present, how to monitor them, and when and how to mitigate.
- Lessons learned, industry direction, and regulatory involvement

**Tutorial #8: Pipeline Risk Management**
*Presenters: Mark Stephens, C-FER Technologies; Jim Miheli, Dynamic Risk*
*Room: Hyatt Doll*

**Description:**
Introduction to pipeline risk management with a focus on:

- Hazard and threat identification
- Determination of acceptable levels of risk
- Risk control
- Available tools for risk analysis (RA)
- Case studies on practical applications of RA in industry

**Tutorial #9: Management Systems for Pipelines**
*Presenter: Jake Abes, DNV GL*
*Room: Hyatt Neilson 1*

**Description:**
Recent incidents in the pipeline industry have led to increased interest in safety management systems as a means of improving safety performance. A safety management system provides a framework for a systematic, comprehensive approach to the management of safety based on the proactive identification of hazards and the analysis and control of risk. The tutorial will address the rationale for adopting safety management systems, an overview of the core elements of a safety management system; and guidelines for the development and implementation of effective safety management systems. The tutorial will be of benefit to those who require a basic understanding of safety management systems, as well as those who may be involved in the development and implementation a safety management system.
Monday, September 26, Half Day Tutorials Morning Sessions

**Tutorial #10: External Corrosion Basics**
*Presenters: Robert Worthingham, Worthingham Professional Services Inc.*
*Room: Hyatt Herald*
*Description:* This tutorial will discuss the primary methods of external corrosion control for pipelines. A brief summary of the science of external corrosion will be provided followed by theory and practical aspects of pipeline coatings and cathodic protection. Both plant and field applied coating application concepts will be discussed. Conventional impressed current cathodic protection systems and associated monitoring will be presented.

**Tutorial #11: Pipeline Assessment Methods: Selection of Appropriate Technology on a Threat by Threat Basis**
*Presenter: Tom Bubenik, DNV GL*
*Room: Hyatt Imperial Ballroom 1*
*Description:* This tutorial would discuss the appropriate assessment techniques on a threat by threat basis. This would primarily include an overview of ILI, direct assessment, and hydrostatic testing. Emphasis on the pros and cons of each method would be discussed.

**Tutorial #12: Pipeline Maintenance Welding**
*Presenter: Bill Bruce, DNV GL*
*Room: Hyatt Bannerman*
*Description:* Topics to be discussed include:
- In-Service Welding
- Burnthrough and Safety Related Concerns
- Hydrogen Cracking Concerns
- Full-Encirclement Repair Sleeves
- Hot Taps Branch Connections
- Simple Approach to Hot Tap and Repair Sleeve Welding

Monday, September 26, Half Day Tutorials Afternoon Sessions

**Tutorial #13: Internal Corrosion & Solids Management**
*Presenter: Trevor Place; Jerry Bauman, Canadian Natural Resources Limited*
*Room: Hyatt Herald*
*Description:* This tutorial will discuss the primary methods of internal corrosion control for pipelines. A brief summary of the science of internal corrosion will be provided followed by theory and practical aspects of pipeline coatings and cathodic protection. Both plant and field applied coating application concepts will be discussed. Conventional impressed current cathodic protection systems and associated monitoring will be presented.

**Tutorial #14: Pipeline In-line Inspection—Validation & Use of Results**
*Presenters: Keith Leewis, Leewis and Associates; Phillip Nidd, Dynamic Risk USA*
*Room: Hyatt Imperial Ballroom 1*
*Description:* This tutorial will address what companies need to do after the data is received from the ILI vendor. The checks that should be done to determine whether the inspections meet the contractual quality communicated by the vendor (ex. +10%, 90% of the time). In addition to the analysis of reporting quality, the session will also discuss how to use tool tolerance in making decisions based on tool data (ex. Re-inspection intervals). Issues such as probability of detection and probability of indication will also be covered.

**Tutorial #15: Social Considerations in Design & Operation of Compressor Stations**
*Presenter: Tom Van Hardeveld, Strategic Maintenance Solutions*
*Room: Hyatt Bannerman*
*Description:* The world of compression design continues to change with new challenges related to lower environmental footprint, fuel flexibility, higher efficiency and more remote and challenging locations. Proper design and consideration of process safety and environmental aspects are now essential in order to obtain the social license that pipeline companies need to be successful. This tutorial provides an introduction to compressor design and selection related to these new challenges by covering topics including:
- Modern design of pipeline compressors, including centrifugal, reciprocating and screw compressors
- Options for drivers including gas turbines, electric motors and engines
- Performance characteristics for different driver and driven equipment combinations
- Selection criteria for compressors and drivers
- Process safety considerations for compressor stations
- Impact of environmental and public issues

Wednesday, September 28, Half Day Afternoon Sessions

**Tutorial #16: Pipeline Stress Analysis**
*Presenter: Robert Thom, Stress Engineering; Darryl Stayko, Stress Engineering*
*Room: Hyatt Herald/Doll*
*Description:* This session will focus on the theoretical and practical aspects of piping stress analysis. Topics to be covered include pipeline monitoring and analysis related to surface loading and geotechnical concerns.

**Tutorial #17: Recommended Practices for Pipeline Repair**
*Presenter: Robert Smyth, PetroSleeve*
*Room: Hyatt Walker/Bannerman*
*Description:* Discussion on pipeline integrity issues, repair and new technologies with a focus on:
- Protocols
- Defect descriptions
- Defect analysis
- Safety
- Repair Methods
- New Advancements
- Codes & Standards

**Tutorial #18: Facilities Integrity Management**
*Presenter: Terri Funk, Axiom Integrity Engineering Solutions*
*Room: Hyatt Neilson 1*
*Description:* Managing Facility Integrity. Topics to be discussed include:
- Risk management
- Integrity planning
- Maintenance optimization

**Tutorial #19: Root Cause Analysis of Pipeline Failures**
*Presenter: Phillip Nidd, Dynamic Risk; Monica Porter, Dynamic Risk*
*Room: Hyatt Stephen*
*Description:* The objective of a Root Cause Analysis (RCA) is to determine the direct cause and root cause(s) of an unexpected event (such as a pipeline operational failure or product release), identify the contributing factors, and provide recommendations that when implemented, will be effective in preventing recurrence of this type of failure. This tutorial will describe many of the different tools, processes, and philosophies for performing a complete RCA. Discussed is how the application of such industry tools as TapRooT, MORT, PAS 55 during the RCA process, can provide consistency and reliability in defining best practice benchmarks. The benefit of an effective RCA applied as a learning tool and as a key element within a Management System continuous improvement process is also discussed.