## CONTENTS

### VOLUME I

#### PART A — RISK ASSESSMENT AND MANAGEMENT

##### Risk Modelling

- The Development of the Pipesafe Risk Assessment Package for Gas Transmission Pipelines  
  *Michael R. Acton, Phil J. Baldwin, Tim R. Baldwin, and Eric E. R. Jager*  
  Page 1

- Risk Management at TransCanada Pipelines  
  *Kevin Cicansky and Glenn Yuen*  
  Page 9

- Relative Risk Assessment - The Competitive Advantage  
  *Bruce D. Beighle and Mike P. Gloven*  
  Page 15

- Risk Assessment of Gas Transmission Pipelines in Mexico  
  *Jose L. Martinez, Héctor G. Alcerreca, Enrique Rodríguez B., and Jesus Hernandez*  
  Page 29

##### Risk Management

- Safe Separation Distances: Natural Gas Transmission Pipeline Incidents  
  *Eugene Golub, Joshua Greenfeld, Robert Dresnack, F. H. Griffis, and Louis Pignataro*  
  Page 37

- Progress of the US Department of Transportation Risk Management as a Regulatory Alternative  
  *Keith G. Lewis and Terri Shires*  
  Page 41

- Geologic Hazards Reconnaissance and Mitigation, and Implications to Natural Gas Pipeline Operations and Risk Management  
  *Jill Braun, Graeme Major, Michal Bukovansky, and Donald O. West*  
  Page 47

#### PART B — EMERGING ISSUES AND INNOVATIVE PROJECTS

##### Global Projects and Trends

- Natural Gas Transmission Opening Trade in Mexico: Energy and Environmental Benefits  
  *Rene Perez Polanco and Enrique Rodriguez Betancourt*  
  Page 59

- Preparing for New Modes of Pipeline Operation in the People's Republic of China  
  *Chang Dahai and Andrew Wike*  
  Page 67

- Colombian Crude Export System Begins Full Operation  
  *Ken M. Topolinsky and German D. Ordoñez R.*  
  Page 75

##### Technology Trends

- The Alliance Pipeline - A Design Shift in Long Distance Gas Transmission  
  *Todd S. Janzen and W. Norval Horner*  
  Page 83

- Technology Management Renewal at Nova Gas Transmission  
  *Randy C. Cormier and David V. Dorling*  
  Page 89

- Route Selection for Project Success: Addressing "Feeling/Perception" Issues  
  *M. Mohitpour, G. Von Bassenheim and Ardean Braun*  
  Page 95

- Dual-Purpose Fibre Optic System Providing Simultaneous, Real-Time Communications and Distributed Vibration Sensing for Pipeline Applications  
  *E. Tapanes*  
  Page 103

- Countdown to the Year 2000  
  *Vernon W. Bachor*  
  Page 111
**PART C — OPERATIONS AND MAINTENANCE**

**Operations**

- An Innovative Approach to Pipeline Isolation and Monitoring  
  *D. D. Savard* .......................................................... 117

- Pipeline Isolation Tool  
  *David R. Jones, Andre Cooman, John Dyck, Gerry Flatekval, and Horst Gotowik* .................................................. 121

- Multi-Product Pipelines - Western Canadian Experience  
  *Judy S. Baum, Larry I. Hansen, Colin A. Brown, and Ken E. Marzocco* .......................................................... 127

- Safe Pig Trap Loading and Unloading: An Interlocking Perspective  
  *Mike (M. J.) Smith* .................................................... 139

- Use of Surface Pipeline Segments to Mitigate Slide Problems on the Fort Nelson Natural Gas Mainline  
  *Drummond S. Cavers and Edward A. McClarty* .................. 151

- Pipeline Exposure at River Crossings: Causes and Cures  
  *Les F. Sawatsky, Michael J. Bender and Dejiang Long* .......... 159

**Repair and Maintenance Processes**

- Pipeline Integrity Assessment and Rehabilitation Personnel Training and Certification  
  *P. G. Nidd, W.L. Stewart and M. P. Winspear* ................. 165

- Floating-Roof Tank Heel Reduction Options and Heel Turnover Emissions  
  *Terry A. Gallagher, Christian R. Desjardins, and Royce J. Laverman* .......................................................... 173

- Maintenance Plan for 1956 Vintage Storage Tank Facility  
  *Brian S. Buck and Thomas W. Fridel* ............................. 189

**Repair and Maintenance Innovations**

- Can Advanced Repair and Maintenance Technologies Prevent Machines From Failing?  
  *James R. Mugford* .................................................... 195

- Reengineering Maintenance for Dependability  
  *Daniel J. Risdon and Thomas Van Hardeveld* .................... 205

- Application of the Quartz Crystal Microbalance to Corrosion Investigation  
  *Heijan Sun, John C. Donini, Kirk H. Michaelian, Sankara Papavinasam, and R. Winston Revie* .................................. 215

- Inhibitor Selection for Internal Corrosion Control of Pipelines  
  *S. Papavinasam and R. W. Revie* ................................ 225

- Repairing Pipe Defects (Cracking, Arc Burns, Corrosion, Dents) Without Operational Outages Using the Petrosleeve Compression Sleeve Repair Technique  
  *Robert J. Smyth* ..................................................... 231

**Operational Innovations**

- Pipeline Information Control System Overview  
  *G. W. Wengreniuk* ................................................... 241

- Environmental Management and Emergency Response Planning for Pipelines Using Geomatics Technologies  
  *David S. Kerr, M. Diane Thompson, Jill S. Hebb, Justin A.M. McPherson, David Morris, Roy Barrett, and Jim C. Thompson* .......... 249

**PART D — CORROSION AND INTEGRITY MANAGEMENT**

**Defect Assessment: Mechanical Damage**

- Strain-Based Failure Criteria For Sharp Part-Wall Defects in Pipelines  
  *Aaron S. Dinovitzer, Brian A. Graville, and Alan G. Glover* ..... 255
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue Damage Calculations for a Dented and Ovalled Section of the TransAlaska Pipeline System at Thompson Pass</td>
<td>263</td>
</tr>
<tr>
<td>James D. Hart, Graham H. Powell, James A. Maple, Glen R. Stevick, and J. David Norton</td>
<td></td>
</tr>
<tr>
<td>Fatigue Curves for Damage Calculations for a Dented and Ovalled Section of the TransAlaska Pipeline System</td>
<td>273</td>
</tr>
<tr>
<td>Glen R. Stevick, James D. Hart, and Bill Flanders</td>
<td></td>
</tr>
<tr>
<td>TransAlaska Pipeline System Linewide Slackline Investigations for Potential Pipe Vibrations</td>
<td>279</td>
</tr>
<tr>
<td>W. G. Tonkins, U. J. Baskurt, and James D. Hart</td>
<td></td>
</tr>
<tr>
<td>Fatigue Behavior of Line Pipes Subjected to Severe Mechanical Damage</td>
<td>291</td>
</tr>
<tr>
<td>Naoto Hagiwara and Noritake Oguchi</td>
<td></td>
</tr>
<tr>
<td>Investigations of Dent Rerounding Behavior</td>
<td>299</td>
</tr>
<tr>
<td>Michael J. Rosenfeld</td>
<td></td>
</tr>
<tr>
<td>Inspection External</td>
<td></td>
</tr>
<tr>
<td>Non-Destructive Techniques for Measurement and Assessment of Corrosion Damage on Pipelines</td>
<td>309</td>
</tr>
<tr>
<td>Richard Kania and L. Blair Carroll</td>
<td></td>
</tr>
<tr>
<td>Estimation of Measurement Errors</td>
<td>315</td>
</tr>
<tr>
<td>Arti Bhatia, N. S. Mangat, and Tom Morrison</td>
<td></td>
</tr>
<tr>
<td>EMAT Generation of Horizontally Polarized Guided Shear Waves for Ultrasonic Pipe Inspection</td>
<td>327</td>
</tr>
<tr>
<td>Julie Gauthier, Vasile Mustafa, Ahmad Chabbaz, and D. Robert Hay</td>
<td></td>
</tr>
<tr>
<td>An Automated ACFM Peak Detection Algorithm With Potential for Locating SCC Clusters on Transmission Pipelines</td>
<td>335</td>
</tr>
<tr>
<td>L. Blair Carroll, Craig C. Monahan, and Raymond G. Gosine</td>
<td></td>
</tr>
<tr>
<td>High-Temperature, High-Pressure Rotating Electrode System</td>
<td>341</td>
</tr>
<tr>
<td>S. Papavinasam and R. W. Revie</td>
<td></td>
</tr>
<tr>
<td>Inspection Internal</td>
<td></td>
</tr>
<tr>
<td>Mechanical Development of a NPS 36 Speed Controlled Pipeline Corrosion Measurement Tool</td>
<td>351</td>
</tr>
<tr>
<td>Robert S. Evenson and Scott K. Jacobs</td>
<td></td>
</tr>
<tr>
<td>TCPL In-Line Inspection Management Program</td>
<td>357</td>
</tr>
<tr>
<td>Patrick H. Vieth, Reena Sahney, and Blaine Ashworth</td>
<td></td>
</tr>
<tr>
<td>The Operational Experience and Advantages of Using Speed Control Technology for Internal Inspection</td>
<td>367</td>
</tr>
<tr>
<td>Reena Sahney, Keith Grimes, and Tom Sawyer</td>
<td></td>
</tr>
<tr>
<td>NPS 8 Geopig: Inertial Measurement and Mechanical Caliper Technology</td>
<td>373</td>
</tr>
<tr>
<td>Phil Michailides and Todd Deis</td>
<td></td>
</tr>
<tr>
<td>The Changing Role of Inspection</td>
<td>379</td>
</tr>
<tr>
<td>Keith Grimes</td>
<td></td>
</tr>
<tr>
<td>Strain Estimation Using VTCO Deformation Tool Data</td>
<td>389</td>
</tr>
<tr>
<td>Michael J. Rosenfeld, Patrick C. Porter, and James A. Cox</td>
<td></td>
</tr>
<tr>
<td>Defect Assessment: Stress Corrosion Cracking</td>
<td></td>
</tr>
<tr>
<td>The Role Of Coatings in the Development of Corrosion and Stress Corrosion Cracking on Gas Transmission Pipelines</td>
<td>399</td>
</tr>
<tr>
<td>Martyn Wilmott, Brian Erno, Tom Jack, and Robert Worthingham</td>
<td></td>
</tr>
<tr>
<td>The Role of Pressure and Pressure Fluctuations in the Growth of Stress Corrosion Cracks in Line Pipe Steels</td>
<td>409</td>
</tr>
<tr>
<td>Martyn J. Wilmott and Robert L. Sutherby</td>
<td></td>
</tr>
</tbody>
</table>
Inspection: SCC/Cracks

The Canadian Energy Pipeline Association Stress Corrosion Cracking Database

Bruce R. Dupuis ................................................................. 589

Use of the Elastic Wave Tool to Located Cracks Along the DSAW Seam Welds in a 32-Inch (812.8-mm) OD Products Pipeline

Willard A. Maxey, Raymond E. Mesloh, and

John F. Kiefner ............................................................... 595

In-Line Inspection Tools for Crack Detection in Gas and Liquid Pipelines

H. H. Willems, O. A. Barbian, and N. I. Uzelac .......................................................... 605

Comparison Between In-Line Crack Detection and Hydrostatic Testing in IPL's Line 3

Michael A. Gardiner, Clive R. Ward, and

Susan E. Miller ............................................................... 613