Getting to Zero

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The Path to Zero

What will it take to get to zero?

People + Process + Technology = Zero Incidents

Continuous Improvement
Continuous Improvement - People

**Enhancing How Work is Performed**

**Human Factors**
- Learning from other industries (aviation, nuclear, petrochemical, medical)
- CSA EXP248 - *Pipeline Human Factors*
- Banff Pipeline Workshop Human Factors Working Group
- Pipeline Research Council International (PRCI) Human Factors roadmap and international collaboration

**Competency Enhancement**
- Industry standards (e.g. API 1163)
- PRCI NDE project

**Organization Specific**
- Knowledge transfer
- Human Factors focus area
- Beyond training programs
Continuous Improvement - Process

Beyond Minimum Standards

Codes, Standards and Regulations
- Management Systems (e.g. API 1173; NEB Performance Measures)
- Technical guidance enhancement (e.g. API 1176)
- PHMSA regulation enhancement
- Canadian Energy Pipeline Association (CEPA) Integrity First

Organization Specific
- Best Practice Analysis of Other Industries
- Reliability enhancement
- Integrity Targets
- Enhanced technology
- Enhanced analytics
Continuous Improvement - Technology

Collaborative R&D
- PRCI
- Joint Industry Partnerships (JIPs)
- Academic Research Support (e.g. NSERC projects)
- PHMSA R&D program

Organization Specific
- Crack ILI tool enhancement – next generation crack tool development
- R&D commitment/spend
- Blue Sky projects

Striving to continuously improve
How can we reach Zero?

**We Still Have More to Do**

**Industry Improvement**
- Greater level of collaboration
- Greater level of industry data sharing
- Greater transparency
- Better industry level measurement and evaluation

**Organization Specific**
- Human Factors - next level
- Technology Improvement and R&D – continuous activity
- Measurement of effectiveness of Continuous Improvement items