Attaining the Goal of Zero Incidents

Pipeline Safety Trust
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Opening Statements

• Integrity Management Programs are robust and continue to mature and evolve as the program is implemented, lessons are learned, and continuous improvement practices are developed
• All actions involve risk, and no action or operation is risk free
  • Zero is a Goal
  • 6σ
• The pipeline industry discovers and repairs far more injurious anomalies than those that lead to failure and loss of containment...
• ...but there is a recognition that we need to improve
Liquids Industry Performance & Trends

- 207,000 miles of pipeline – 33/33/33
- 52% reduction in ROW releases since 1999 – post-IMP performance
- Recent increasing trend for releases
  - Facilities releases (71%)
  - Increase in pipeline miles/facilities
- Release volumes are generally
  - Per mile release volume rates:
    - $\leq 5$ bbls: +27%
    - $\geq 50$ bbls: -12%
    - $\geq 500$ bbls: -32%
- 2015: only 5% >500 bbls
- 99.999% reliability ($6\sigma = 99.99966\%$)

All data taken from US DOT PHMSA web site
Commitment to Safety & Integrity

Liquids Industry Shared Pipeline Safety Principles*

Zero Incidents
Organization-wide commitment
Safety Culture
Continuous Improvement
Learn from Experience
Systems for Success
Employ Technology
Communication Stakeholders

Technology
- Inspection
- Assessment
- Data Systems & Data Integration

Processes
- Manuals
- Standards
- Training
- Plan-Do-Check-Act

People
- Office vs Field
- Contractors
- Aging Workforce

* 2016 API-AOPL ANNUAL LIQUIDS PIPELINE SAFETY PERFORMANCE REPORT & STRATEGIC PLAN
Taking Action to Get to Zero

People
• Understanding and managing human factors
• Next generation of pipeline professionals (YPP)
• Knowledge transfer and generational learning

Process
• Safety Management Systems – API RP 1173
• Recommended Practice for Assessment and Management of Cracking in Pipelines – API RP 1176
• Data Management and Integration Guideline – API TR 1178
• Guidelines for Use of Hydrostatic Testing as an Integrity Management Tool – API TR 1179
• Recommended Practice for Basic Inspection Requirements for New Pipeline Construction – API RP 1169
• Managing System Integrity for Hazardous Liquid Pipelines – API RP 1160*
• Recommended Practice for Managing Hydrotechnical Hazards for Pipelines Located Onshore or Within Coastal Zone Areas – API RP 1133*

* - currently being revised
Taking Action to Get to Zero

**Technology – Pipeline Inspection**

- Performance specifications are set following a defined process
- Manufactured vs. real-world
- Multiple & interacting threats and combinations of technologies
- Industry response and drive for improvements – PRCI TDC

**PRCI TDC – brings it all together**
- Access to many real-world features
- State-of-the-Art pull test facility
- CONTINUOUS IMPROVEMENT
Taking Action to Get to Zero

**Technology – Facilities Integrity**

- Different challenges, different risks
- PRCI and CEPA Initiatives
- Tracer Gas
- Corrosion Probes
- Identify new or alternative inspection technologies and approaches - **Fit for Purpose**
- Process Safety Management and Engineering Reliability
- Upgrades, new facility design

Photo courtesy Applus RTD

Photo from US DOT
Taking Action to Get to Zero

**Technology - Data**

Data Integration & Analytics
- Data Quality & Data Visualization
- Pipeline Operating Data
- Machine Learning and advanced algorithms and analytics – exploiting the data to the fullest extent
- BIG data and Next Generation Computing
- Cross-over technologies, other industries

Data Mining
- Leading Indicators (predictive capability?)
- Industry-wide data sharing and analysis
- Cross-industry data exchange & benchmarking

Data & Information Exchange
- Safety Tailgates
- Pipeline Information Exchange
- Incident Analysis and Root Cause Analysis
Conclusions and Closing Remarks

• Integrity Management Programs are robust and continue to mature and evolve – continuous improvement is truly continuous and never ends
• While the goal of zero may be attainable, it will take time to reach the goal

• **To Get to Zero, we need:**
  • Investment in people and optimizing and continuously improving the technologies and processes
  • Safety Culture
  • Innovation, new approaches, new technology
  • Data Mining and Advanced analytics
  • Industry Leaders & Leadership
  • Collaboration
BE SAFE!