

Hazardous Liquids Pipeline Industry R&D Priorities

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Liquids R&D Model

- Majority of Operators are direct members of PRCI or are represented indirectly via AOPL membership
- API Leadership and OTC assists AOPL with project prioritization

Liquids R&D Priorities

- Biofuels/Ethanol Transportation in Pipeline
- Pipe long seam issues (assessment and detection)
- Improved field measurement techniques for cracks

Liquids R&D Priorities (cont.)

- Fatigue analysis and prediction models of time to failure
- Facility integrity and plant piping
- Damage prevention technology; remote threat detection
- Enhanced leak detection

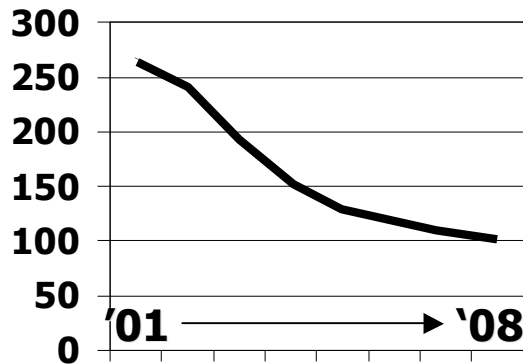
Biofuels/Ethanol

- Base Issues:
 - Impact on pipeline safety and integrity
 - Product quality impacts (impurities and cross contamination)
- PRCI SCC-4-3, -4 and -5
 - Moving ethanol safely in new and existing pipelines
- Biodiesel and other biofuels

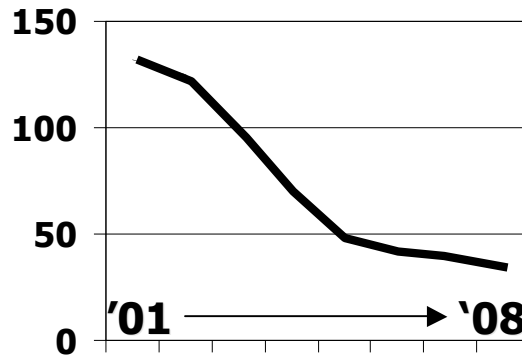
PPTS Onshore Pipe Incidents, '99-'08

3-Yr Average Ending Year Shown

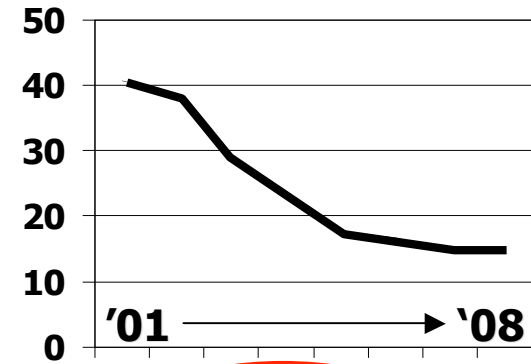
TOTAL, ALL CAUSES



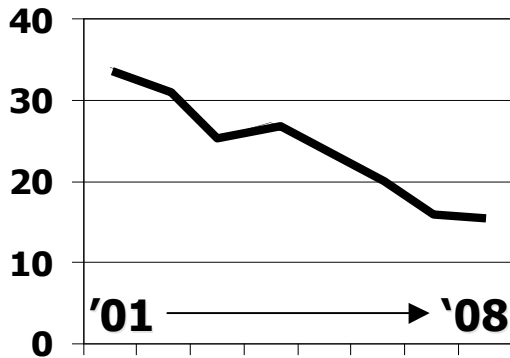
CORROSION



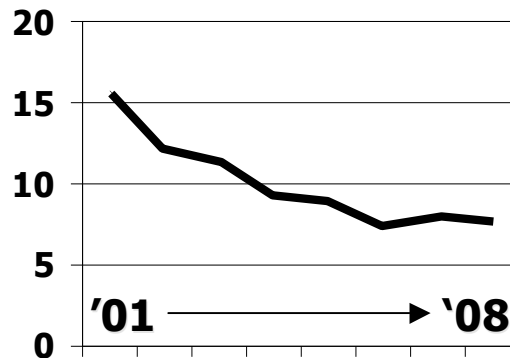
THIRD PARTY



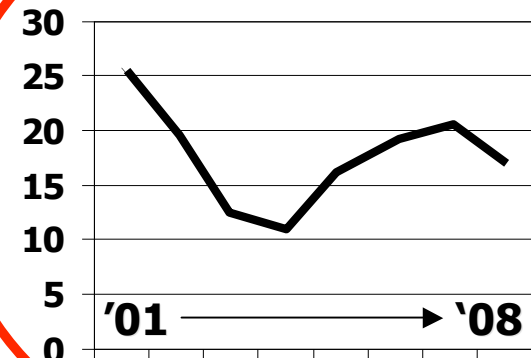
EQUIP./NON-PIPE



OPERATOR/OPER'N



MAT'L/SEAM/WELD



Long Seam Issues

- Reviewing PHMSA data
- Completed a survey seeking additional information from operators
- Better tools needed to detect anomalies and predict where they are likely to occur

Field Crack Analysis

- Continued need for:
 - More reliable detection tools
 - Better predictive tools
- Some companies taking a closer look at and getting better results with a different look at data integration
- Need for more analysis/sharing of these techniques

Seam Fatigue Analysis

- Need for better models for fatigue analysis
- Concept will be discussed during the Anomaly Detection and Characterization Session

Facility/Plant Piping

- API OTC conducted survey – 11 companies participated (57% PPTS mileage); 180 incidents
 - Results have been considered by work group (goes beyond OTC)
- Preliminary Findings:
 - Leaks from tubing and small piping – 52% of releases in survey
 - Drain Lines and Dead Legs at 22% and 16%
- Next Steps
 - Advisory with considerations from survey
 - Begin to look at pumps – R&D opportunity

2010 PRCI Research – Continuing Projects

- SCC-4-3 & 4-5: Requirements for New Ethanol Pipelines and Environmental Factors that Produce SCC
- Right-of-Way Automated Monitoring (RAM)
 - Multi-year commitment by industry in partnership w/NASA
 - A model PRCI approach for long term, significant R&D

2010 PRCI Research – New Projects

- Corrosion of the Long Seam Welds
- Fatigue Analysis Prediction Model
- Review and Develop Technologies to Monitor Station/Facility
- Best practices and technology to reduce the risk of directional drilling and boring operations

Other PRCI R&D of Note

- The preceding projects are those chosen for liquid pipeline emphasis through AOPL's PRCI subscription
- There are other R&D initiatives being addressed by individual Operators
- Examples include projects in the Compressor and Pump Station Arena:
 - Effect of Ethanol on Pump Stations
 - Pump Seal Leak Reductions at Unmanned Facilities
 - Variable Speed vs. Variable Frequency Drives

Questions?
