PHMSA R & D WORKSHOP

NYSEARCH
Technology Roadmapping

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Northeast GAS ASSOCIATION

WHY TECHNOLOGY ROADMAPPING?

- Need for coordinated and long term plan that provides a basis for technology and project selection
- Technology Innovation is increasingly important to industry
- Roadmaps, i.e. multi-layered graphical time-based charts, are flexible and can address a wide range of issues

PROCESS FOR ROADMAPPING BY TECHNOLOGY AREA

- Identify Needs
- Identify business level objectives (Critical system requirements)
- Consider different types of projects or program areas that qualify
- Establish available technologies and parallel efforts that address need
- Identify Technology Gaps
- Develop technical approach, solutions and timelines for proving solutions
- Consider on-ramps & off-ramps where one technology supercedes or replaces another
- Estimate resources needed to advance a particular Technology Gap

PHMSA R & D PROGRAM ELEMENTS (DEFINED BY PIPELINE INTEGRITY THREATS)

- Threat Prevention
- Leak Detection
- Anomaly Detection & Characterization
- Anomaly Remediation & Repair
- Design, Materials & Welding/Joining & Valves
- Alternate Fuels, Climate Change & Other

THREAT PREVENTION - PROGRAMS

- Areas of Work in Damage Prevention
  - Underground Sensing/Proactive Monitoring
  - Surveillance for Proactive Monitoring
  - Advanced Pipe Location
  - Sewer Lateral Location
  - Better Engineering/Locate Processes
  - Advanced Sensing on Excavating Equipment
  - Sensors directly on or near Pipe
- Recent Initiatives/Current Gaps/New Areas
  - Self-Healing Pipe
  - Economically-Viable Smart Pipe

LEAK DETECTION - PROGRAMS

- Leak Surveillance
  - Remote detection from Ground
  - Advanced Sensors for in-line and personal use i.e. smart nose
  - Remote detection from Air
  - High speed, sensitive detection technologies
- Odorization Issues
  - Odor Fade
  - Odor Masking
- Leak Pinpointing – Gaps/Needs
  - Advanced Sensors

ANOMALY DETECTION & CHARACTERIZATION - PROGRAMS

- External Corrosion
  - Remote Inspection using Advanced Sensors
  - Robotic Inspection using metal loss detection sensors
  - Expansion of Sizes for Inspection of Unpiggable Pipe
- Internal Corrosion
  - Cameras/Visual Inspection
  - MFL/RFEC metal loss detection using Unpiggable Pipe Robot
  - Expansion of Sizes for Inspection of Unpiggable Pipe
- Interacting Threats – several projects ongoing
- Dents/Gouges
  - Ovality Sensing/Optics
- Complex Defects (initiated by several – Gap/Need worthy of additional/follow-on R & D)
  - Cracks, Cracks in Welds, Seam Failures, SCC
- Overall Risk Assessments – Fitness-for-Purpose

ANOMALY REMEDIATION & REPAIR - PROGRAMS

- Repair Sleeves for PE Pipe (without system shutdown)
- Advanced Matls/Clockspring
- Composite Wraps
- Self – Healing Pipe (crossover with Threat Prevention)
- Gaps/Needs
  - New Methods of Pipe Renewal

DESIGN, MATLS & WELDING*/JOINING & VALVES - PROGRAMS

- Advanced Fusion Products
  - Non-Destructive Evaluation of PE Joints
  - Advanced LT Testing Procedures
- PE NDT Technology
- Advances in Test Procedures and Standards for Limits on Aged PE Pipe
- Gaps/Needs
  - Valve Automation and Improving Communication Signals
  - Advances in PE NDT Tools, Testing & Demonstration

DAMAGE PREVENTION

- Needs, Business Objectives, Gaps and Technology Areas identified
  - Time-based graphical layout of program plan in process

SUMMARY

- Technology Roadmapping is a formalized process that NYSEARCH and members are working on for several Program Areas
- Process is comprehensive and starts with Needs and Identifies Gaps but to be effective needs to identify/ project future technology solutions
- Challenge is to evaluate technology options for long term