Pipeline R&D Forum

March 22 -24, 2005

Damage Prevention Technical Session

Damage Prevention Research

Project Title	Researcher	OPS	Co-Share	(MO)	%
Infrasonic Frequency Seismic Sensor System for Pipeline Integrity Management	Physical Sciences Inc.	$99,910		24	100
Pipeline Damage Prevention Through the Use of Locatable Magnetic Plastic Pipe and a Universal Locator	Gas Technology Institute	$95,502	$95,541	36	100
Digital Mapping of Buried Pipelines with a Dual Array System	Witten Technologies, Inc.	$469,060	$539,671	27	100
Mechanical Damage Inspection Using MFL Technology	Battelle Corporation	$410,000	$380,000	36	100
Emerging Padding and Related Pipeline Construction Practices	Battelle Corporation	$70,000	$70,000	24	85
Effectiveness of Prevention Methods for Excavation Damage	C-FER Technologies	$70,000	$80,000	12	40
Nonlinear Harmonic-based Mechanical Damage Severity Criteria for Delayed Failures in Pipelines	Southwest Research Institute	$244,740	$250,000	24	40
Mechanical Damage at Welds	BMT Fleet Technology Limited	$80,000	$149,997	12	38
Infrasonic frequency seismic sensor system for preventing third party damage to gas pipelines	Northeast Gas Association	$175,000	$199,500	18	27

NYSEARCH

- FFT and other Fiber sensing projects
- PIG PEN concept
- GASNET distributed sensor
- Handheld GPR pipe locator
- GTI/Battelle Acoustic Monitoring

Top 5 Gaps/Challenges

- Monitoring of Right of Way Encroachment
- Improved technologies to locate existing damage
- Affordable Monitoring Technologies (for damage incidents)
- Avoidance sensors on digging/boring equipment
- Develop improved technologies to locate buried pipelines

Goals to Top 5 Gaps/Challenges

- **Monitoring of Right of Way Encroachment**
  - **Goal:** Knowledge of Right of Way activity (Real-time 24/7)
- **Improved technologies to locate existing damage**
  - **Goal:** Locate any damage that requires repair and affects the integrity of the pipeline
- **Affordable Monitoring Technologies (for damage incidents)**
  - **Goal:** Detect any contact to the pipe
- **Avoidance sensors on digging/boring equipment**
  - **Goal:** No contact to the pipe
- **Develop improved technologies to locate buried pipelines**
  - **Goal:** Affordable and accurate horizontal/vertical location

Solutions to Top 5 Gaps/Challenges

- **Monitoring of Right of Way Encroachment**
  - **Solutions:** Systems that continuously sense, monitor, and report
- **Improved technologies to locate existing damage**
  - **Solutions:** 1) Improved information/Perfect ILI 2) Improved above-ground survey tool 3) Improved defect assessment tool (on the pipe) 4) More enforcement/education or better laws requiring damage reporting
- **Affordable Monitoring Technologies (for damage incidents)**
  - **Solutions:** Systems that continuously sense, monitor, and report
- **Avoidance sensors on digging/boring equipment**
  - **Solutions:** On-Board Tools that warn, alert, or shutdown equipment in vicinity of the pipeline
- **Develop improved technologies to locate buried pipelines**
  - **Solutions:** "Magic Wand"

Road map for Top 5 Gaps/Challenges

- **Monitoring of Right of Way Encroachment**
  - **Road Map:** Does it need a new tool or technology to accomplish? Is there existing technology? Fiber optics, acoustic, satellite, smart recognition software on cameras. Revise, improving, or enhance existing technology with affordability factors. Stakeholders can be far reaching. Telecommunications and fiber optics are key. Some barriers are digging in Right Of Way & cost benefit.
- **Improved technologies to locate existing damage**
  - **Road Map:** Research on improved ILI; measuring metallurgical notches (bring science to field), & need assessment tool to measure damage (RSTRENG type).
- **Affordable Monitoring Technologies (for damage incidents)**
  - **Road Map:** Similar to 1st GOAL

Road map for Top 5 Gaps/Challenges (cont.)

- **Avoidance sensors on digging/boring equipment**
  - **Road Map:** Revised/new tool; identify performance requirements, far reaching (joint stakeholder effort); barriers: commitment from industry; best practice: excavator sweep before dig; Insurance companies can help drive new technology; insurance standards (premium benefit for new technology)
- **Develop improved technologies to locate buried pipelines**
  - **Road Map:** New, revised, or combination of many tools; vendor team up to create "Magic Wand" with proposal specifics; data transfer technology-microwave (no heavy duty recorders); far reaching technology; Barriers: bringing manufacturers together, bring industry stakeholders together, market demand, acceptance of existing tools versus new tools; standards, guide lines, best practices: GPR acknowledgement throughout industry, requiring GPS coordinates every time we mobilize (from excavators and one call tickets)