OTD
Operations Technology Development

# Mechanical Damage Technical Workshop

> Prevention Technology Research

Maureen Droessler
February 28, 2006

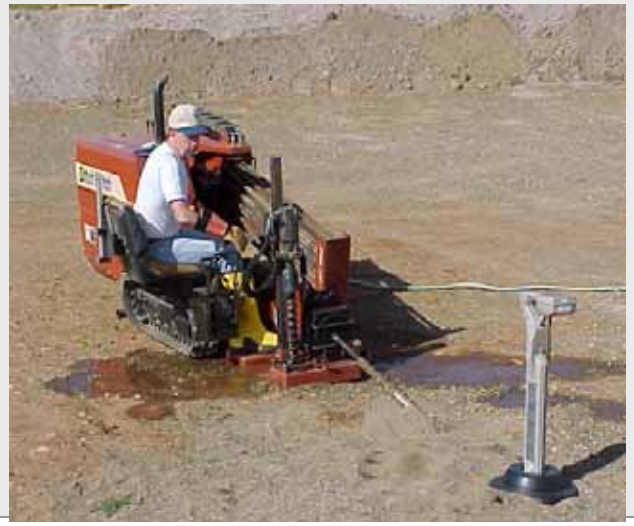
# Operations Technology Development (OTD)

- OTD is a stand-alone, 501c (6) not-for-profit, member-controlled company where gas utilities work together to develop technology solutions to common operations issues
  - Membership dues are based on the number of customers
  - Each company votes and allocates their own dollars towards specific projects
  - All members have access to all project information
  - Established in 2003
- Currently 17 members
- 2006 Dues are approx. $7.4mm

OTD
Operations Technology Development

# Research Objectives

- Enhance System Safety
- Improve Operating Efficiencies
- Reduce Operating Costs
- Maintain System Reliability and Integrity



OTD
Operations Technology Development

# Research Program Areas

- OTD Funds 6 Program Areas
  - Pipe and Leak Detection
  - Pipe Materials, Repair, and Rehabilitation
  - Excavation and Restoration
  - Pipeline Integrity Management and Automation
  - Operations Infrastructure Support
  - Environmental Science and Forensic Chemistry
- 17 new projects starting in 2006

OTD
Operations Technology Development

# Damage Prevention Technology Challenges

- Monitoring and characterizing unauthorized activity near pipelines
  - Consider both internal and external monitoring
- Developing tougher materials
  - Pipe or coatings that resist damage
- Improving locators
  - Address accuracy, depth, smaller diameters, types of material detected, lower cost, and ease of use

OTD
Operations Technology Development

# Underground Facility Pinpointing

- Description:
  - Addresses Subsurface Mapping/Location for all piping systems
  - Conduct an independent, comparative, technical evaluation and field evaluation of emerging locator technologies
  - Locator technologies include electromagnetic, ground penetrating radar, magnetic, acoustic, and ultrasonic
- Status:
  - Focus in 2006 is on non-electromagnetic locator technologies including GPR, acoustic, and ultrasonic
- Contractors: GTI and developers
- Time Frame and OTD Funding: 2003-7, $700k, Cofunded with AwwaRF

OTD
Operations Technology Development

# Hand-Held Acoustic Pipe Locator

- Description:
  - Addresses Subsurface Mapping/Location for all piping systems
  - Uses sonic technology to provide accurate location information on buried metal, plastic, or concrete pipes.
  - Goal is to consistently and accurately detect pipes as small as 2 inches in diameter at depths from 6 inches to 8 feet.
- Status:
  - A prototype detector has been built and evaluated in the field.
  - Work in 2006 includes testing in difficult terrain and improving the speed of the data collection and analysis.
  - Commercialization discussions are underway.
- Contractors: GTI and developer
- Time Frame and OTD Funding: 2004-7, $1.8mm

OTD Operations Technology Development

# Buried Pipe Imaging by Capacitive Tomography

- Description:
  - Addresses Subsurface Mapping/Locating for all pipe systems
  - Developing a compact and inexpensive capacitive tomography imaging sensor prototype in the form of a flat plate or flexible mat that can be placed on the ground to quickly and accurately provide an image of the buried objects in the soil below the sensor.
  - Objective is to locate facilities to a depth of 6 feet
- Status:
  - Following successful laboratory testing in 2005, work in 2006 includes electronics simplification, hardening, and field testing. Also, software development and system integration.
- Contractor: GTI
- Time Frame and OTD Funding: 2004-6, $630k

OTD Operations Technology Development

# Integration of Electromagnetic and Acoustic Obstacle Detection Systems for Horizontal Directional Drilling Operations

- Description:
  - Addresses Boring Equipment/ HDD Sensing for all piping systems
  - Combines the advantages of two technologies into a single wireless, mobile, obstacle detection concept for use in horizontal directional drilling operations.
  - Objective is to design, build and test a system to provide real-time detection of underground objects near the drill head
- Status:
  - Integration of detection and communication systems with the HDD machine is taking place.
  - Prototype system will be tested in the field in 2006
- Contractors: GTI and developers
- Time Frame and OTD Funding: 2004-6, $880k

OTD
Operations Technology Development

# Obstacle Detection System for Horizontal Directional Drilling Using Ground Penetrating Radar

- Description:
  - Addresses Boring Equipment/HDD Sensing for all pipe systems
  - Adapting and integrating the radar system with the horizontal drilling machine and evaluate the pre-prototype system in the field.
  - Objective is to sense obstacles at least 6 feet in front of the drill head so the system can stop and the operator can maneuver the drill head to miss the obstacles
- Status:
  - Electronics are being ruggedized and software integrated
  - Pre-prototype will be tested in the field in 2006
- Contractors: GTI and developer
- Time Frame and OTD Funding: 2004-6, $650k

OTD Operations Technology Development

# Micro-Excavation System

- Description:
  - Addresses “daylighting” the buried pipe for more precise location. Appropriate for all pipe systems.
  - Develop tools to make micro- (4-6 inches) size excavations to access buried facilities through smaller, less expensive openings.
- Status:
  - In 2006, prototype tools are being developed for use in micro-excavations
  - Commercializing partner is being sought for the excavation tool
- Contractors:  GTI and developers
- Time Frame and Funding: 2004-7, $815k

OTD
Operations Technology Development

# Maintenance-Free Pipeline Coatings for Critical Locations

- Description:
  - Addresses Improved Pipe Materials/Coatings for metal pipe systems
  - Evaluating thermal spray systems and coating materials for application on pipe in critical locations and difficult to access areas to ensure a corrosion free life of 50-70 years.
  - Objective is to take the relatively mature technology with superior corrosion and mechanical damage protection and apply it to above and below ground pipeline applications
- Status:
  - Conducting laboratory tests based on ASTM codes and protocols for adhesive and cohesive strength, impact resistance, abrasion, disbondment, effects of salt and UV radiation, substrate corrosion, and blistering.
  - Field testing the top four ranked systems in 2006
- Contractor: GTI
- Time Frame and OTD Funding: 2005-6, $375k

OTD Operations Technology Development

OTD
Operations Technology Development

# Mechanical Damage Technical Workshop


> Maureen Droessler
maureen.droessler@gastechnology.org
847.768.0608