NYSEARCH Pipeline Integrity Program

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Pipeline R&D Forum

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Northeast Gas Association

- NGA: New York State and New England natural gas trade association
- NGA: Merger of New York Gas Group and New England Gas Association 1/1/03
- NYSEARCH: R&D Committee of NGA
  - 10 Members and 5 Associate Members

NYSEARCH R&D Strategy

- From among the five main areas of Pipeline R&D, NYSEARCH is primarily pursuing R&D in two of them
  - New Construction, Materials, and welding
  - Prevention (NYSEARH focus area)
  - Detection and Assessment (NYSEARH focus area)
  - Mitigation and Repair
  - Facilities

NYSEARCH R&D Strategy To Address Pipeline Integrity

- Short Term
  - Develop and implement risk assessment model
  - Evaluate DA process & best method for implementation
- Medium Term
  - Evaluate and develop, if necessary, commercial or near-commercial condition assessment tools
  - Develop third party damage prevention technologies
- Long Term
  - Develop In-Line Inspection robotic platforms for distribution and transmission (unpiggable) pipelines

Prevention

Third Party Damage R&D

- TPD: reason for majority of pipeline damage
- R&D focus on developing technologies that will provide early warning of potential encroachment of pipeline's immediate area
- Two projects underway
  - FFT fiberoptic cable
  - PSI infrasound distributed sensor system
  - GTI acoustic monitoring system (planned)

Detection and Assessment

Assessment R&D

- Focus on conducting R&D to determine whether ECDA and ICDA based on the NACE standard can provide the level of inspection provided by In-Line Inspection systems
- Two projects underway
  - Evaluation of DA process
  - Development of risk assessment model

Evaluation of DA Process

Objective: Demonstrate that ECDA is a valid pipeline integrity alternative to in-line inspection and pressure testing.

- Phase I: ~20 miles assessed; completed
- Phase II: ~60 miles to be assessed including "special" conditions; in-progress

ECDA Validation – Phase I

- 9 companies and NYS PSC
- ~20 miles of pipe, 66 excavations (43 indications and 23 controls) – sufficient data collected for statistical validity of results
- Completed and results reported in April ’03
- Data collected supports ECDA as a valid integrity management tool
- When conducted properly ECDA on par with ILI and pressure testing

Extended DA Validation - Phase 2

- Effort initiated April 2003
- Additional ECDA to support validation
  - Expecting assessment of ~60 miles of pipelines
  - 12 companies participating
- Develop ECDA methods for special areas
  - Cased and uncased crossings
  - Bare pipe
  - Stray current
- ICDA demonstration

Detection R&D

- Inspection of distribution pipelines (Explorer and Explorer II)
- In-Line Inspection of unpiggable transmission pipelines a major issue with NYSEARCH member companies
- R&D focus on developing robotic platforms that will provide the means to inspect such pipelines
  - Two projects underway and one planned

Robotic Platforms for Unpiggable Pipelines - Objectives

- Conduct research and development in support of new technologies that will allow the internal inspection of presently unpiggable LDC-owned transmission pipelines
  - Identify and evaluate critical technologies
  - Build prototype platform systems

Background

- Currently funding two parallel efforts
  - Foster-Miller/GE Power (PII)
  - Automatika Inc. (Maurer Engineering)
- Focusing on determining ability to solve critical technology issues related to such systems
  - Communication/control mode
  - Locomotion
  - Power supply
  - Segmented sensors
- A third effort is being planned - CMU Explorer II

Platforms/Sensors Considered

- Foster-Miller/GE-PII
  - Based on Pipe Mouse
  - Battery powered, fiber optic tether
  - Able to negotiate all obstacles
  - MFL sensor able to pass through plug valves and other obstacles

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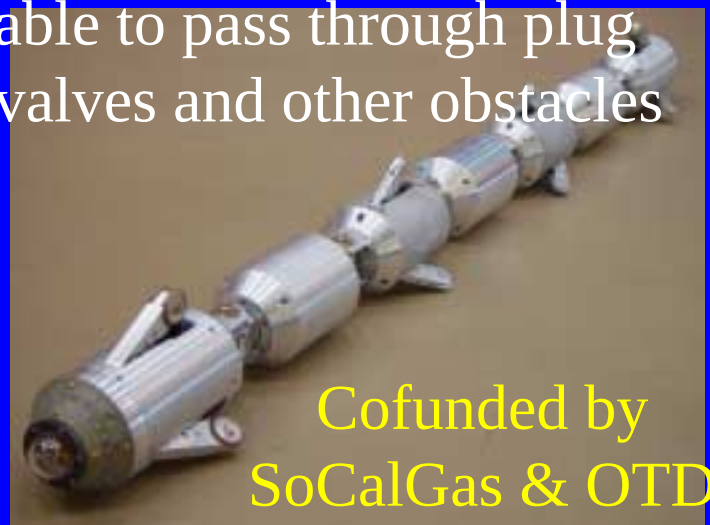
- Automatika/Maurer Eng.
  - Based on EXPLORER
  - Battery powered, wireless communication
  - Able to negotiate all obstacles
  - MFL and RFEC sensors able to pass through plug valves and other obstacles



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Summary of NYSEARCH R&D

- Multifaceted approach to Pipeline Integrity (necessitated by complexity of problem)
  - TPD prevention
  - Validation of DA approx 60 miles of qualifying transmission lines
  - Identified challenges and seeking solutions to unpiggable pipelines ILI
- Manufacturers/Service Providers interested but not as proactive as the utilities who face inspection of unpiggable lines - collaborative cofunding is key to keeping gas industry needs at the forefront