Modernizing and Strengthening Gas Utility GIS: Tracking and Traceability

Tom Coolidge, Esri
Tom DeWitte, Esri
Dave Twichell, Esri
Regulatory and Market Drivers Are Changing the Pipeline Industry
Gas Distribution Integrity Management
Overview of DIMP Final Rule

- Periodic evaluation and improvement
- Results reporting
  - # of hazardous leaks eliminated or repaired
  - # of excavation damages
  - # of excavation tickets
  - Total # of leaks eliminated or repaired, by cause

- Corrosion
- Natural forces
- Excavation damage
- Other outside force damage
- Material
- Weld or joint failure
- Equipment failure
- Incorrect operation
- Other concerns

- Know your system
- Identify threats
- Identify & mitigate risks
- Evaluate & rank risk
- Measure, monitor, and evaluate effectiveness
- Results reporting
  - # of hazardous leaks eliminated or repaired
  - # of excavation damages
  - # of excavation tickets
  - Total # of leaks eliminated or repaired, by cause
Data Integration – combining & analyzing combined data

Data Integration = Data Aggregation + Data Analysis

- Visual Overlay
- Spatial Analysis
- Mashup
- Modeling

PHMSA FAQ-240 (What must I do for “data integration”?); ASME/ANSI B31.8S
“Develop and implement a plan for all segments of the gas industry to improve data integration for integrity management through the use of geographic information systems.”
“Pipeline operators view geographic information systems as the preferred tool for effective data integration, as it can be used as a system of records and a source of authoritative data.”
Tracking and Traceability Proposed Rules

U.S. Federal Regulation

- Regulation Goal
  - Improving the ability to know, document, and/or collect information related to the distribution and location of a given component after delivery from the manufacturer or supplier (Tracking)
  - Improving the ability to identify the origin of material and parts used to manufacture a component and/or the product processing or manufacturing history (Traceability)
• Regulation specifics

- 192.3: Have the method to identify the locations of pipe, the person who joined the pipe, and the components within the pipe

- 192.375: Maintain tracking and traceability information records for the life of the pipeline

- 192.63: Require operators to adopt the tracking and traceability requirements in ASTM F2897-11a (Barcodes)
Tracking and Traceability Proposed Rules
U.S. Federal Regulation

- Track the location of pipes and pipe system components
- Store for the life of the pipeline the following information
  - ASTM F2897 Barcode
  - Manufacturer
  - Manufacture Lot #
  - Manufacture Date
  - Material
  - Size
  - Pressure Rating
  - Model and Type
Digital As-Builting

Goals

- Reduce the need for drawing in the field
- Increase consistency in data collection
- Reduce the time it takes to collect and share as-built information
- Reduce versioning footprint of as-builting
- Increase accuracy of as-built data
- Allow a better way to locate facilities
- Increase drafting efficiencies
Digital As-Builting

New Process

- Convergence of technologies allows for new cost-effective data gathering methods
  - Utility grade GPS antenna’s wirelessly communicate with smart devices
  - Barcode readers can directly attach to, or wirelessly communicate with smart devices
  - ArcGIS for Collector available for Apple, Android and Windows devices

- Questar Gas has documented a 66% reduction in field data gathering
  - Legacy paper centric = 30 minutes
  - GPS Digital As-Builting = 10 minutes
ArcGIS enables every employee and contractor to easily discover, use, make, and share maps from any device, anywhere, anytime.
Applying ArcGIS Platform to Tracking and Traceability

Digital As-Builting

Collector

Contractor/Crew assessable storage

Staging GDB

Decode barcode & append to Ent GDB

Mappers connect digital as-built with gas system

Analysts identify Location of systematic issues

Enterprise GDB
Roadmap for Gas Utilities
A Platform for Collaboration, Integration, Analytics, Innovation and Dissemination

Best Practices for Utility of the Future
Systems of Record AM/FM

Systems of Engagement Portal
2D & 3D Assets
Real-Time Events
Big-Data

Rapid Adaptation to Business and Technical Environments

Systems of Insight

... Focused on Business Value, and Innovation
Typical Next Step
Location as a strategy to complement organizational goals

Enable People to make better decisions
Simple tools for all employees and contractors to get information based on Role in company

Secure Destination for corporate collaboration

Company Asset Data

Organized and Configured Results

Standard Analytic Results
Schema/Collector Configuration, Dashboard, Attribute Assistant, GP Tool

Standard Business Groups
Planning, Engineering, Construction, Network Operations, Marketing, Sales, Customer Care, Real Estate, Finance, Corporate

Additional Maps

Esri Basemaps
Imagery, Topographic, OpenStreetMap, Light Gray