Northeast Gas Association
2018 Spring Operations Conference

DISTRIBUTION INTEGRITY – HOW WELL DO YOU KNOW YOUR SYSTEM?

LEVERAGING TECHNOLOGY AT UNITIL
Speakers

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Overview

- Who is Unitil
- Leveraging Technology At Unitil
- Data Collection Past and Present
- Work Flow Past and Present
- Benefits / Challenges
- 2018 Enhancements
- Summary
Who is Unitil?

Combination Operator in NH, ME, and MA

- Electric 103,500
- Gas 78,700
- Granite State Gas Transmission 87 miles of Interstate Pipeline
New Installation

§192.1007 (a) (5) Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.

Existing Components

§192.1007 (a) (3) Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities).

Is this enough information for an operator to know their system?
Electronic Data Collection Benefits

- Higher Quality of the data
- Data Accessible in the field
- Improves overall accuracy of our systems of record
- Significantly improves DIMP Risk Analysis, Threat Identification and Threat Mitigation
Unitil GPS Data Collection

- Geospatial reference points and attributes:
  - Newly installed assets (mains & services)
  - Gas leaks
  - Inspection surveys
  - Critical & Distribution Valves
  - Transmission Pipeline Support
  - GPS Marker Balls
  - Special projects
  - Existing Assets – whenever gas assets exposed
    - Unknown Wall (Ultrasonic)/ SDR Validating Design Pressure
2008-2016 Data Collection

- Development
  - 2008 GPS collection contracted
  - Unitil brought GPS in-house in 2010

- Equipment
  - Trimble GeoXH sub-foot
  - Pole-mounted Zephyr antenna
  - Pathfinder Office / Terrasync software
  - Barcode scanner ASTM (pilot 2012)
2010-2016 Data Work Flow

- Field crews collect GPS data on installed and existing assets
- Contractor personnel visits each crew to download raw GPS data from GPS unit - or crews download data at contractor office
- Data sent to Unitil
  - As post-processed GIS data
  - Since 2015 – Raw GPS data for improved tracking
    - Unitil post-processed all data
- Integration into enterprise/prod GIS
Transition to LocusView Solution

- Conversations with GTI/LVS on field collection process in 2012
- Unitil barcode pilot project prompted further discussions
- LocusView became its own entity in 2015 with new solutions
- In 2016 Unitil completed in house technology improvements to set the stage for LocusView
- Contractor discussion regarding use of new technology use and hardware investment 2016
- Deadline from ME PUC Jan 1, 2017 (Chap. 420):
  - The (GPS) information tracked shall include, but is not limited to: material description; manufacturer; date of manufacture; batch, lot, and/or heat numbers; maximum design pressure and/or maximum yield strength; and identification of the individual(s) who made any plastic pipe joints and/or steel welds.
- Rolled out to all contractor & internal crews April 2017
Equipment/Hardware Data Collection

- GPS Receiver capable of sub-inch accuracy
- Android OS Tablet
- Bar Code Scanner
- Mounting Pole
- Bluetooth communication
- Real Time Kinematic Base Stations
  - Calculates & broadcasts GNSS correction data to each GPS receiver
  - 3 stations installed on Unitil facilities (NH & ME) / MA CORS RTK
LocusMap Application

- Mobile application that provides a way to accurately map assets, capture joint information and associate joint records with mapped assets that is traceable, verifiable and complete
- Create Joint barcodes in Joint Module for all joints which will contain:
  - Operator information via OQ card scan verified vs ITS database
  - Joint and Machine type
  - Machine parameter information
- Map Assets – New or Existing:
  - Scan ASTM barcode on fitting or pipe
  - If no barcode - Manual Entry
- Scan joint barcode to associate with mapped asset
LocusMap – Mapping Assets

- Pictures associated with mapped assets
- Add joint record to assets
- Manually place/refine point as necessary
2017 Work Flow

- Contractor and Unitil crews collect GPS data on new installations and existing assets in Work Requests created in LocusMap.
- Collected data available immediately for review in webmap by GIS staff & office supervisors.
- Approved GIS data sent to Unitil upon request – to be automated.
  - Includes all related records for joints, projects and images.
WebMap Viewer

- Field data available immediately for review and verification
- GIS staff able to review and edit data prior to export
- Filter on WR, unit number, map extent
- Export to table
Dashboard

- Quality of data initial focus
- Filter on unit number, WR, date ranges
- Reports on accuracy, Input Method, Fix Quality, etc.
Field Collected Data
Benefits of Switching to LocusView

**Field User Benefits**
- Ease of User Interface
- More consistent spatial accuracy
- Larger Input Format (tablet)
- Feature mapping time:
  - From 45-60 sec to 1 sec
- Ability to map line segments
- Ability to add geo-referenced pictures
- Field user data review on tablet

**Office Benefits**
- No post processing
- Auto attribute input via ASTM scan
- Instant data review by GIS and supervisory staff
- Quicker availability of data for mapping and Digisafe submissions
LocusView conducted training for both contractors and in-house crews

- 1 Full week in house with supervisors/power users
- Foreman training 2 days
- Unitil conducted additional full day field training at each DOC
- Supplemental training
- End user technical support available any time via remote MDM software
LocusView Initial Challenges

- Learning Curve
  - Crews used to collecting using GPS technology
- Butt fusion / steel weld mapping
- Equipment Connectivity
- Configuration / Data Model
Future Enhancements

- Butt fusion workflow – associate connected pipe segments to joint feature
- DWO forms
- Digital Sketch element
- Enhanced Leak collection
- Conditional attribute values
- Pressure test information
- Transmission Specific Selection
- Meter Set Collection
- Admin Tool
Industry Challenges Still Occurring

- Barcode Accessibility:
  - Barcode Placement
  - Sticker Falling off
  - Barcode on pipe only one side
  - Barcode damaged
  - 1D vs 2D scanning
  - Supplier/Manufacturer resistance
  - Steel assets
Use of Collected Data

- **DIMP**
  - Risk Assessment Model
  - More attributes fed into the model results in more targeted Threat Identification
    - Example: Deep Dive into Failures / Leaks
  - Aids in Threat Mitigation Activities

- **Conducting Maintenance Activities**
  - Mains Leak Survey
  - Service Line / Exposed Pipe Survey
Questions