Safety & Enforcement Division
Technology Utilization in Infrastructure Management

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Emerging Trends Committee
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CPUC Enforcement

The CPUC monitors regulated entities' compliance with applicable law, including CPUC rules, regulations, and orders.

Regarding its jurisdictional authority on natural gas utilities, the CPUC enforces General Order 112-F, by reference, Title 49, Code of Federal Regulations Parts 191, 192, 193, 199

Natural Gas Distribution Infrastructure Management

- Primarily exercised through operators' Integrity Management Program
  - Assesses the condition of each section of the operator's pipeline
    - Pipeline is defined as the pipe, valves, metering stations and any other physical facilities through which gas is transported
    - Ranks and manages threats to pipeline integrity such as external force damage & corrosion
    - Devises mitigative and preventative countermeasures to proactively protect Distribution pipeline
- Supported by Operational Program Components
  - Operations & Maintenance (O&M) management systems
  - Control Room Management (CRM)
  - Supervisory Control And Data Acquisition (SCADA) systems
  - Geographic Information System (GIS)

Compliance Enforcement

- Assessing compliance via the exercising of regulations by operators

Operations and Maintenance (O&M)	Integrity Management	Design, Materials, and Construction	Welding and Joining
Corrosion Control	Testing and Uprating	Qualification of Personnel	

- Ensure Gas Utilities' Information is:

Traceable	Verifiable	Complete

GSRB Information Systems

GSRB currently utilizes the following information systems in its compliance enforcement program:

❖ Inspection Assistant	❖ Access Databases	❖ Network File Directories

GSRB Information Systems – Inspection Assistant

- Inspection Assistant (IA) is a natural gas safety inspection tool released by the Pipeline and Hazardous Materials Safety Administration (PHMSA)
- Handles inspection execution and management for GSRB's auditing process
- Allows inter- and intra-agency synchronization of inspection information
  - Track violations and noncompliance items
- Ability to reference and compare with previous inspections
- Audit progress tracking
- Data importing (uploading documents and pictures), recording (staff notes and findings), exporting (generating audit documentation) capabilities

GSRB Information Systems – Other Systems

Access Databases	
❖ Incident Database	❖ Mobile Home Parks Database
❖ Audit Database	❖ Inspection-Person-Days Database

Network File Directories	
USRB	GSRB
Fileserver for SF & Sacramento Staff	Fileserver for LA Staff

- ❖ Aids and optimizes:
  - ❖ Compliance and enforcement process tracking
  - ❖ Scheduling and planning of logistics
  - ❖ Organizational time management
  - ❖ Collaborative knowledge repository for intrastate inspectors
  - ❖ Tracking trends in noncompliance, allow audits to better target deficient areas

Utility Information Systems

	O&M	GIS	IM Risk Assessment	CRM	SCADA
PG&E	SAP	GD GIS	Synergi Pipeline	Sharepoint	Aveva OASyS
Sempra	SAP	ESRI	ICAM/D	J5 Operations Managment	Aveva OaSySDNA ezXOS
SWG	FOMS	ESRI	Synergi Pipeline	Hourglass	Aveva OASyS 2018
WGS	File Directory	ESRI	N/A	MS Office	WonderWare
LGS	File Directory	ESRI	N/A	MS Office	iFix

Utility Info. Systems' Effectiveness

SCADA

CRM

O&M Management Systems

GIS

IM Risk Assessment

CPUC Compliance Enforcement

How Does This Assist	
Utilities?	CPUC Compliance Enforcement?
❖ Capture data of immediate system conditions for controllers ❖ Highlights anomalous system conditions ❖ Facilitate remote control	❖ Gathers data about system conditions, pressure regulation operation history, and reporting of over- /under-pressure events

Utility Info. Systems' Effectiveness

SCADA

CRM

O&M Management Systems

GIS

IM Risk Assessment

CPUC Compliance Enforcement

How Does This Assist	
Utilities?	CPUC Compliance Enforcement?
• Allows knowledge transfer between controller handovers • Manages changes and abnormalities in operation • Facilitates prompt and appropriate response to system conditions	• Facilitates reporting of system pressure anomalies in a timely manner • Secondary resource of pressure regulation and operation records

Utility Info. Systems' Effectiveness

SCADA

CRM

O&M Management Systems

GIS

IM Risk Assessment

→ **CPUC Compliance Enforcement**

How Does This Assist	
Utilities?	CPUC Compliance Enforcement?
• Manages maintenance and inspection planning, scheduling, tracking, processing, and record-keeping • Helps utilities to allocate their resources and personnel	• Primary source of records relating to maintenance and inspection execution and results • Centralizes and maintains utilities' O&M records

Utility Info. Systems' Effectiveness

SCADA

CRM

O&M Management Systems

GIS

IM Risk Assessment

CPUC Compliance Enforcement

How Does This Assist	
Utilities?	CPUC Compliance Enforcement?
• Repository of spatial enabled data such as service history, pipeline design and planning • Supports engineering, emergency response, and IM activities	• Ability to track service history and performance • Captures pipeline characteristics such as material grade and operating pressures for compliance review

Utility Info. Systems' Effectiveness

SCADA

CRM

O&M Management Systems

GIS

IM Risk Assessment

CPUC Compliance Enforcement

How Does This Assist	
Utilities?	CPUC Compliance Enforcement?
• Actively supports pipeline integrity • Oversees and assesses pipeline improvement initiatives • Aids in threat risk calculation and priority ranking	• Demonstrates utilities' compliance with IM regulations • Shows how negative trends in pipeline safety and operation are addressed

Example Scenario

- SCADA Human-Machine Interfaces detect and report rapid loss of pressure in a section of pipeline
- Control Room notifies local gas base personnel and the incident is resolved
- Control Room logs system information for recordkeeping while crew does the same via their O&M management system

Example Scenario cont'd

- Utility investigation uses their O&M management system to consult its installation
- Utility also uses GIS system to determine component information for gas assets involved
- Integrity Management uses information gained from the investigation to identify and assess any threats
- If risks are found, the utility can develop programs to address the risk

Distribution Integrity Management

i. Distribution Riser Inspection Program – Anode less risers.

ii. Sewer Lateral Inspection Program - Pipeline damage associated with sewer laterals

iii. Gas Infrastructure protection Program – Protection from vehicular damage.

iv. Distribution Risk Evaluation and monitoring System – Prioritize risk mitigation and replacement of early-vintage pipeline segments. Early vantage steel (pre-1960) and plastic (pre-1986), including Aldyl-A.

Existing Tools/ Methods: Capabilities & Shortcomings

1. Hand-held Remote Methane Leak Detector (RMLD) allows for leak detection in access challenged locations, ***but*** subject to environment i.e., wind, rain.
2. In-line Inspection tools; For piggable pipes, used to identify internal and external corrosion. Could have improved sensor technology and battery life.
3. Acoustic line locator; identify and accurately locate underground unmapped facilities and/or those without electrical signature. Challenge in accurately discerning facilities identified.
4. Horizontal Directional Drilling(HDD); More enhancements in obstacle detection could be made.

Direction of Industry R&D

1. A hands-off automated butt fusion machine for high quality joint assurance.
2. A tool that would enable Non –Destructive Testing (NDT) of Polyethylene fusion joints.
3. Obstacle detection technology; for Horizontal Direction Drilling (HDD) to lower the chance of excavation damage
4. Advanced cross-bore detection using visual and sensing technologies.

Direction of Industry R&D cont'd

5. Abandoned line detector; A NDT tool that can determine whether line is abandoned or in use.
6. In-Line Inspection tools for Un-Piggable Pipe allow for system conditions to be captured from pipes where traditional pigging cannot be utilized (plastic distribution pipe, long stretches)
7. Reliable Residential Methane Detectors allow for detection of methane emissions, possibly relating to natural gas leaks, with fewer false-positive readings
8. Better Odorometers with GPS Capability to improve leak detection

Direction of Industry R&D cont'd

9. Stub Detection and Identification devices would help avoid excavation damages involving stubs, as stubs are more difficult to detect than traditional pipeline
10. Other Tools with Remote Detection capabilities similar to RMLD's to address inaccessibility issues
11. Matrix Barcoding (QR) on Pipeline to retain pipe installation and design information during pipe lifetime
12. Radio Frequency Identification (RFID) on Pipeline to both serve as a remote detection method and as information storage without requiring line of sight

Other Avenues of Pipeline Safety improvement

- SCADA
  - System hardening, backups, and redundancy
- CRM
  - Safety Culture - Training, personnel management, knowledge capture and transfer
- Operations
  - Increased technical/technological capabilities in gathering information
  - Same in ensuring information meets traceability, verifiability, and completeness needs

Other Avenues of Pipeline Safety improvement - GSRB

- Server and Database Backups
  - Guarantee GSRB information systems' integrity
  - Increase GSRB IS reliability

- GSRB GIS Support
  - Incorporation of a GIS platform or similar system to corroborate results from GSRB's field work compliance inspections, audit findings, incident investigations, and other enforcement actions
  - Allows GSRB staff to pool and share utilities' system information to upon which a collective body of knowledge can be amassed
  - Another way to optimize GSRB's program performance by ensuring coverage of all utilities and all utilities' pipeline systems

Thank you!

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Any Questions?