Distribution Integrity Management

Risk Management for Natural Gas Pipeline Safety

New England Conference of Utility Commissioners
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Agenda

Unitil

1. Company Overview
2. DIMP Background
3. DIMP Challenges
4. Key Elements of DIMP

ABOUT UNITIL

Company Overview

- Natural gas and electric distribution utility with **operations in three states** serving ~182,000 customers
- **Growing** operations and customer base
  - Robust natural gas system expansion
  - Nearly 500 full-time employees with dual storm roles
- We provide **energy for life**, safely and reliably delivering natural gas and electricity in New England

Genesis of Integrity Management

- Bellingham, WA Liquid Transmission Line Incident on June 10, 1999, caused the fatalities of 3 young men, (2 boys)

- Carlsbad, NM Gas Transmission Line Incident on August, 2000 caused the fatalities of 12 family members camping.

- These two incidents were the prime movers in the passing of IM for hazardous liquid pipelines in 2000 and then gas transmission pipelines ("TIMP") in 2003.

Genesis of Integrity Management

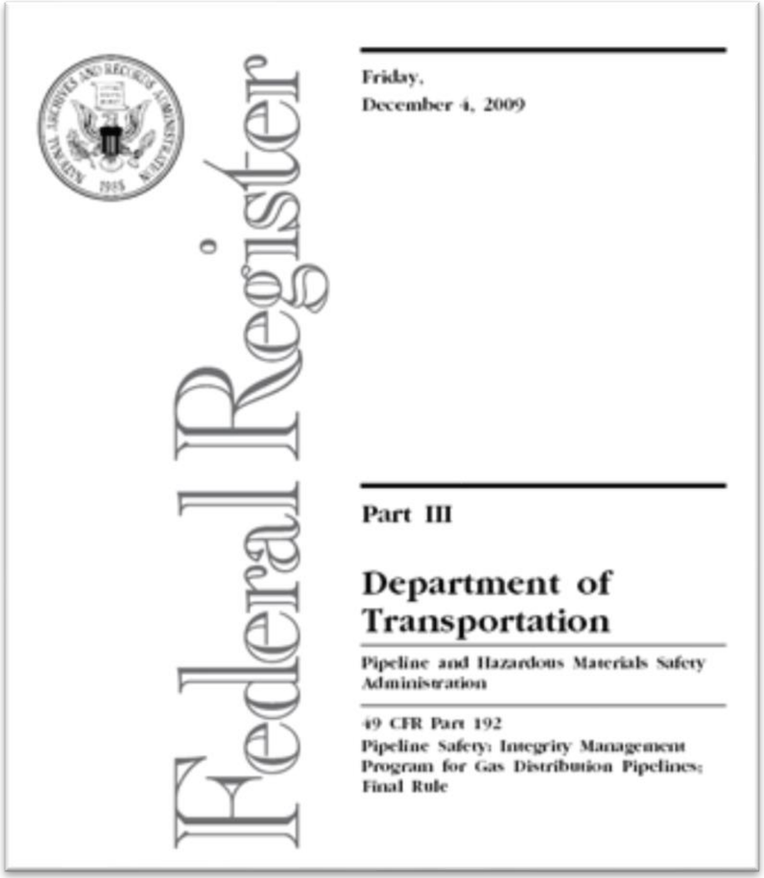
- From 1986 to 2006 there were **63 fatalities** resulting from transmission pipeline incidents.
- From 1986 – 2006 there were **349 fatalities** resulting from gas distribution incidents.
- PHMSA concluded an investigation in 2005 and determined that TIMP regulation was impractical to apply and diversity amongst operators made prescriptive regulation also impractical
- PHMSA concluded an investigation in 2005 and recommended a risk-based integrity management program for distribution operators.

Carlsbad, NM August of 2000

The Nature of Distribution Incidents

Timeline

- May 2005 – Report to Congress titled "*Assuring the Integrity of Gas Distribution Pipeline Systems*"
- June 5, 2008 – Notice of Proposed Rulemaking, Federal Register / Vol. 73 36015
- December 4, 2009 – Final Rule Published, Federal Register /Vol. 74 63906
  49 CFR § 192 Subpart P - Gas Distribution Pipeline Integrity Management
- August 2, 2011 – Required gas distribution operators to have developed and implemented an integrity management program.


Federal Register

Friday,
December 4, 2009

Part III

Department of Transportation

Pipeline and Hazardous Materials Safety Administration

49 CFR Part 192
Pipeline Safety: Integrity Management Program for Gas Distribution Pipelines; Final Rule

Key DIMP Takeaways

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1. Inspection techniques used for transmission integrity management (TIMP) is not technically feasible for distribution
2. Diversity amongst distribution operators and systems (1000 +) made it impractical to establish prescriptive requirements and instead focused on a high-level flexible regulation
3. DIMP instead focused on a high-level flexible performance based regulation.

Challenges with Implementation

Regulators

1. Inspection Challenges - A High-Level Performance based regulation is challenging for regulators to inspect.
2. Time Intensive -Inspections are time consuming because it requires a comprehensive review.
3. Judgement – Inspectors are required to use judgement during inspections regarding compliance

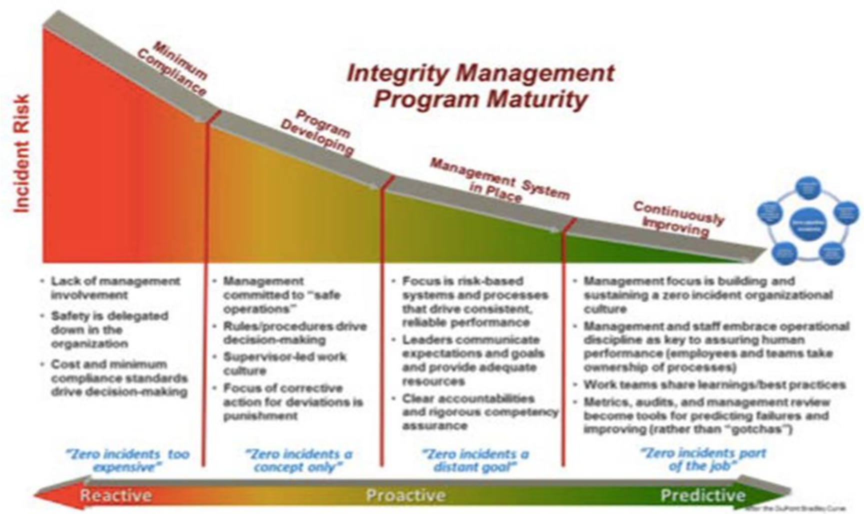
LDC's

1. Compliance Complexity – Ensuring compliance is more complex than adhering to prescriptive rules.
2. Expectations – State Jurisdictions having different expectations and DIMP requirements.
3. Implementation - The balance between the implementation of DIMP mitigation measures and the increasing prescriptive regulations on the State level.

Successful DIMP Programs

- Code Compliance for Subpart P is only the Starting Point!!
  - Evaluate the intent of the code
  - Requires Self Assessment.
- Everyone in the Organization Must be Involved – Top to Bottom
- Safety Culture is Relevant
  - Doing the right thing at all times
  - Employee Ownership & Engagement
- Continuous Improvement
  - Not a regulatory exercise or book on a shelf.
  - A tool to analyze needs and progress

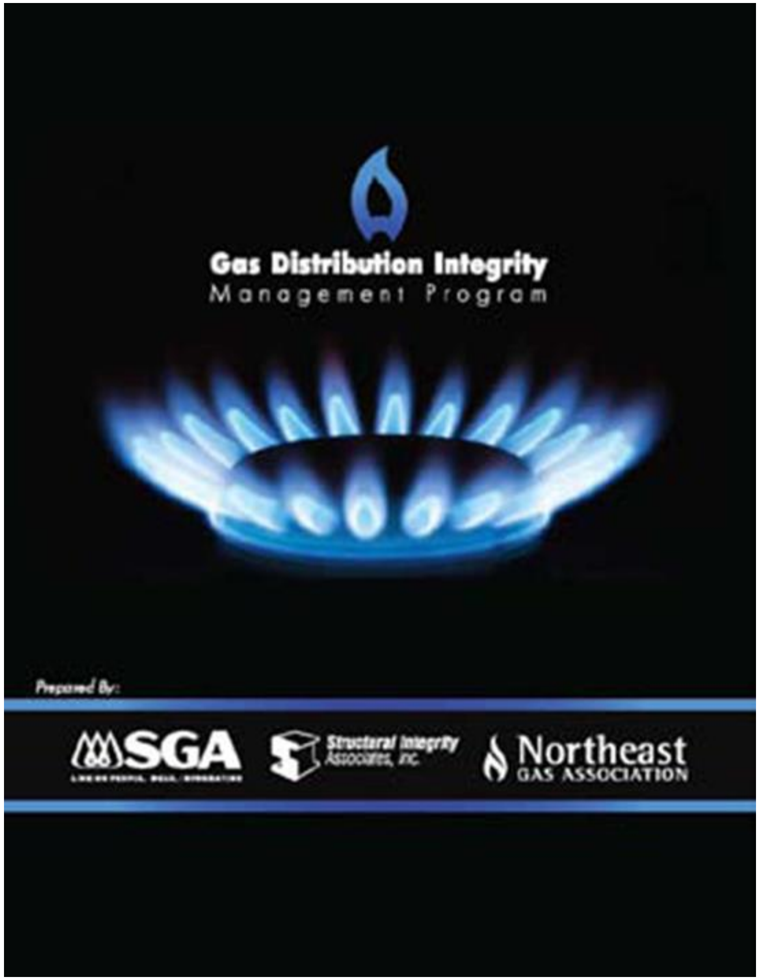
Assessing Maturity



7 Key Elements of DIMP

Distribution Integrity Management requires natural gas distribution companies to develop, write, and implement a risk management plan with the following elements:

1. Knowledge of Infrastructure
2. Identify Threats
3. Evaluate and Rank Risks
4. Identify and Implement Measures to Address Risks
5. Measure Performance, Monitor Results, and Evaluate Effectiveness
6. Periodically Evaluate and Improve Program
7. Report Results



1 - Knowledge of Infrastructure

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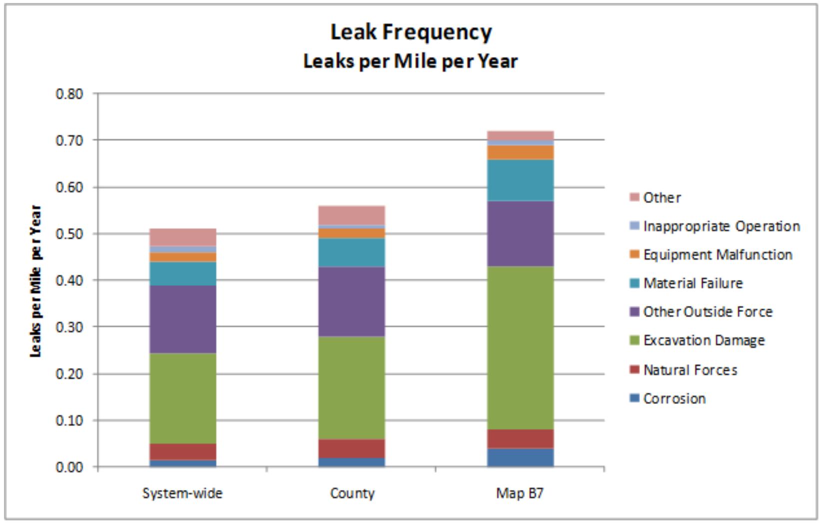
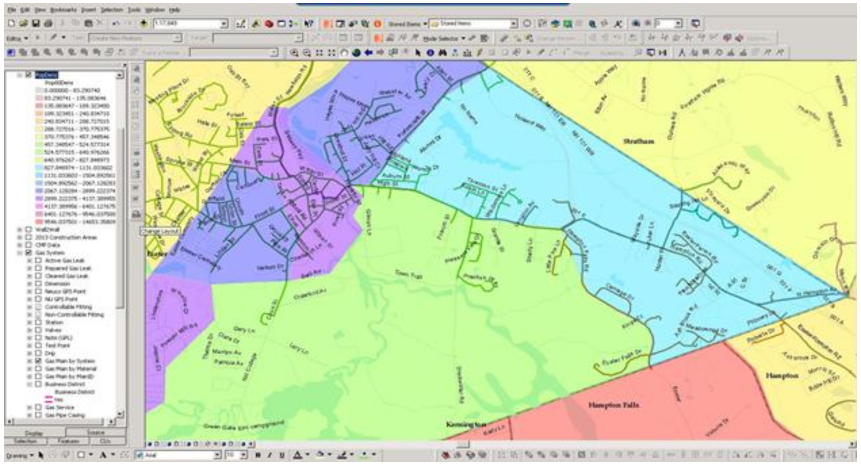
- § 192.1007: "An operator must demonstrate an understanding of its distribution system"
- The foundation of the program is <u>System Knowledge</u> which includes:
  - Asset Information (existing &new)
  - Environmental Factors (population, flood, wall to wall)
  - Past design, operations & maintenance
- Operators should use the intent of the code to determine what data should be collected.



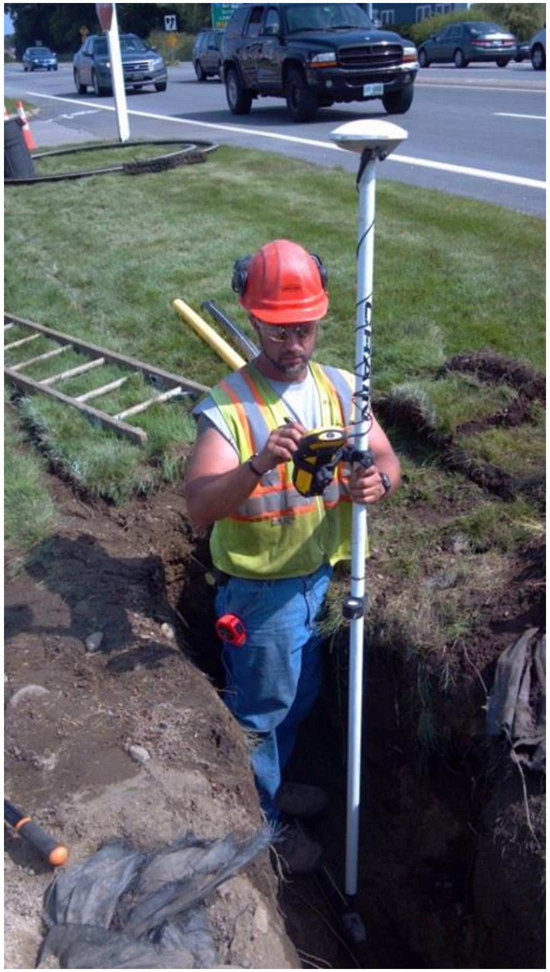


Knowledge (Compliance vs Intent)

- Compliance - § 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.

- Intent – Operators need to evaluate there system and ensure that the data that is being captured is sufficient for existing and potential (i.e., future) threats.

Trace & Traceability



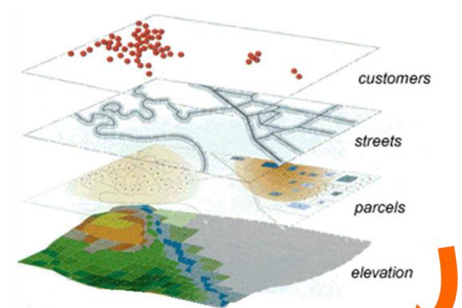
Knowledge Acquisition - Unitil

- Implemented GPD Data Collection
- All Newly Installed Components
- Existing Components when Exposed

Key Data	Examples
Pipe Size & Sizing System	1” IPS
Wall Thickness	SDR 11
Product Name	Driscoplex
Series	8100
Pipe Material Designation	PE3408/PE4710
Manufacturing Standard	ASTM D 2513
Date of MFG	July 1, 2012
Plant Code & Extrusion Line	KV-4 (Knoxville Tennessee)
Resin Code	RN-B53m1
Shift & Operator No.	04-201
Unitil Installer	Employee No. 7066
Operator Qualification	Scans Fusion Qualifications

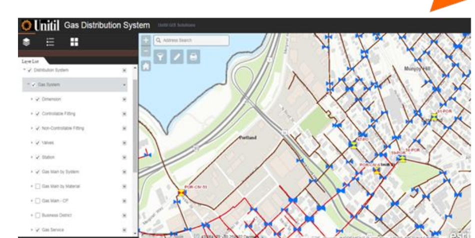
GPS

The Global Positioning System



GIS

A Geographic Information System



2- Identification of Threats

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Requirement - 2: Categorize threats to each gas distribution pipeline.

Consider reasonably available information to identify existing and potential threats.

Code Required Threat Categories

- corrosion
- natural forces
- excavation damage
- material, weld or joint failure
- equipment failure
- incorrect operation

Distribution System Annual 7100.1-1 Report

PART C - TOTAL LEAKS ELIMINATED/REPAIRED DURING YEAR		
CAUSE OF LEAK	Mains	Services
CORROSION	4	86
NATURAL FORCES	93	0
EXCAVATION	0	8
OTHER OUTSIDE FORCE DAMAGE	0	0
MATERIAL OR WELDS	15	0
EQUIPMENT	8	0
OPERATIONS	0	15
OTHER	9	20
NUMBER OF KNOWN SYSTEM LEAKS AT END OF YEAR SCHEDULED FOR REPAIR 29		

Identification of Threats - Unitil

Primary DOT Cause	Secondary Cause	Third Cause
Code Required	**1st Phase DIMP**	**2nd Phase DIMP**
Corrosion	Atm. Corrosion	No meter protection
Natural Forces	Snow/Ice/Frost/Flood	Inadequate Meter protection
Excavation Damage	Not Marked/One Call	Snow removal
Outside Force Damage	Vehicle Damage/Vandalism	Frost
Material Weld	Aldyl A/Mech Coupling	Falling Ice & Snow
Equipment Failure	Operator Error	
Incorrect Operations	Bell Joints	
Other		

3 -Evaluation and Ranking of Risk

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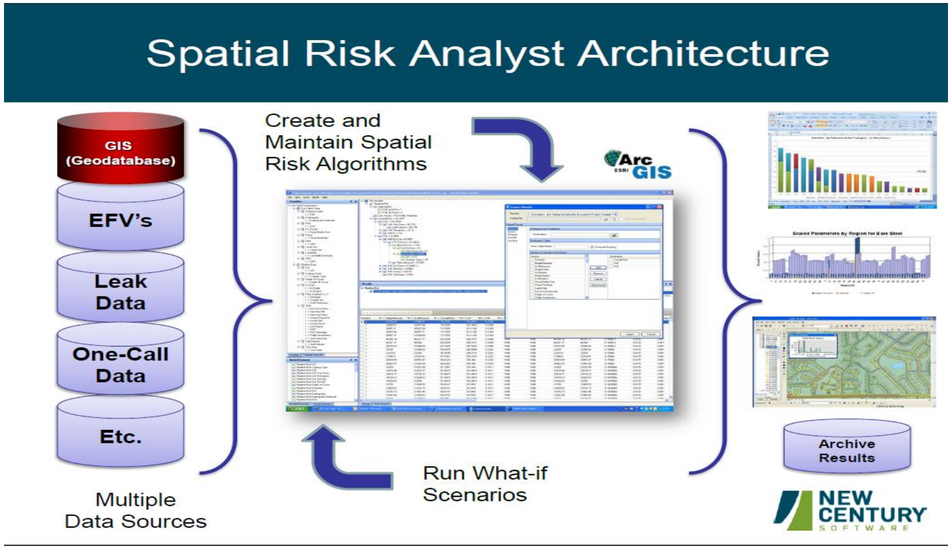
Requirement - 3: Evaluate the risks associated with the distribution pipeline system.

- Determine the relative importance of each threat and estimate and rank the risks posed to the pipeline.
- Consider the likelihood of failure associated with each threat, and the potential consequences of such a failure.
- Must Consider Potential Threats.



4 - Risk Mitigation

Requirement: Identify and implement measures to address risks.

- Determine and implement measures designed to reduce the risks from failure of the gas distribution pipeline.
- These measures must include an effective leak management program (unless all leaks are repaired when found).

Risk Mitigation

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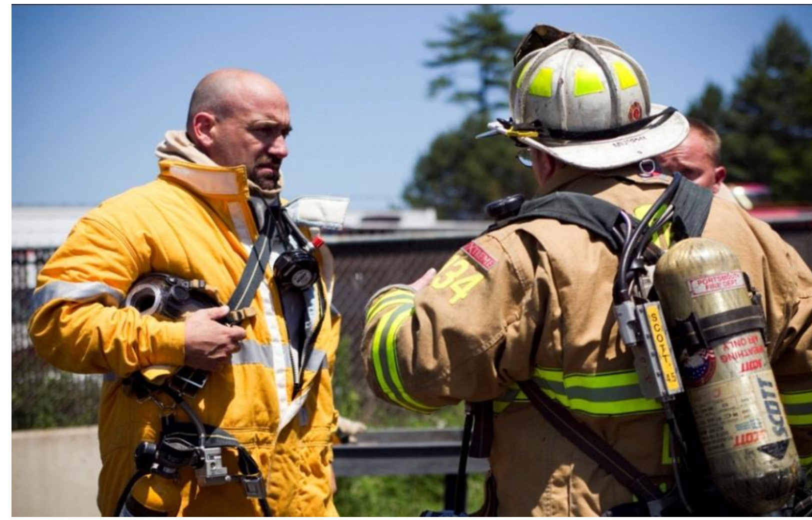
***Risk Mitigation** - What is it?*

- Accelerated Actions "AA's"
  - Increased Leak Survey
  - Active leak re-check
  - Leak clearing
- Pipe Replacement Programs
  - Cast Iron Models
  - Bare Steel Models
- Enhanced Damage Prevention
  - High Risk Tickets
  - Monitoring Third Party Excavations
- Public Education & Outreach
- Training & Procedures

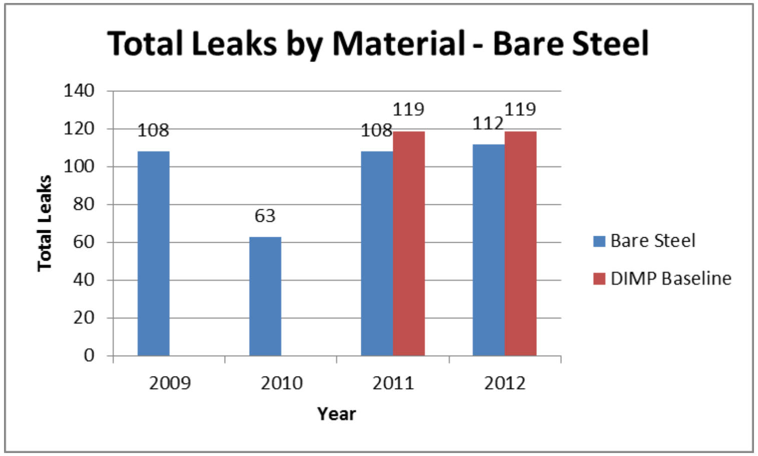


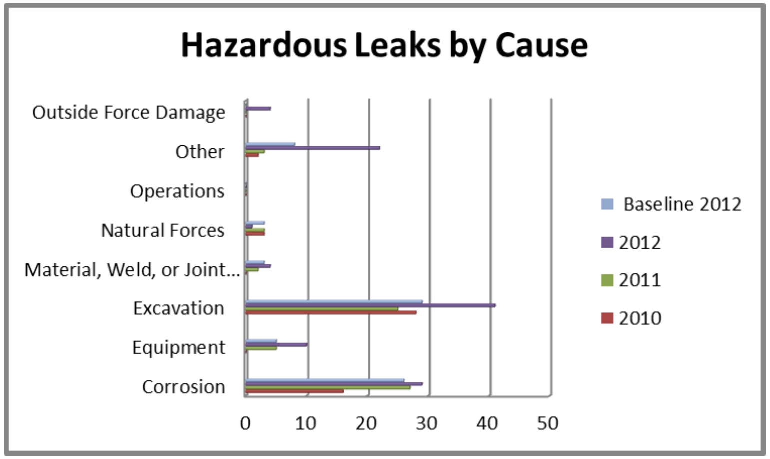
5 - Ensuring Program Effectiveness

Requirement: Measure performance, monitor results, and evaluate effectiveness.

- Establish a baseline to evaluate the effectiveness of the IM program.
- Identify any additional measures needed to evaluate the effectiveness of the IM program in controlling each identified threat.

"What gets measured, gets done."





6 & 7 Evaluate, Improve & Report

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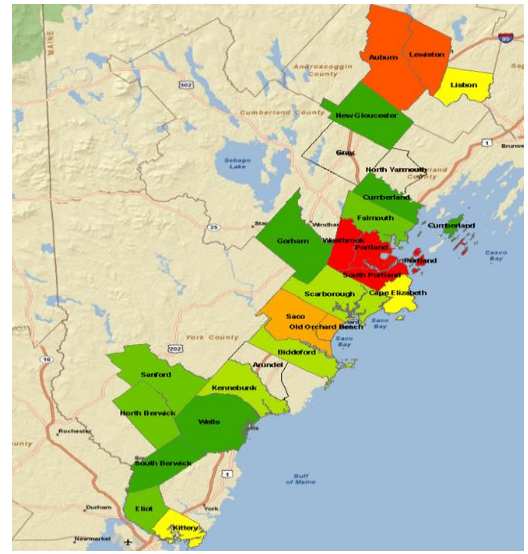
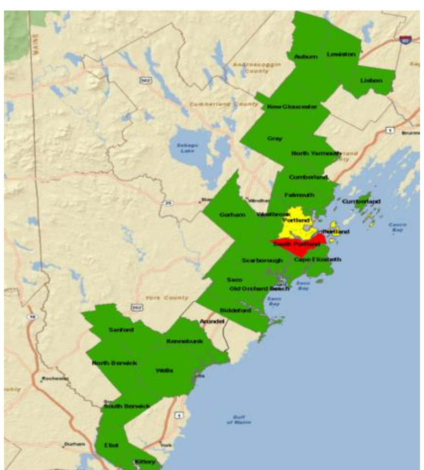
Required frequency	Program Re-evaluation Element
Required Annually	Update Baseline and on-going performance measures
Required Annually	Update Knowledge of System Characteristics, Environmental Factors and Threats
As needed*	Update Threat Identification Process
As needed*	Update Threat Identification
As needed*	Update Risk Evaluation and Ranking Process
As needed*	Update Evaluation of Risks
As needed*	Update Risk Evaluation and Ranking Validation
As needed*	Update Risk Evaluation and Ranking Process Improvement Action Plans
Required Annually	Update Leak Management Program Key Performance Metrics
As needed*	Update Action Plans





Performance Measures that Exceeded Baseline				
Region	Performance Measure	Actual Performance for Year _____	Established Baseline	Re-evaluation criteria
Existing Date for Complete Program re-evaluation:___________				
Is a shorter timeframe for complete program re-evaluation warranted? : _______				

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