AGF & DIGIT

Presented by

Philip Sher
(Connecticut Dept. Public Utility Control)

for

National Association of Pipeline Safety Representatives (NAPSR)

April 2008

NAPSR
National Association of Pipeline Safety Representatives

Initial Study Effort

Safety Performance and Integrity of the Natural Gas Distribution Infrastructure

- Sponsor: American Gas Foundation (AGF)
- Report issued ***January 2005***
- Project overseen by Distribution Infrastructure Government-Industry Team (DIGIT)

DIGIT

- AGF (regulated, privately-owned distribution operators)
- American Public Gas Association (APGA) (municipally-owned gas operators)
- U.S. Department of Transportation's Office of Pipeline Safety (OPS) (safety regulators)

DIGIT

- National Association of Pipeline Safety Representatives (NAPSR) (State regulators who oversee pipeline safety)
- National Association of Regulatory Utility Commissioners (NARUC) (staff representing State Commissioners who regulate gas operators)

Purpose

1. a detailed analysis of the natural gas distribution industry's ***safety performance***;
2. an overview of current ***regulations*** and ***industry practices*** that address threats to the natural gas distribution infrastructure;

Purpose

3. a description of the ***unique characteristics*** that differentiate natural gas transmission pipelines from distribution pipelines; and
4. identification of industry and government initiatives that are currently in-place to ensure ***continual improvement*** in regulation and practices affecting distribution integrity

Basic Information

- Characteristics of transmission lines and distribution lines are ***significantly different***
  - Material
  - Stress level
    - Rupture vs. leak
  - Operating pressure
  - Joining method

Basic Information

- Leak survey method
  - With/without gas detector
- Nature of the system
  - Point-to-point over long distances vs. dense, integrated network
- Rural vs. urban - Population density
  - 78% of transmission lines in Class 1 – lowest population density areas
  - Almost all distribution lines are located in areas adjacent to businesses and residences

Basic Information

- Vintage
- Environment
  - Soils
  - Topography
  - Weather
  - Agricultural activity

Main Data Source

- Data analysis period used was ***1990-2002***
- Statistics on incidents derived from ***Federal incident database*** (required filings – 49 CFR 191)
- ***National data*** can be subjected to ***statistical analysis*** for trends
- Trends are up or down - “Flat” trends are “indeterminate”

Data Limitation

- ***Subsets*** of data (by State, by cause, etc.) often ***cannot be subjected to statistical analysis*** because of sparsity of data (too few incidents)
- Some data ***incorrectly classified***
- Some data is ***incomplete*** preventing full identification of some important issues

Data Importance

- Analysis of incidents that are considered ***Serious Incident*** – those that involve Fatalities or Injury - may be more significant that analysis of all incidents
- However, a ***smaller data base*** means that ***analysis*** may be more ***limited***

Significant Findings

- Regarding ***Serious Distribution*** Incidents for 1990 through 2002, the report states that there is:

  "a statistically determined ***decreasing trend***, with a decrease of approximately 40%" [1]

- Approximately ***27%*** of all distribution serious incidents were categorizes as "***Other***" and "***No Data***"

[1] p. 8-1

Significant Findings

- ***Outside force*** damage comprises:
  - 1st and 2nd party damage (operator and/or operator's agent)
  - 3rd party damage (damage by independent excavators)
  - Earth movement (e.g. landslide/washout, subsidence, frost heave, earthquake, etc.)
  - Lightning and fire; and
  - Other

Significant Findings

- Damage by outside force showed a "statistically determined ***decreasing trend***, with a decrease of approximately 50%" [1]
- Damage by outside force was the leading cause of Distribution Serious Incidents accounting for ***47% of the serious incidents***

[1] p. 8-1

Significant Findings

- The predominant component of outside force damage was ***3rd party damage*** which accounted for nearly ***35%*** of the total serious incidents
- However, ***65%*** of the total serious incidents was due to causes other than 3rd party damage (vehicle damage, fire first, other, natural forces and operator error)

Significant Findings

- Distribution and transmission total ***incidents per mile*** of pipe are approximately equal as of 2002
- ***Serious Incidents per mile*** of pipe for the period 1990-2002 are approximately the same for distribution and transmission systems
- There are ***5-6 times*** as much distribution pipe as transmission line

Significant Findings

- The causes of Distribution Serious Incidents are:
  - Outside force 46.6%
  - Other 26.6%
  - Construction/operator error 9.8%
  - Accidentally by operator 9.8%
  - Corrosion 6.5%
  - No data 0.7%
  - Total 100.0%

Significant Findings

- The material involved in Distribution Serious Incidents & total inventory:
  - Polyethylene plastic . 37.3% … 45.7%[1]
  - Steel ……. 34.4% … 50.2%
  - Cast iron …… *23.9%* … *3.8%*[2]
  - Miscellaneous ……. 4.3% … 0.3%
  - Total …….. 99.9% … 100.0%

[1] includes all plastic

[2] includes cast and wrought iron

Industry Practices

- A survey was performed on 36 operators
- Of the 36, ***23*** responded
- Some of the operators did not answer certain questions

Industry Practices

- Based on the survey:
  - Operators use ***additional preventive and mitigative measures*** that exceed the requirements of the federal regulations
  - Over 80% of the operators in the survey use some form of ***risk ranking***
  - Over 60% of the operators in the survey have planned ***replacement*** programs for ***cast iron***

Industry Practices

- Almost 80% of the operators in the survey have planned ***replacement*** programs for ***bare steel***
- None of the survey operators reported any ***gaps*** between the specific threats to distribution integrity management and industry practices

NAPSR Position

- "the AGF Study, in the majority, has resulted in a ***balanced report*** with supported conclusions while addressing the concerns of safety regulators"

NAPSR Position

- "NAPSR believes that the ***gap analysis*** in the AGF report considers only whether existing regulations or practices address all threats applicable to distribution pipeline systems, ***not whether these are sufficient or broadly applied throughout the industry***

NAPSR Position

- "The report concludes regulations and ***practices*** do ***exist*** that address all applicable threats. This conclusion is ***useful, but not sufficient***."

NAPSR Position

- "NAPSR concludes that, while the resulting study is a useful first step, there is a ***need for additional work***."
- Subsequently, an expanded investigation was performed. The result of was the Integrity Management for Gas Distribution Report of ***Phase 1*** Investigations.

Availability of Study

- The AGF DIGIT Safety Performance and Integrity of the Natural Gas Distribution Infrastructure report is a ***part of the Docket***
- It can be found at: http://www.cycla.com/opsiswc/docs/s8/p0069/AGFStudy.pdf

INCIDENT DATA ANALYSIS

Jim Anderson

State Evaluator

PHMSA

Incident Reporting Causes

Prior to March 2004

- Accidentally Caused by the Operator
- Construction defect or Operator Error
- Corrosion
- Damage by Outside Force
- Other

Incident Reporting Causes

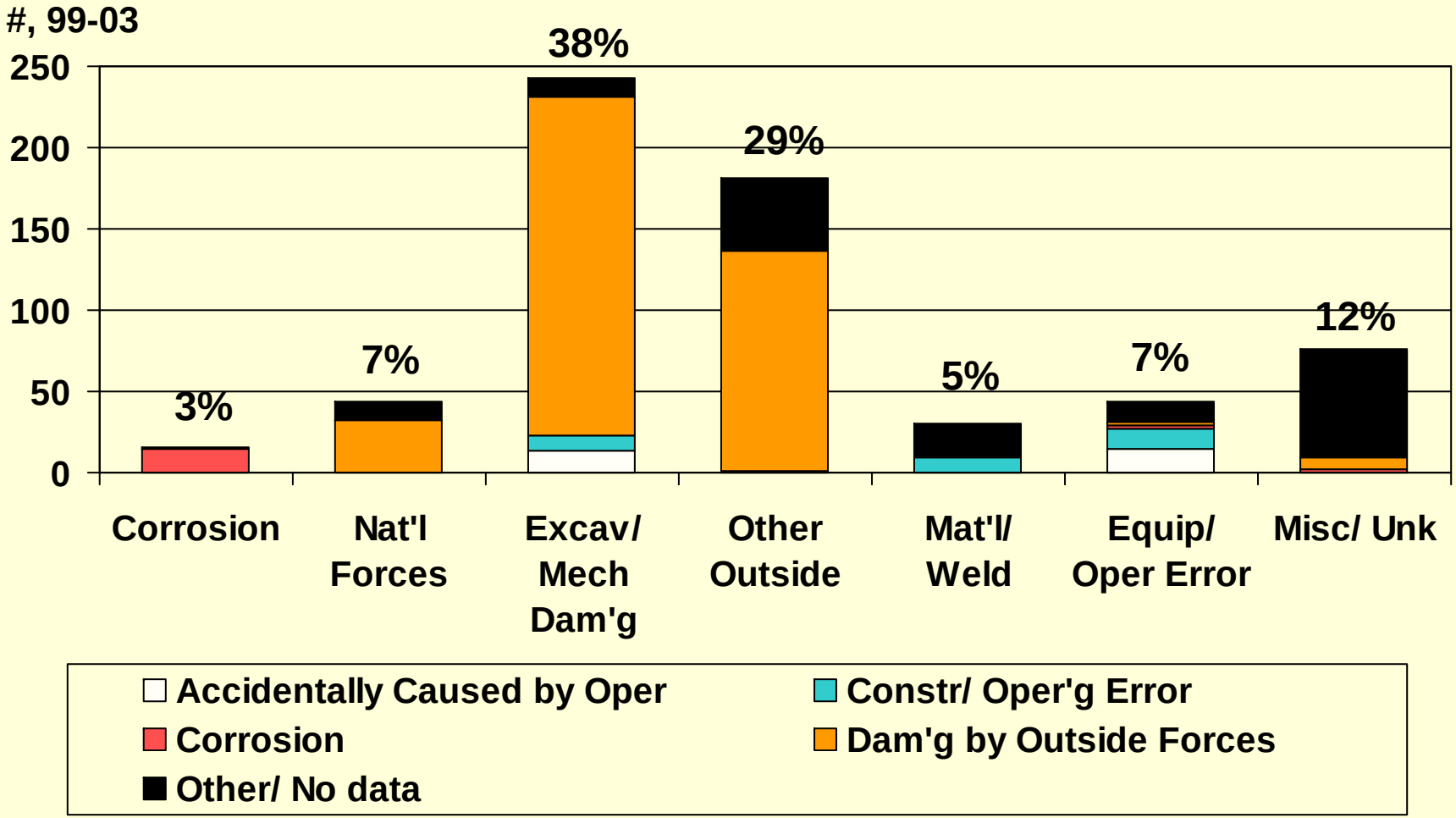
After March 2004

- Corrosion
- Natural Forces
- Excavation
- Other
- Other Outside Forces
- Materials/Welds
- Equipment/Operations

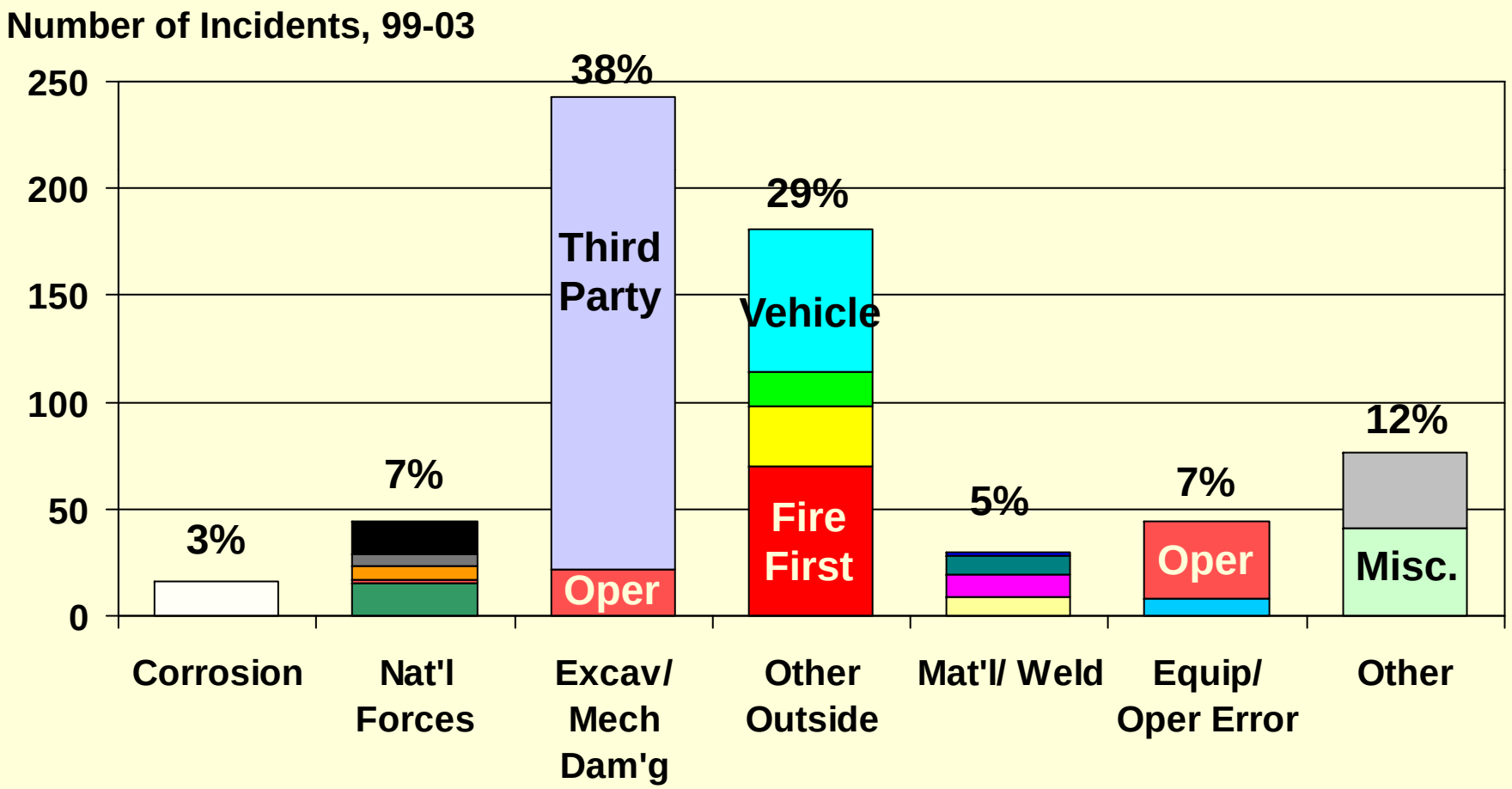
Trends

- Earlier data needed to be re-categorized
- PHMSA contracted Allegro
  - Reviewed incidents from 1999-2003
  - Assigned to new categories based on narrative description
- Result allows multi-year trending using the more-detailed cause categories

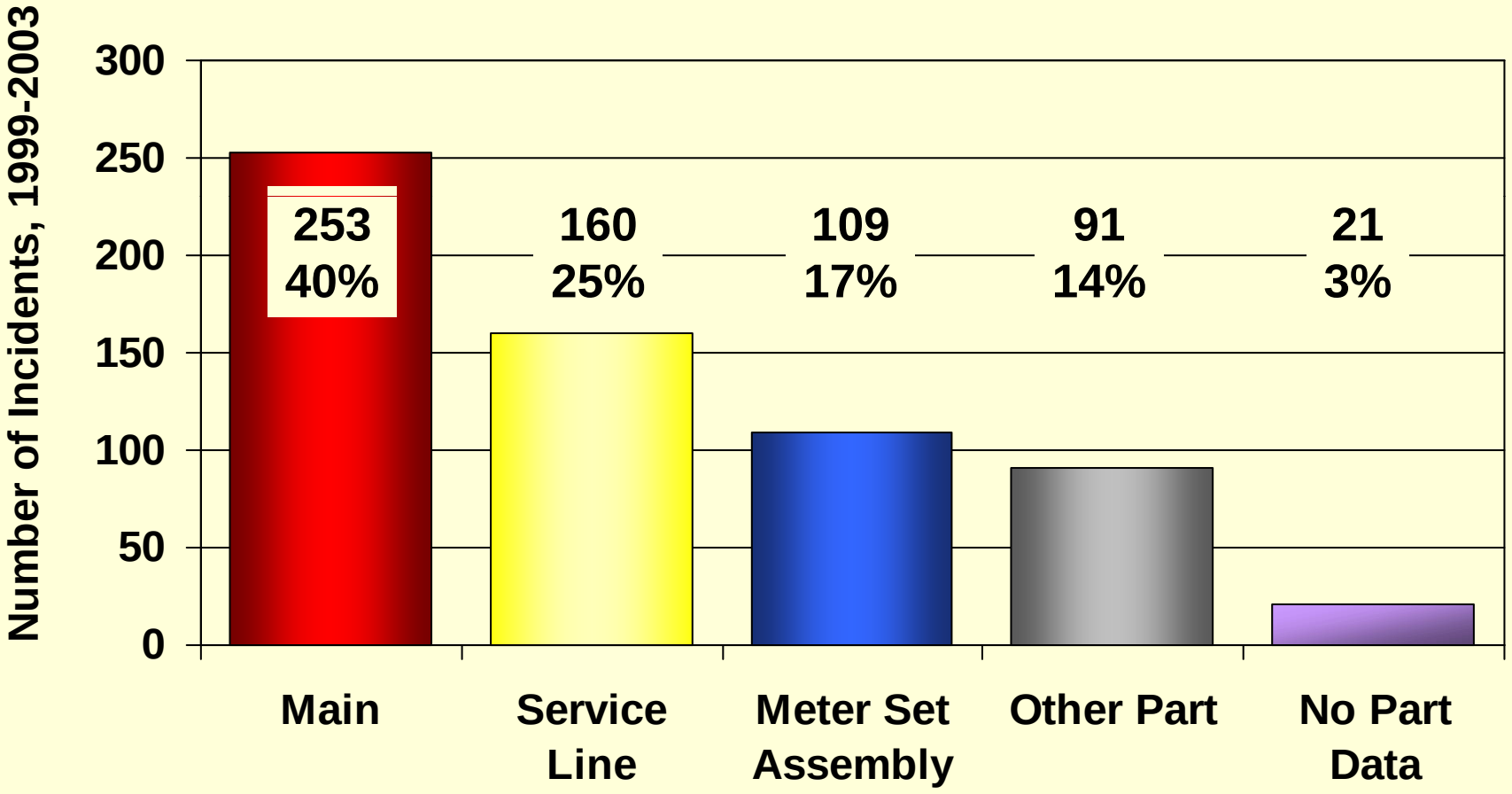
From the Old Reporting Criteria to the New Reporting Criteria (i.e., 1st-Level Causes)



And Now, the New Reporting Criteria (i.e., 2nd-Level Causes): Hazards, Threats

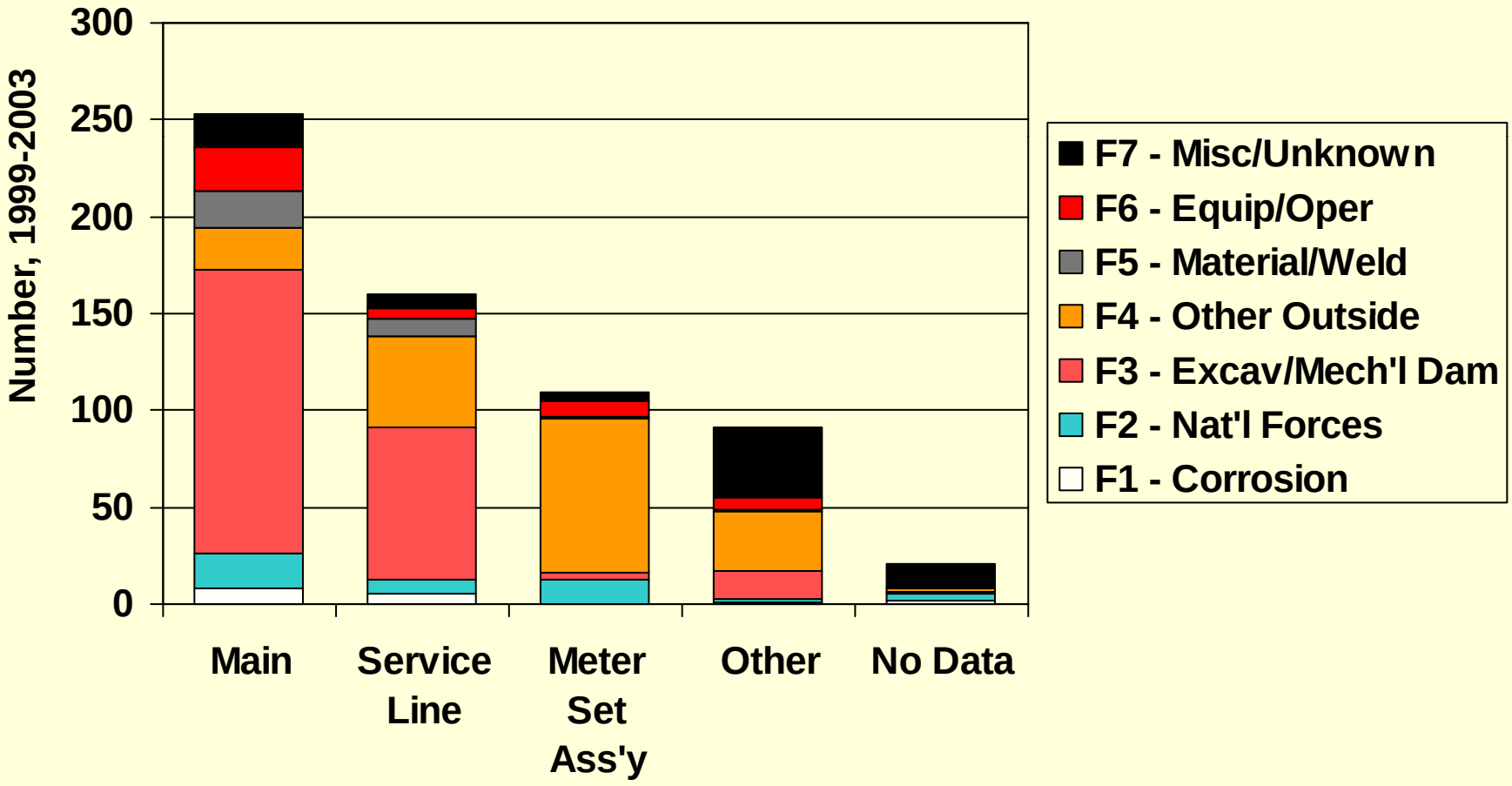


System Part Involved



Based on RSPA 7100.1 filings

System Part by 1st-Level Cause



Distribution Integrity Management Webcast– Report to Congress

Glynn Blanton
State Evaluator
US DOT/PHMSA

Congressional Request

- FY 2005 Conference Committee on Appropriations requested report
  - Extent to which IM could be applied to distribution
  - Plans to do so
- Prompted by IG Findings and Testimony

Describing PHMSA's Plan

- Hazardous liquids first – environmental consequences
- Gas Transmission second – experience from hazardous liquids applies
- Distribution was to be third element – design differences require different approach

Report to Congress

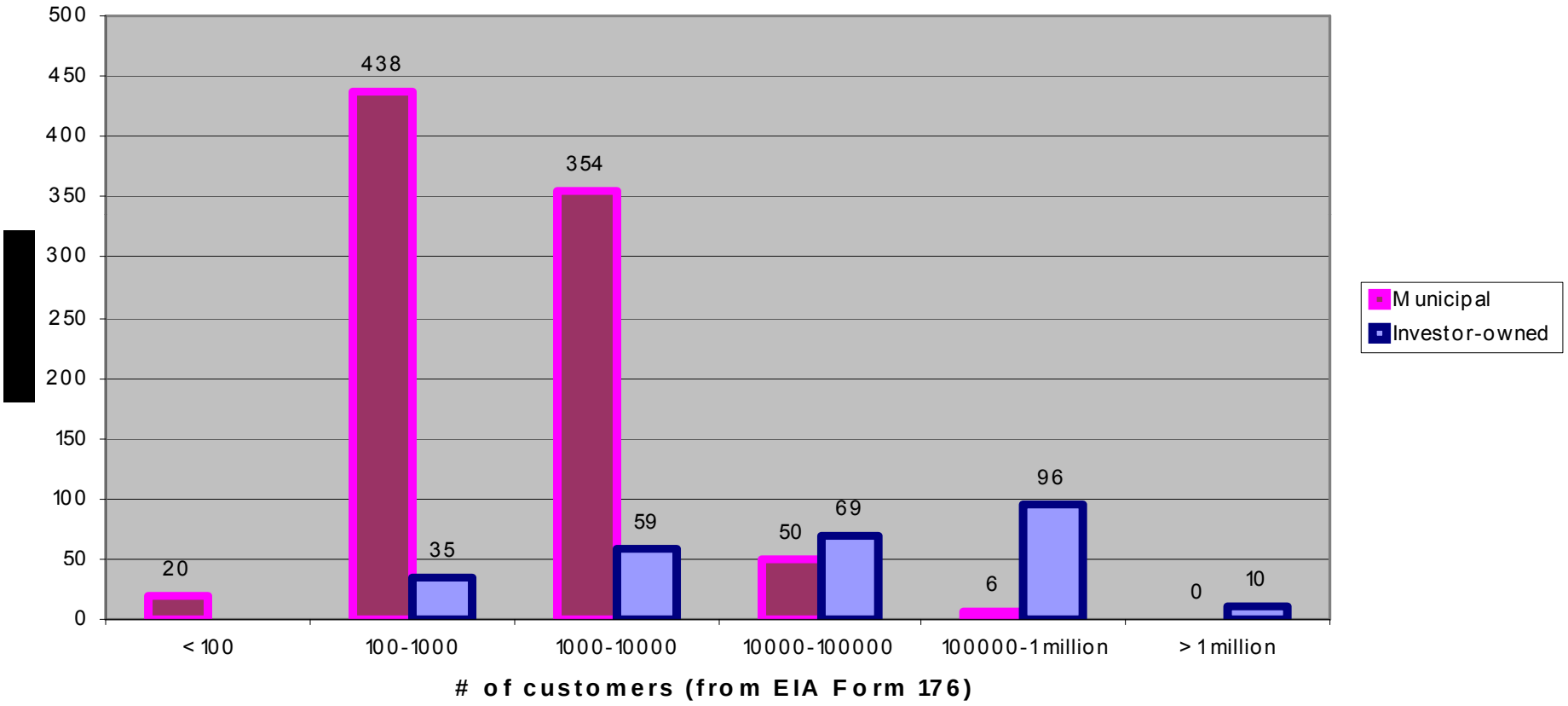
- Report submitted May 2005
- Described baseline safety level
- Described design differences
- Reported guiding principles and plan for developing DIMP

Key Principles Used in Development of Phase 1Report

- Strengthen relationship of state/federal regulators, operators, public
- Base DIMP on distribution threats
- Allow states ability to address their needs
- be risk-based, technically defensible, and cost beneficial
- consider added financial burden and safety trade-offs (particularly for municipals)
- ensure continued reliability of service
- measure progress from current baseline
- identify improvements by consensus among state/federal regulators, standards bodies, industry, public

The Distribution Challenge

Figure 1 - Distribution systems subject to 49 CFR 192
(Prepared by APGA from EIA data)



Involvement of Stakeholders

- Involve those who know distribution best
- Executive Group to oversee
- Four working-level stakeholder groups and a Coordinating Group
  - Strategic Options Group
  - Risk Control Practices Group
  - Excavation Damage Prevention Group
  - Data Group

Report in Docket

- May 2005 Report to Congress is in the rulemaking docket
- Instructions for accessing the docket in last webcast session

Integrity Management for Gas Distribution Report of Phase 1 Investigations

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National Association of Pipeline Safety Representatives (NAPSR)

April 2008

National Association of Pipeline Safety Representatives

Precursors

- December 1, 2000 - OPS FR - IMP for liquid operators that own or operate 500 or more miles of pipeline
- January 16, 2001 - OPS FR - IMP for liquid operators that own or operate less than 500 miles of pipeline
- December 15, 2003 – OPS FR – IMP for gas transmission lines

Precursors

- July 20, 2004 – US DOT Inspector General testified before Congress on need for Distribution IMP
- December 16, 2004 – PHMSA public meeting on Distribution IMP
- January 2005 – AGF-DIGIT report issued
- March 2005 - Phase 1 Organization established

Phase 1 Organization

- Executive Steering Group
- Coordinating Group
- 4 Work Groups

Phase 1 Organization

- ***Strategic Options Group*** – evaluating strategic approaches to implementing integrity management elements
- ***Risk Control Practices Group*** – evaluating existing risk control practices, required and/or implemented voluntarily by operators, and the adequacy of existing regulations and guidance

Phase 1 Organization

- ***Excavation Damage Prevention Group*** – evaluating means to reduce damage from excavation near pipelines, which is the predominant cause of distribution pipeline incidents
- ***Data Group*** – evaluating data on incidents and leaks to identify factors to prevent incidents and correlating information on the efficacy of excess flow valves as a risk mitigation tool

Phase 1 Organization

- Participants
  - State pipeline safety agencies
  - distribution pipeline owners (both investor-owned and municipal agencies)
  - interested public
  - PHMSA

Phase 1 Organization

- American Gas Association (AGA) (investor-owned gas companies)

- American Public Gas Association (APGA) (municipal gas operators)

Phase 1 Organization

- National Association of Pipeline Safety Representatives (NAPSR) (State pipeline engineers and inspectors oversee pipeline safety)
- National Association of Regulatory Utility Commissioners (NARUC) (State Commissioners who regulate gas operators and their pipeline safety staff)

Phase 1 Organization

- National Association of State Fire Marshals (State fire marshals whose are engaged primarily in fire prevention and safety from fire)
- Pipeline and Hazardous Materials Safety Administration (PHMSA) (Federal pipeline safety organi-zation)

Report

- The report was issued December 2005
- The report is a ***part of the Docket***
- It can be found at: http://www.cycla.com/opsiswc/docs/s8/p0068/DIMP_Phase1Report_Final.pdf

TPSSC & THLPSSC

- The status of this work was reviewed with the Technical Pipeline Safety Standards Committee and the Technical Hazardous Liquid Pipeline Safety Standards Committee, on December 13, 2005

  (The Hazardous Liquid Pipeline committee was included because the findings regarding federal legislation for damage prevention will affect all pipelines)

Data

- Several shortcomings in the incident and annual report data had been identified
- Some modifications and improvements were made to the incident data by a consultant under contract to PHMSA
- The resultant data was better able to address some of the issues

Overarching Conclusions

1. Distribution systems are ***diverse***, and in many cases unique
2. ***Localized conditions*** can be a major factor in determining the appropriate integrity management strategies
3. A national, ***prescriptive*** regulation ***cannot*** address the ***specific needs*** of each distribution system

Overarching Conclusions

4. A "***high level, risk-based, performance-oriented***" regulation that requires a specific Distribution IMP is supported by the fact that
   - ***a) elements*** necessary to implement a Distribution IMP have been ***identified***;
   - ***b) threats*** have been ***identified***; and
   - ***c) methods exist*** for operators to develop the elements

Overarching Conclusions

5. The ***Gas Piping Technology Committee*** should develop ***guidance*** to assist operators in determining
   a) which ***threat prioritization*** methods,
   b) which ***risk control practices***, and
   c) which ***performance measures***

   are most appropriate for their individual risk control program

Overarching Conclusions

6. ***All*** distribution pipeline operators, regardless of size, need to implement an integrity management program

Integrity for the Future

- ***Current*** design, construction, installation, initial testing, corrosion control, and operation and maintenance ***regulations*** should be effective in ***providing*** for ***integrity*** of the distribution facilities that are ***being installed today*** (assuming a strong excavation damage program)

Keys Elements of Regulation

The Distribution IMP regulation should encompass 7 key elements:

1. Develop and implement a ***written integrity management plan***
2. ***Know*** the infrastructure
3. ***Identify threats***, both existing and of potential future importance

Keys Elements of Regulation

4. Assess and ***prioritize risks***
5. Identify and implement appropriate measures to ***mitigate risks***
6. ***Measure performance***, monitor results, and evaluate the effectiveness of the programs, making ***changes*** where needed

Keys Elements of Regulation

7. Periodically report a limited set of ***performance measures*** to the regulator

High Consequence Areas

Since the ***entire distribution system*** would be covered by the Distribution IMP, there is ***no need*** to identify high consequence areas or identified sites as part of the plan as was required for transmission pipelines

Threats

Threats for Distribution IMP are the "Cause of Leaks" in Part C of Annual Distribution Report (PHMSA Form 7100.1-1)

1. Corrosion
2. Material or Welds
3. Natural Forces
4. Equipment
5. Excavation
6. Operations
7. Other outside force damage
8. Other

Threats - Leaks

- Leaking gas poses a ***threat to public safety***
- ***Management of gas leaks*** is fundamental to successful management of distribution risk

Threats - Leaks

Effective programs include the following elements:

Locate the leak,

Evaluate its severity,

Act appropriately to mitigate the leak,

Keep records, and

Self-assess to determine if additional actions are necessary to keep the system safe

Threats: Excavation Damage

- Excavation damage poses the ***most significant single threat*** to distribution system integrity
- Some States have implemented ***effective comprehensive damage prevention programs*** that have resulted in significant reductions in the frequency of damage from excavation

Threats: Excavation Damage

Damages/1000 Tickets	CY2000	CY2004
Other States	6.27	4.91
Comprehensive States [1]	4.98	3.64
Percent Reduction	20.6%	25.9%

[1] Connecticut, Georgia, Massachusetts, Minnesota and Virginia

Threats: Vehicle Damage

- ***Vehicle damage*** caused
  - ***11%*** of all distribution incidents over a 5-year period,
  - ***25%*** of all fatalities
- There is ***insufficient data*** to develop a coherent understanding of the nature of the problem, so it is ***not possible to develop strategies*** to address this issue. Need more data.

Performance Measures

- The national performance baseline may be characterized using the following three factors:
  1. DOT reportable incident statistics
  2. Data on leaks removed
  3. Information on system physical characteristics (e.g., miles of materials with an increased leakage potential such as unprotected ferrous materials or cast iron)

Data

- Several data ***reporting changes*** were suggested, including reporting of hazardous leaks removed by material; this could provide data to support a leak-related national performance measure
- ***On-going work*** is being performed to identify and improve data gathering and analysis

EFVs

- The Report concluded that excess flow valves (EFVs) can be a ***valuable incident mitigation option*** and recommended their use under appropriate conditions
- The Pipeline Inspection, Protection, Enforcement and Safety Act 0f 2006 ***imposed certain requirements*** for EFVs for residential applications

Cost Implications

February 2005 – NARUC Resolution:

- support development an approach to ***better assure distribution pipeline integrity***
- encouraged ***risk-based, technically sound and cost-effective*** measures that ***balance*** continued ***safe operation, reliable service***, and ***financial demands*** on customers

Cost Recovery

- NARUC recognized that the most efficient method of ***cost recovery*** related to Distribution IMP costs is one that is ***timely***, that ***recovers all costs***, and that recognizes the unique and important ***distinctions among LDCs and their State regulators*** and therefore, does not impose a "one size fits all" methodology

Conclusion

- The goal of the Distribution IMP program should be
  - Flexible
  - Technically valid
  - Risk-based
- It should produce significant safety benefit and value for the ratepayer dollars

Distribution Integrity Management Webcast– Developing the Rule and Guide

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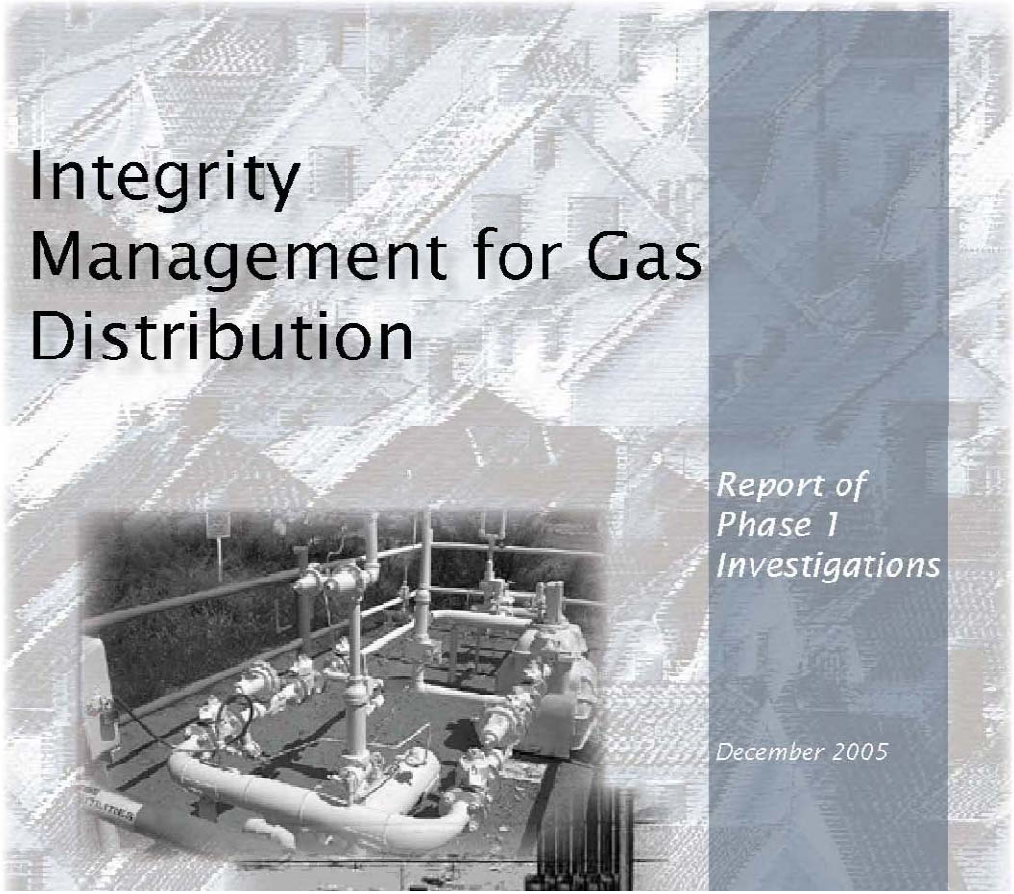
US DOT/PHMSA

Integrity Management for Gas Distribution Phase 1 Report



Report located in PHMSA docket file.

Develop Rule/Guidance

- PHMSA/States petitioned GPTC to develop guidance

GAS PIPING technology committee

Organization is uniquely qualified and has been writing “how to” guidance for operators since the pipeline safety regulations were created 40 years ago.

Established a Distribution Integrity Task Group of industry, regulatory and general interest persons who participated in the DIMP Phase 1 report. Developed guidance before rule was released. (Inverted process.)

Task group integrated elements of the Phase 1 report into guidance material.

Develop Rule/Guidance

- NPRM (Notice of Proposed Rule Making)

U.S. Department of Transportation
Pipeline & Hazardous Materials Safety Administration

GAS PIPING technology committee

Distribution Integrity Management Program Rule:

- Developed in parallel to GPTC guidance.
- Ex parte restrictions preventing sharing language on NPRM with GPTC committee members.
- Guidance is a “live” document. It will be reviewed and modified by GPTC to meet final rule. More discussion on this will be provided later in the web cast.
- PHMSA is “THANKFUL” to GPTC for accommodating our unusual request in developing the guidance document.

NPRM on DIMP

NPRM on Distribution Integrity Management rule will be posted on PHMSA's web site.

- Web site address is: http://phmsa.dot.gov