"Safety Performance and Integrity of the Natural Gas Distribution Infrastructure"

Gary W. Gardner
Executive Director

NARUC Gas Committee
February 15, 2005
Washington, D.C.

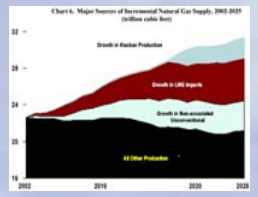
American Gas Foundation

AGF Mission

Independent source of information, research and programs on energy and environmental issues that affect public policy

Current Studies

Safety Performance & Integrity of the Natural Gas Distribution Infrastructure (Jan 05)



Natural Gas Outlook to 2020 (Feb 05)

Public Policy and Real Energy Efficiency (Mar 05)

American Gas Foundation

Study Background

- AGF Board of Trustees priority (2002)
- Solicitation of industry support / URS award (2003)
- Formation of DIGIT / Study development (2004)

American Gas Foundation

Distribution Infrastructure Integrity Government-Industry Team (DIGIT)

Lee Reynolds (Chairman)
NiSource

Don Martin (Chairman)
Arkansas Public Service Commission

Brad Ardner
Minnesota Office of Pipeline Safety

Jim Anderson (Observer)
North Carolina Utilities Commission

Bob Beuregard (Observer)
American Public Gas Association

Glynn Blanton
Tennessee Regulatory Authority

DeWitt Burdeaux (Observer)
Transportation Safety Institute

Will Carey
Public Service Electric & Gas

Eric DeBonis
Southwest Gas

John Erickson
American Public Gas Association

Tom Fortner (Observer)
US DOT, Office of Pipeline Safety

Roger Huston (Secretary)
CYCLA Corp.

Mike Israni (Observer)
US DOT, Office of Pipeline Safety

Gerald Lee
City Utilities of Springfield

George Mosinskis (Observer)
American Gas Association

Bruce Paskett
NW Natural

Philip Sher
Connecticut Dept. Public Utilities

Jerome Schmitz
Southwest Gas

Ted Tiger
Oklahoma Corporation Commission

Michael Thompson
Oregon Public Utility Commission

Tom Ziegenfuss
Peoples Energy

American Gas Foundation

Study Mission

Establish an independent technical foundation for the government and industry to use in the consideration of a distribution integrity management program

American Gas Foundation

Study Approach

- Engage all key stakeholders – Utilities, NAPSR, NARUC, and DOT/OPS
- URS conduct statistical analysis and develop written report
- Basis of report: DOT/OPS Reportable Incident Database (1990 – 2002)

American Gas Foundation

Study Components

- Transmission Pipelines and Distribution Infrastructure
- Review of Distribution Safety Record
- Industry Practices and Programs
- Review of Leak and Unaccounted for Gas Data
- Gap Analysis
- Major Findings

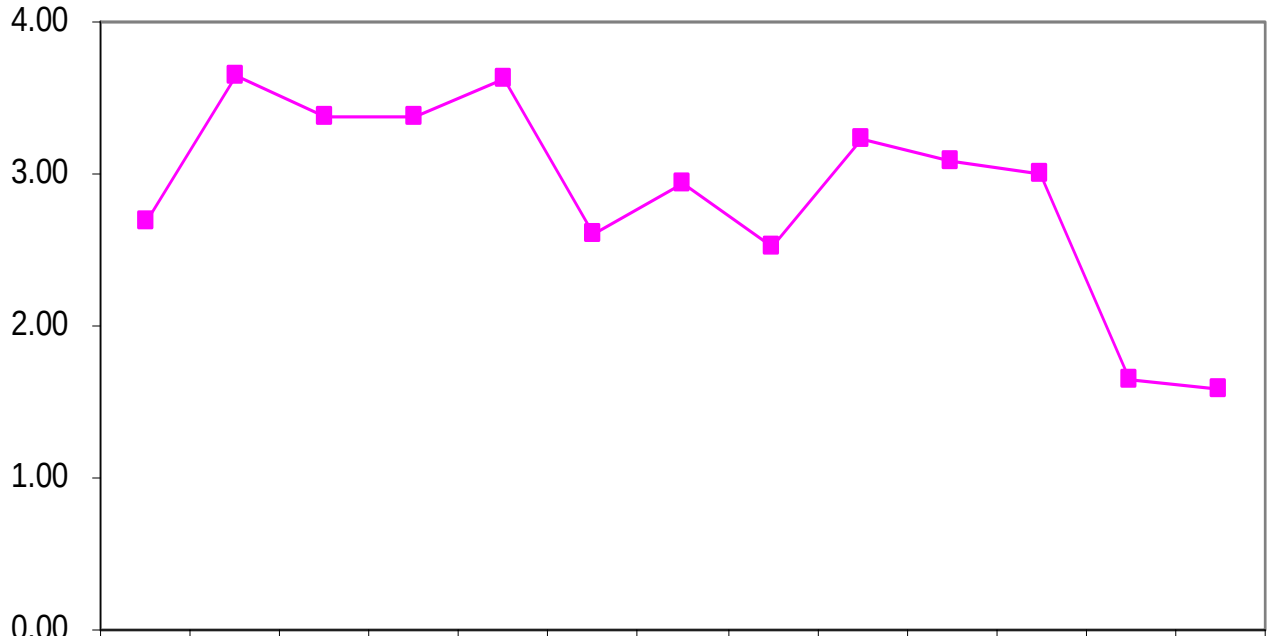
American Gas Foundation

STUDY FINDINGS

Study Findings - Safety Performance

- Of the total 1,579 incidents for natural gas distribution, 601 (38%) were serious incidents
- Serious incidents shows a downward trend of approximately 40%
- Outside force damage was the leading cause of serious incidents (47%)

Serious Incidents
Normalized to 100,000 Miles
For Years 1990 - 2002

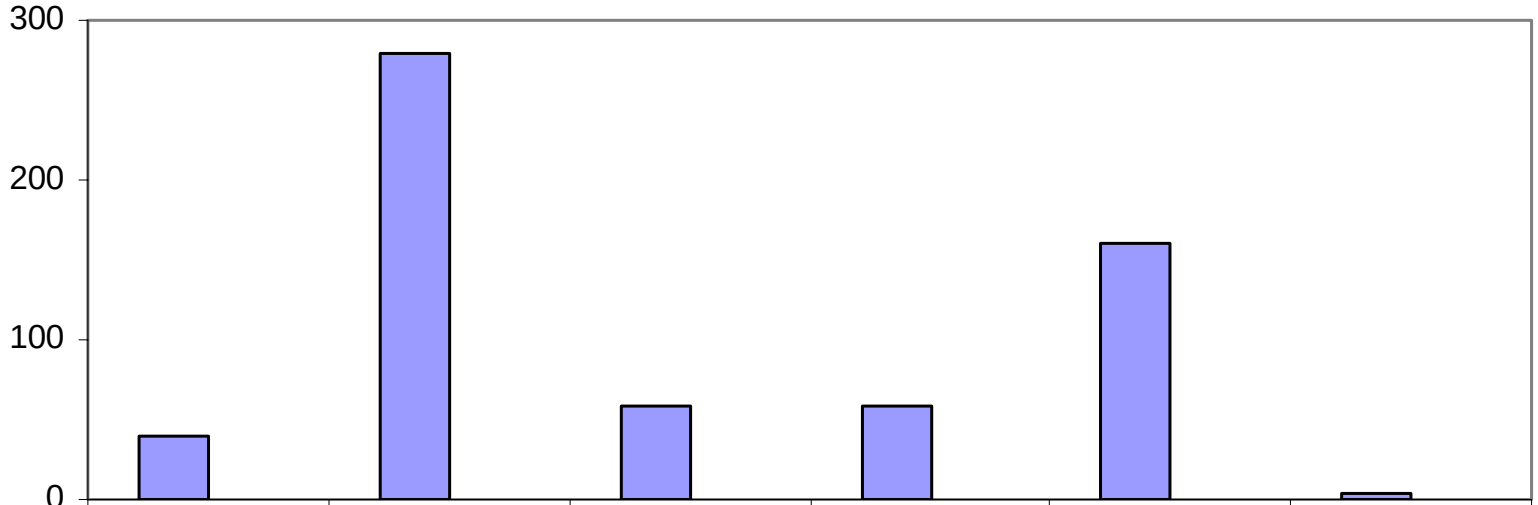


	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Serious Iincidents	39	53	50	51	60	43	47	41	54	52	51	30	30
Normalized Serious Incidents	2.69	3.65	3.37	3.38	3.63	2.60	2.93	2.52	3.23	3.08	2.99	1.65	1.59

American Gas Foundation

Source: US DOT/OPS Reportable Incident Database

Serious Incidents
by Cause
Total of 601 for Years 1990 - 2002

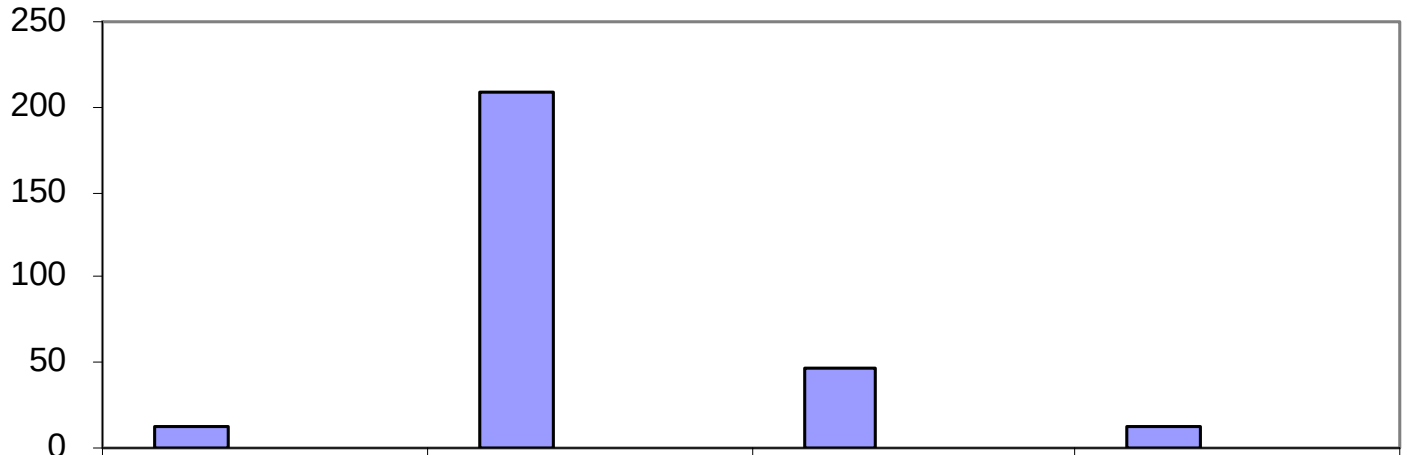


	Corrosion	Outside Force	Construction / Operating Error	Accidentally Caused By	Other	No Data
Serious Incidents	39	280	59	59	160	4
% of Serious Incidents	6.5%	46.6%	9.8%	9.8%	26.6%	0.7%

Source: US DOT/OPS Reportable Incident Database

American Gas Foundation

Outside Force Serious Incidents
By Category
Total of 280 for Years 1990 - 2001



	1st / 2nd Party	3rd Party	Earth Movement	No Data
Outside Force Serious Incidents	13	208	46	13
% Of Oustside Force Serious Incidents	4.6%	74.3%	16.4%	4.6%
% of Serious Incidents	2.2%	34.6%	7.7%	2.2%

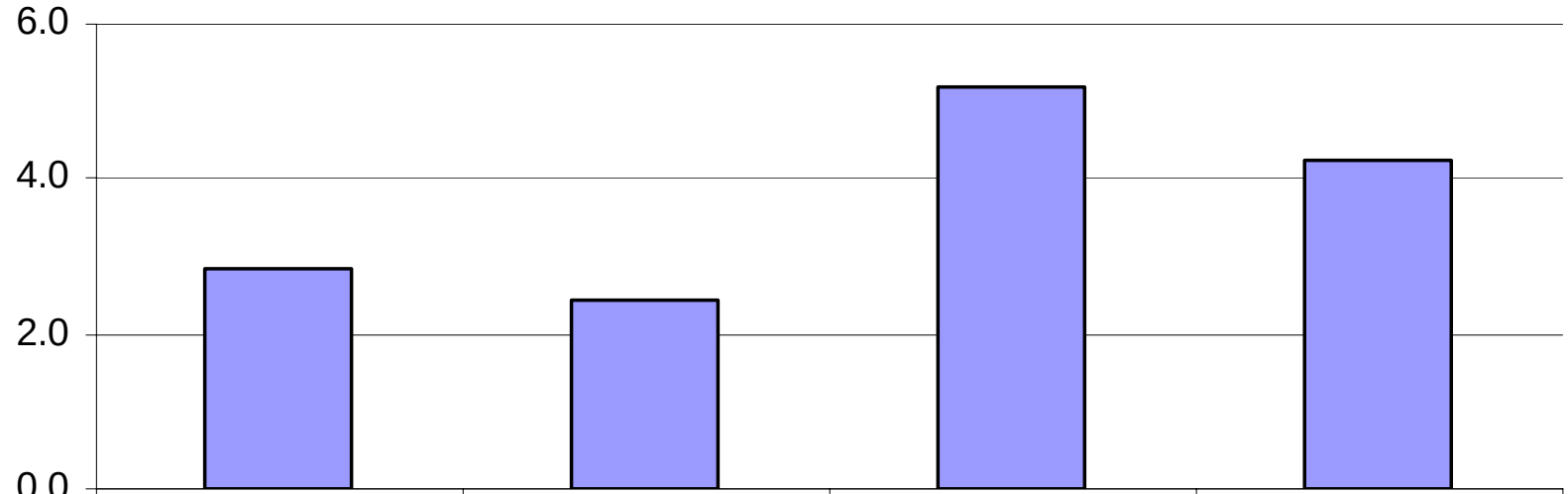
American Gas Foundation

Source: US DOT/OPS Reportable Incident Database

Study Findings – Transmission/Distribution Comparison

- Type of infrastructure
- Size of pipelines
- System operating pressures
- Mix and types of materials of construction
- Typical failure mechanisms
- Inspection methods and inspection frequencies
- Gas Odorization
- Location of facilities
- Connection to customers

Distribution Incidents Data
vs.
Transmission Incidents Data
Normalized to 100,000 Mile
For Years 1990 - 2002



	Distribution Serious Incidents	Transmission Serious Incidents	Distribution Fatalities and Injuries	Transmission Fatalities and Injuries
Normalized Ave	2.8	2.4	5.2	4.2

Source: US DOT/OPS Reportable Incident Database

American Gas Foundation

Study Findings – Operator Survey

- Representative cross section of industry (based on responses of 23 utilities)
- Responders' Statistics
  - No. customers : 16.9 million (25% of U.S.) (Range: 3,100 to 3.2 million)
  - Miles of Mains: 252,000 (23%)
  - Miles of Services: 15 million (24%)
  - Total Incidents on Mains: 25% ('98-'02)
  - Total Incidents on Services: 18% ('98-'02)

Study Findings - Operator Survey

The top five process identified as having highest impact on distribution integrity:

1. Cathodic protection systems
2. Leak surveys
3. Operator qualification programs
4. One-call systems
5. Planned pipe replacement programs

Study Findings - Operator Survey

Threats to Distribution Integrity

- External Corrosion
  - Coated and Wrapped/ Bare Steel / Cast Iron
- Internal Corrosion
- Manufacture-Related Defects
  - Steel /Plastic
- Construction-Related Defects
  - Steel / Plastic
- Equipment Malfunction
- Excavation/Mechanical Damage
- Incorrect Operations & Operator Error
- Outside Force/Weather
  - Steel / Cast Iron / Plastic

Study Findings - Operator Survey

- 80% use risk ranking tools to evaluate their distribution infrastructure
- 65% have program for replacing cast iron
- 80% have program for replacing bare steel
- 8% replacing certain older plastic pipe

Summary

- AGF study is just the starting point
- Downward trend in serious incidents
- Outside force damage the leading cause
- Prevention & mitigation measures exceeding the federal code
- Data gaps were identified that call for additional review

American Gas Foundation

www.gasfoundation.org