



**National
Transportation
Safety Board**

Perspectives and Recommendations for the Natural Gas Industry

Robert J. Hall, PE

**Director, Railroad, Pipeline and Hazardous
Materials Investigations**

2015 Pipeline Safety Conference



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**Pipeline SMS
Pipeline Accident Report
HCA Pipeline Safety Study**



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Pipeline SMS

Marshall, Michigan

July 25, 2010

Marshall, Michigan

To the American Petroleum Institute:
Facilitate the development of a safety management system standard specific to the pipeline industry (P-12-17)

Pipeline SMS

API Recommended Practice 1173
Pipeline Safety Management Systems
issued July 2015

NTSB Board Action

API RP1173 exceeds our original intent; accordingly, the recommendation is classified “Closed—Exceeds Recommended Action.”

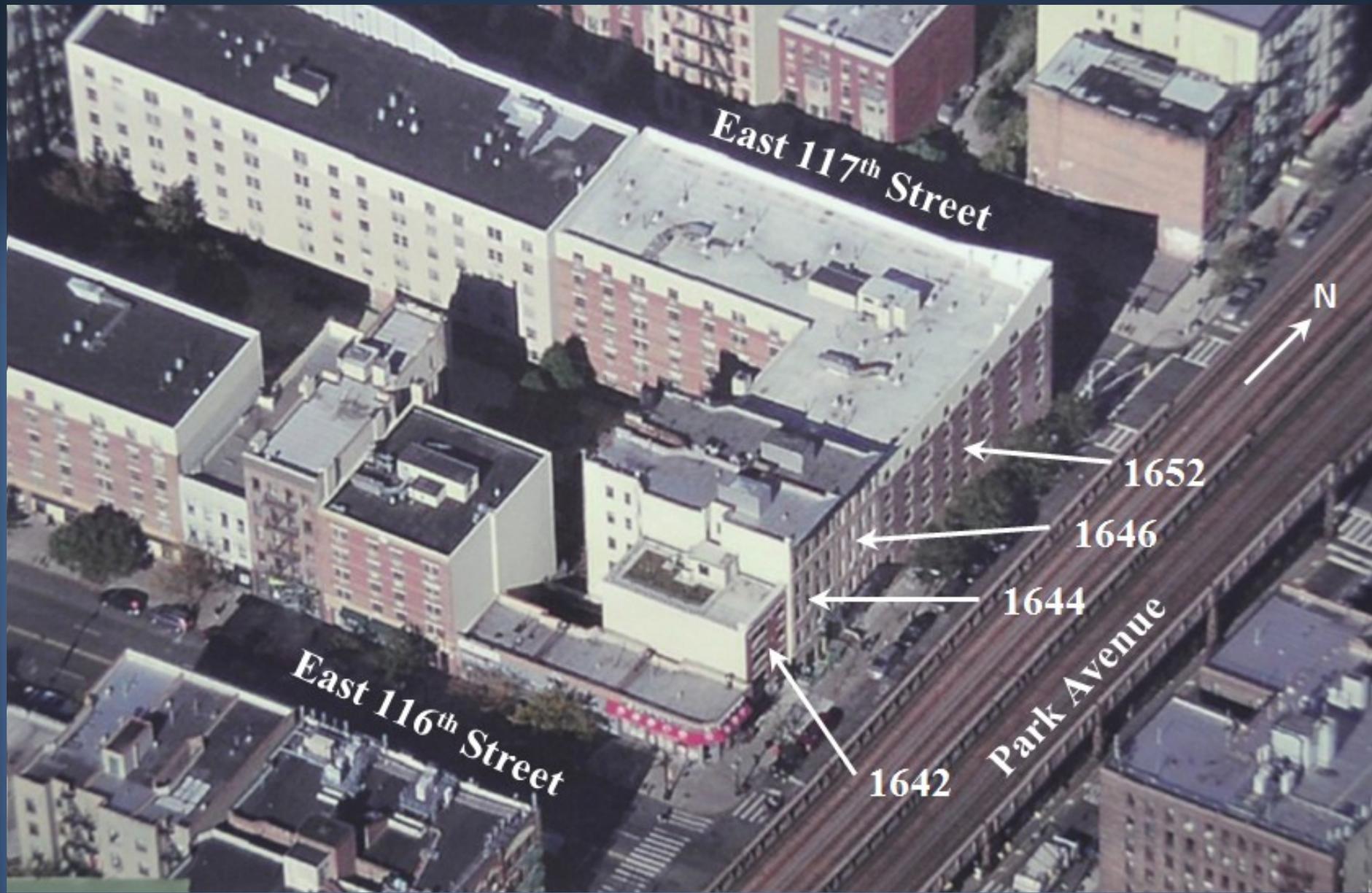


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Natural Gas Pipeline Accident

Manhattan, New York

March 12, 2014

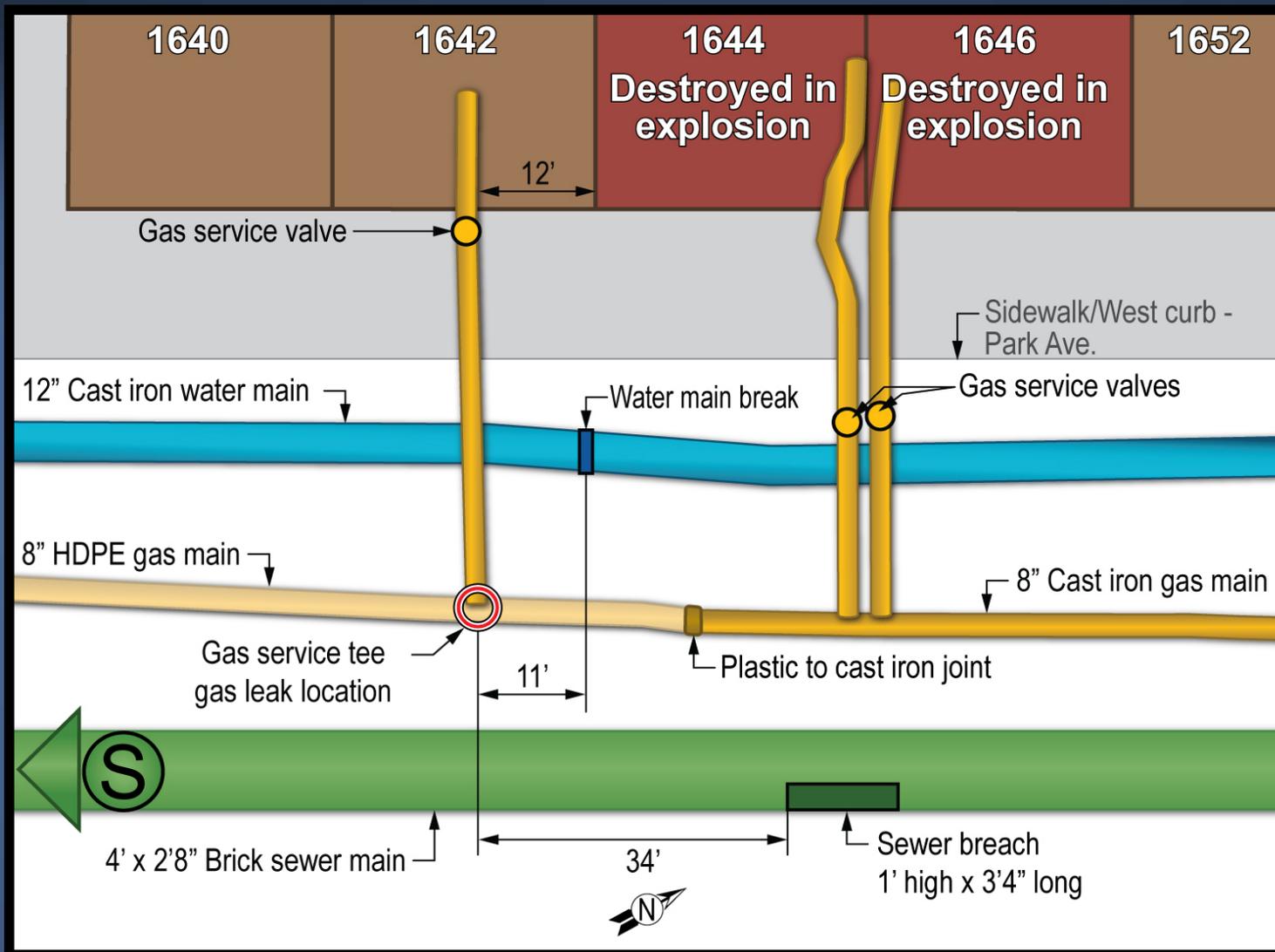


Manhattan, New York (Harlem)

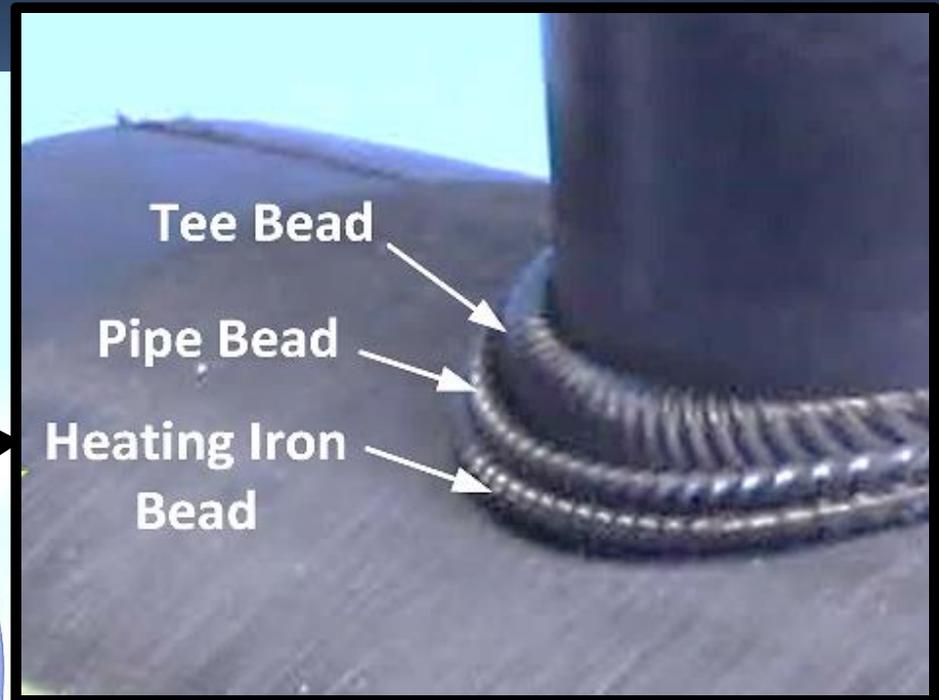
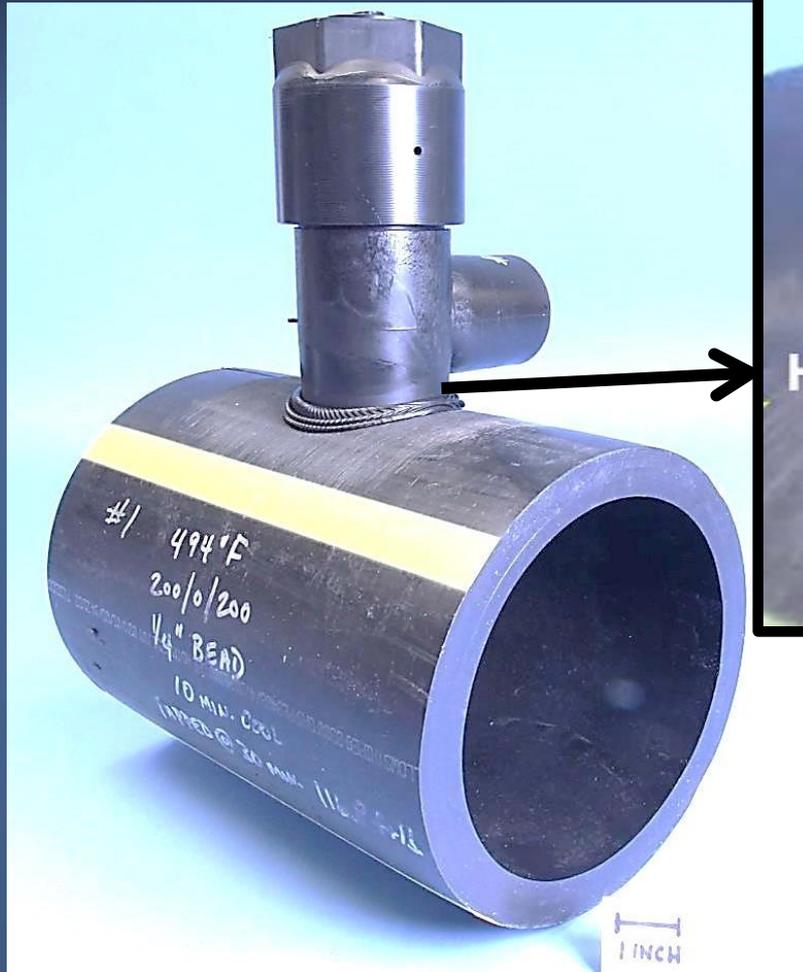
- Consolidated Edison
- 8-inch cast iron/plastic distribution line (1890 / 2011)
- 8 in wc MAOP, 6 in wc operating
- 8 Fatalities
- 48 injuries



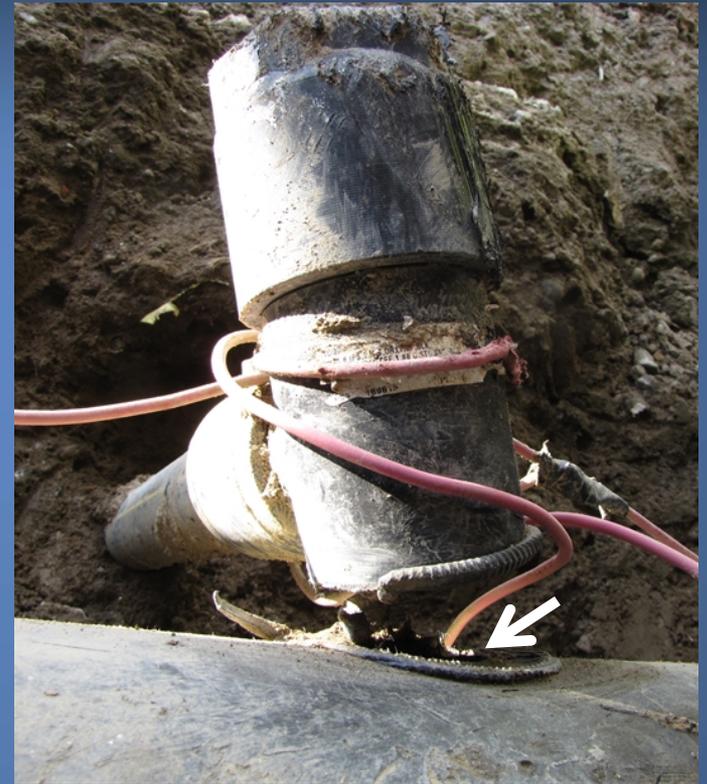
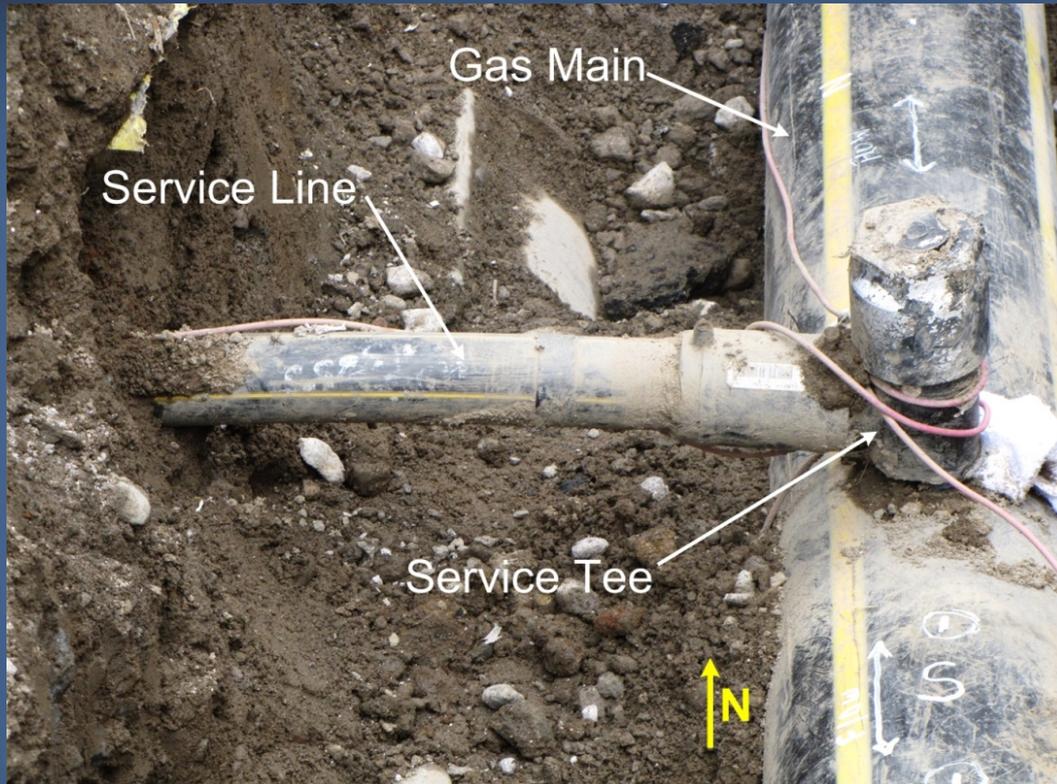
Utilities in the Accident Block



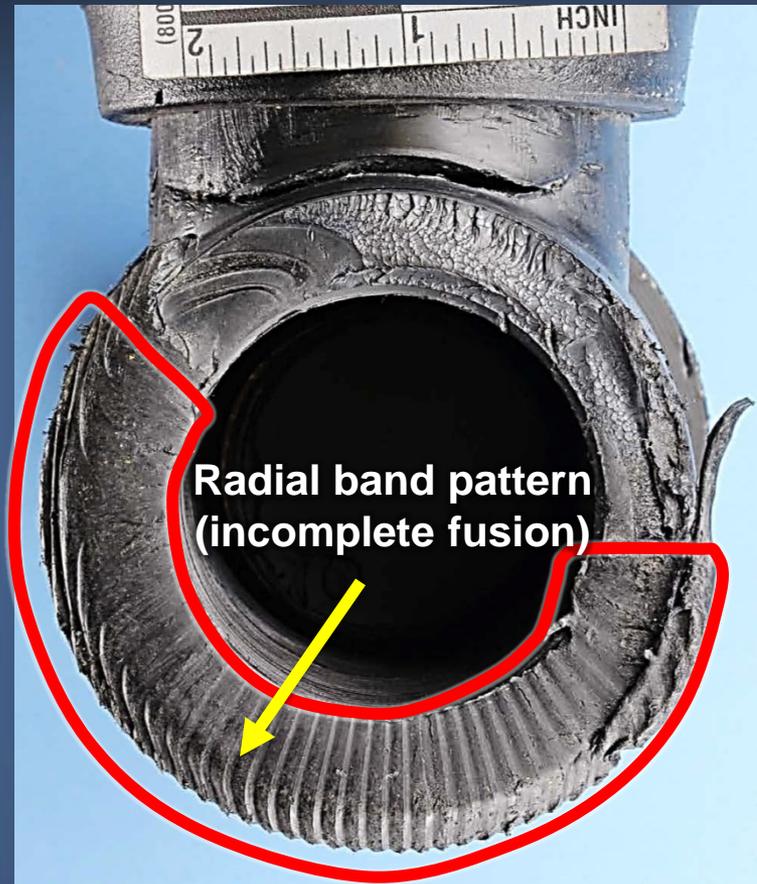
Saddle Fusion Joint Exemplar Test Piece



On-Scene Activities - Service Tee



Fusion Joint – Incomplete Fusion

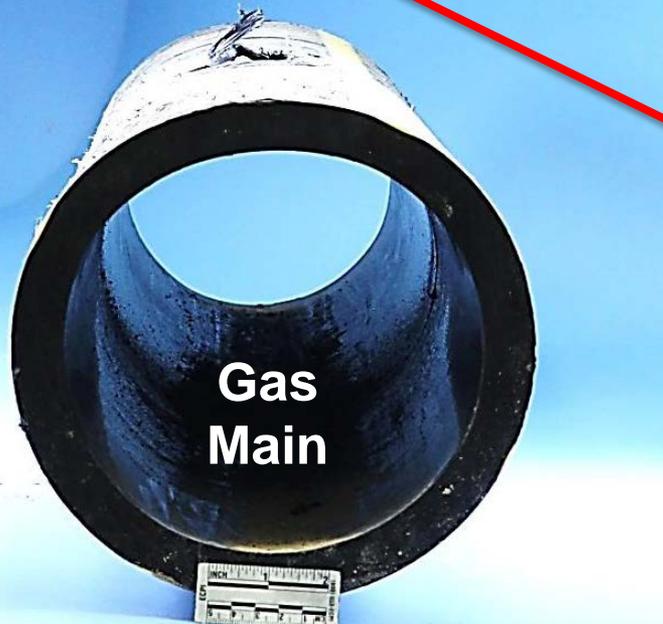


- Radial band pattern (60%)
- Is incomplete fusion
- Is a weld defect
- Weak bond strength
- Caused by contamination or inadequate surface preparation before fusion welding

Service Tee Fracture Face

Service Tee – Crack at Outlet

- No evidence of pre-existing crack
- Rapid loading event from post-accident excavation





Service Tee

Water Main
Crack

Gas Main

N



2014 Sewer Main Damage



Conclusions

- Large hole in the sewer dated back to 2006
- Service tee to gas main weld not properly cleaned – lack of fusion
- Supporting soil under the plastic gas main washed into the damaged sewer for many months

Conclusions (cont'd)

- Gas leak resulted when sagging gas main opened the defective weld
- Post-accident excavation work
 - Separated the service tee from the main
 - Cracked the branch outlet
- Water main cracked after the explosion

Probable Cause

- Defective service tee fusion weld leaked gas, which migrated into the building and ignited
- Unrepaired sewer line breach allowed groundwater to undermine the supporting soil under the gas main and overstress the defective weld

Recommendations

- City of New York - Improve sewer main integrity process
- Consolidated Edison - Revise plastic pipe fusion procedure
 - Cleaning methods
 - Improve final visual inspection

HCA Gas Transmission Line

Integrity Management Safety Study



Safety Study

NTSB/SS-15/01
PB2015-102735



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Recent NTSB Safety Studies

- Safety of Experimental, Amateur-Built Aircraft
- Curbside Motorcoach Safety
- Commercial Vehicle Onboard Video Systems

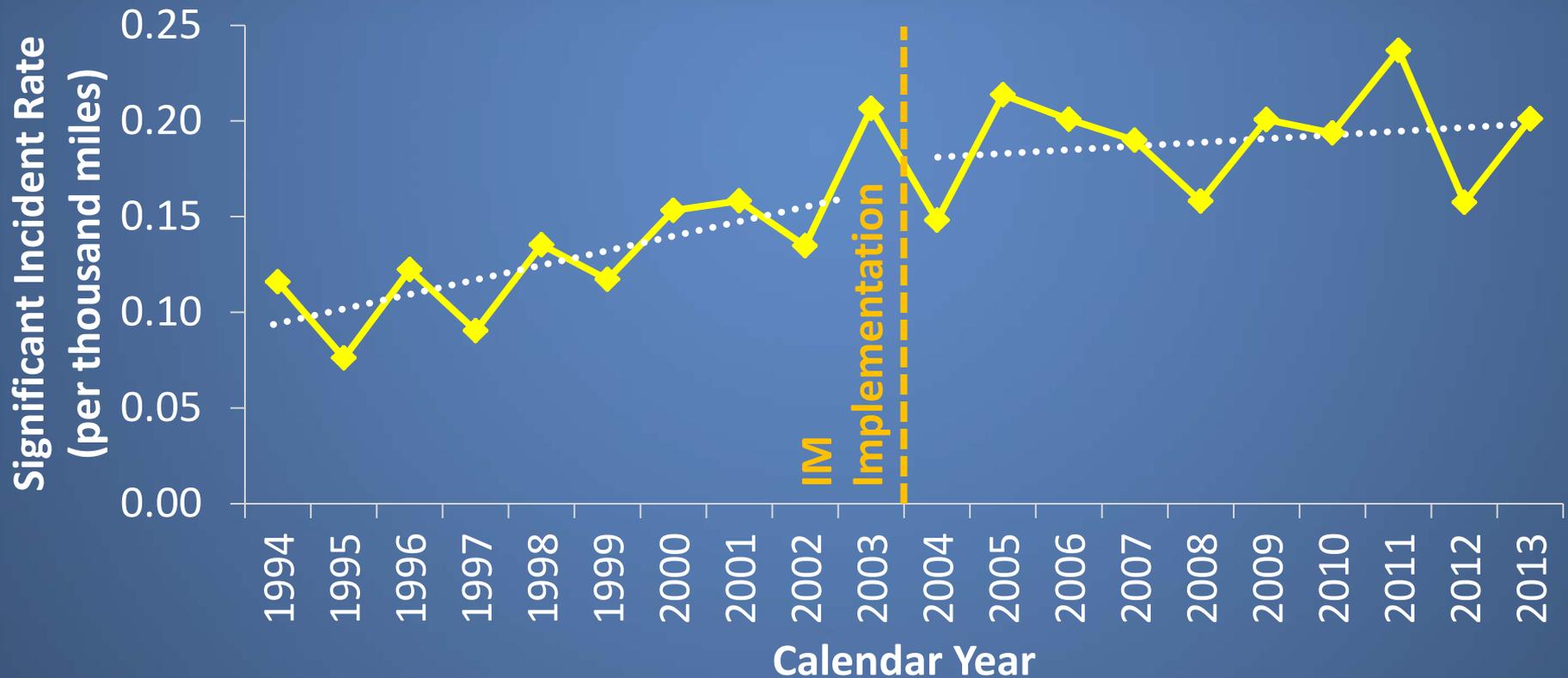


Motivation for the HCA IM Study

- Palm City, FL
May 4, 2009
- San Bruno, CA
September 9, 2010
- Sissonville, WV
December 11, 2012



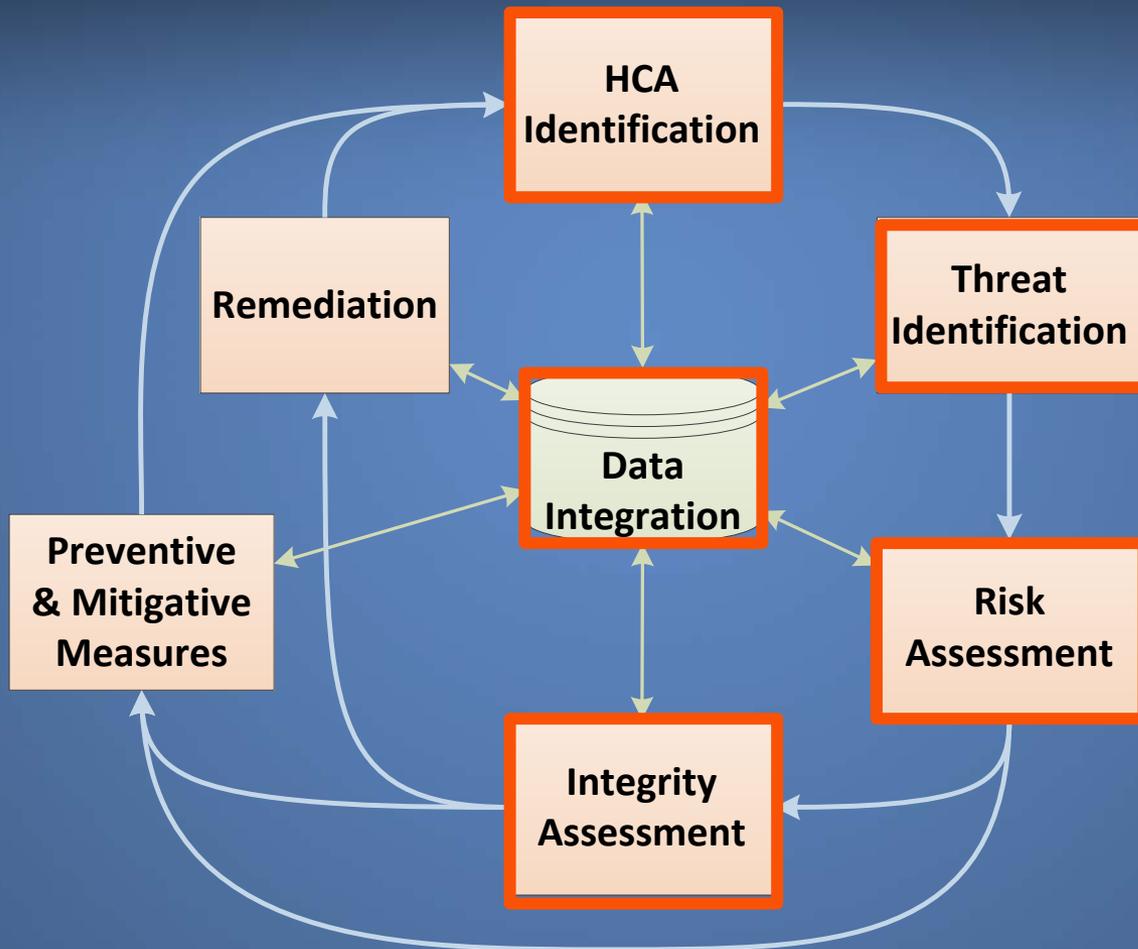
Gas Transmission Pipeline Significant Incident Rate (1994-2013)



Objective of the Pipeline Study

Evaluate the need for safety
improvements to gas transmission
high consequence area
integrity management programs

Focus Areas



Study Methodology

- Quantitative analysis of PHMSA data
 - Incident data and annual reports
 - National Pipeline Mapping System (NPMS)
 - IM progress reports and enforcement actions
- Stakeholder interviews
 - Federal and state regulators
 - Gas transmission pipeline operators
 - Firms and researchers providing IM services
 - Industry associations
- Stakeholder technical review of study

Topics Discussed

- HCA identification and verification
- Threat identification
- Risk assessment
- Integrity assessment
- Data integration and continual assessment
- Federal and state oversight

Safety Recommendations

- 28 new recommendations
 - 22 to PHMSA
 - 2 to AGA
 - 2 to INGAA
 - 1 to NAPSR
 - 1 to Federal Geospatial Data Committee
- 1 DOT reiterated recommendation

Pipeline Safety Axioms

- Know what you don't know
- Look for the unknown
- Think Leak
- Put the NTSB out of business



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202-314-6463

Robert.hall@ntsb.gov