National Transportation Safety Board

NTSB Investigation and Findings:

Over-pressurization of Natural Gas Distribution System, Explosions, and Fires, in Merrimack Valley, Massachusetts

Robert Sumwalt
NTSB Chairman

Our mission:

Prevent Accidents

Reduce Injuries

Save Lives


CBS THIS MORNING
DEADLY LIMO CRASH
20 KILLED IN ACCIDENT IN UPSTATE NY


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CONCEPTION

NTSB

- NTSB investigates accidents, determines probable cause, and issues safety recommendations.

- We do not have congressional authority to fine organizations, or enforce laws or regulations.


LIVE
NTSB LEAVING D.C. THIS MORNING FOR
MERRIMACK VALLEY TO INVESTIGATE
BREAKING
NEWS
#WCVB


INCIDENT
COMMAND

NTSB

Our investigation focused on:

- How and Why the over-pressurization occurred
- Emergency Response to this event
- Recommendations to improve safety

Safety Recommendations – November 2018

One recommendation to Massachusetts
Four urgent recommendations to NiSource

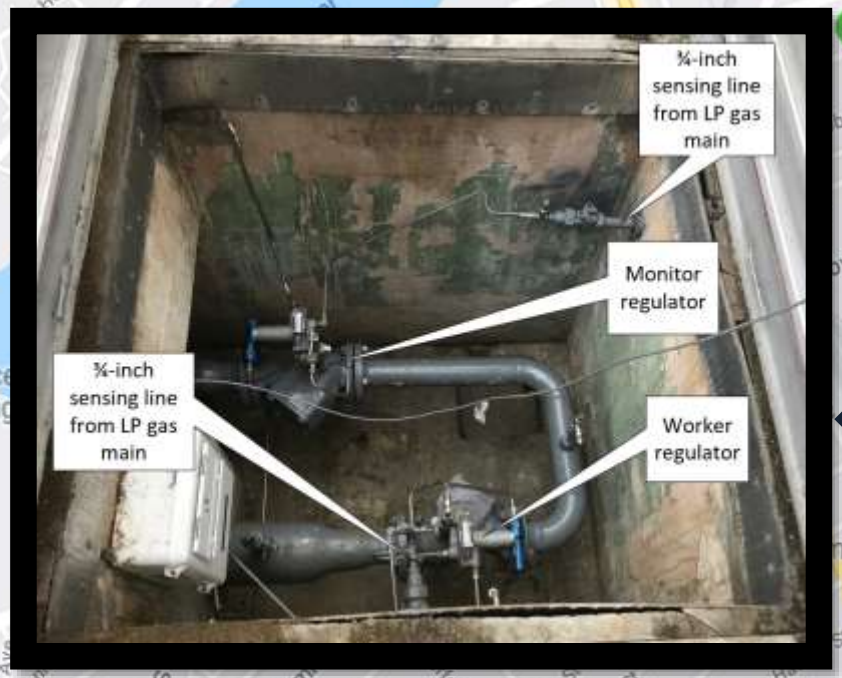
NTSB

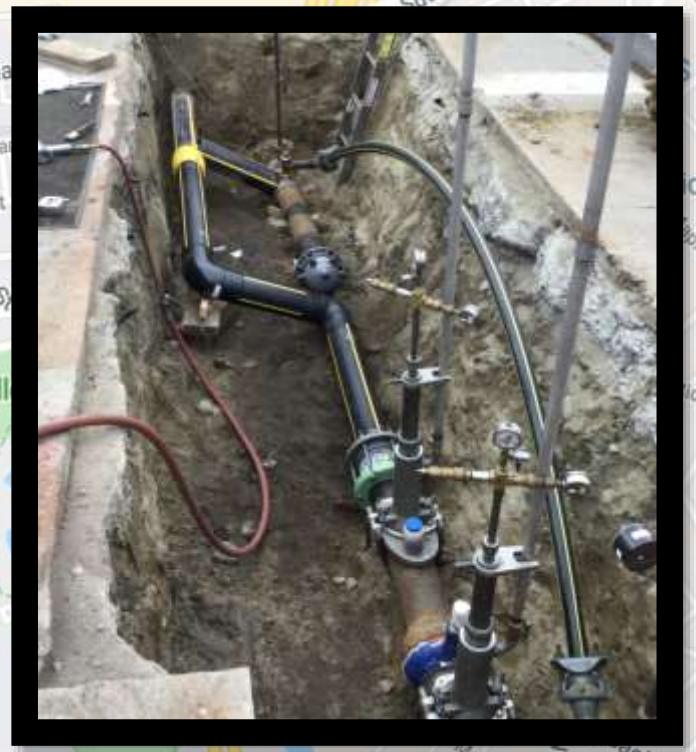
U.S. Senate Testimony
Lawrence, MA. November 26, 2018

(AP Photo/Winslow Townson)

NTSB Board Meeting

Washington, DC. September 24, 2019





Salem St.

South Union Street

Winthrop Ave.

Bypass

Branch Main

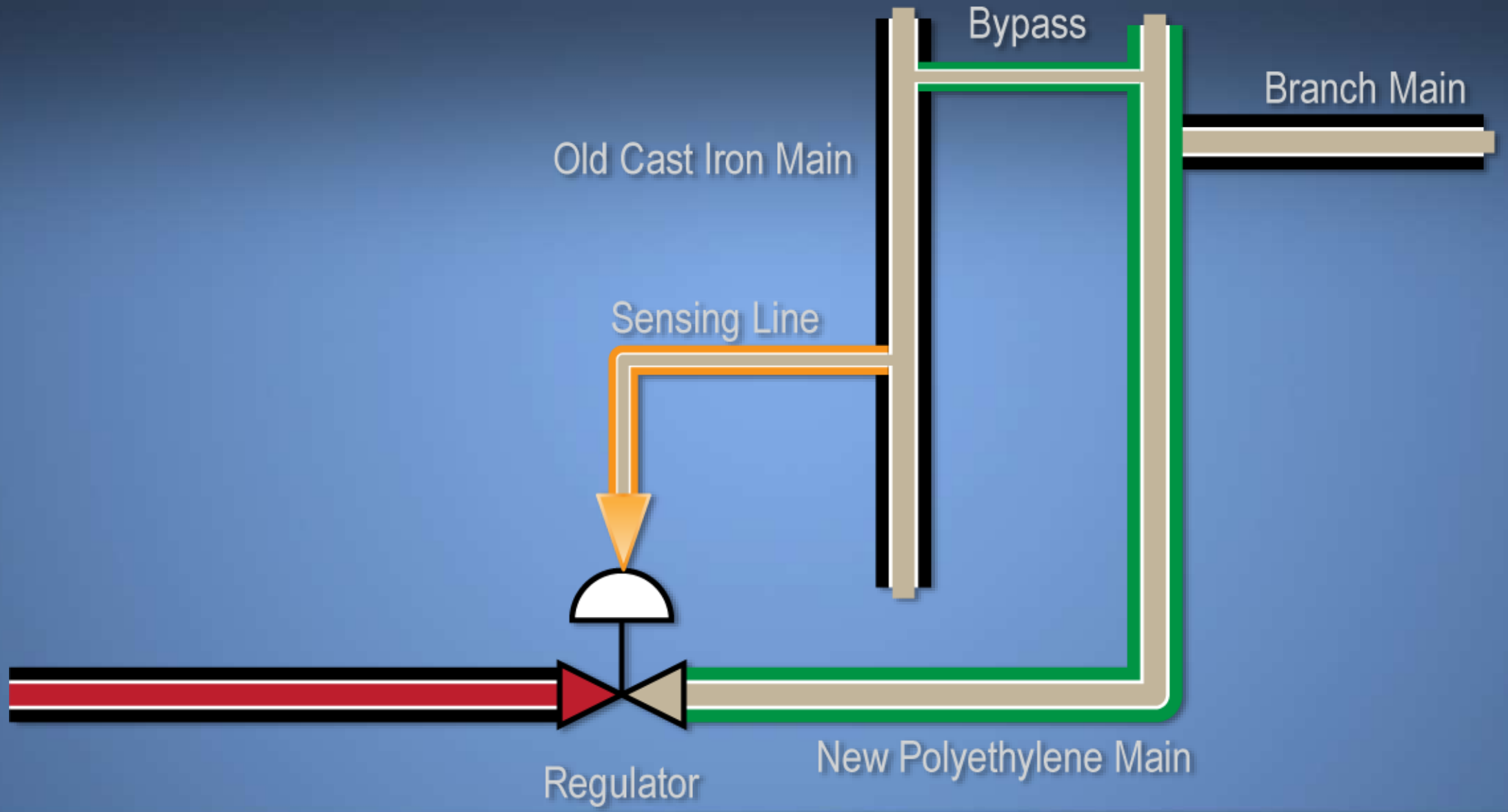
Old Cast Iron Main

Sensing Line

Regulator

New Polyethylene Main

NTSB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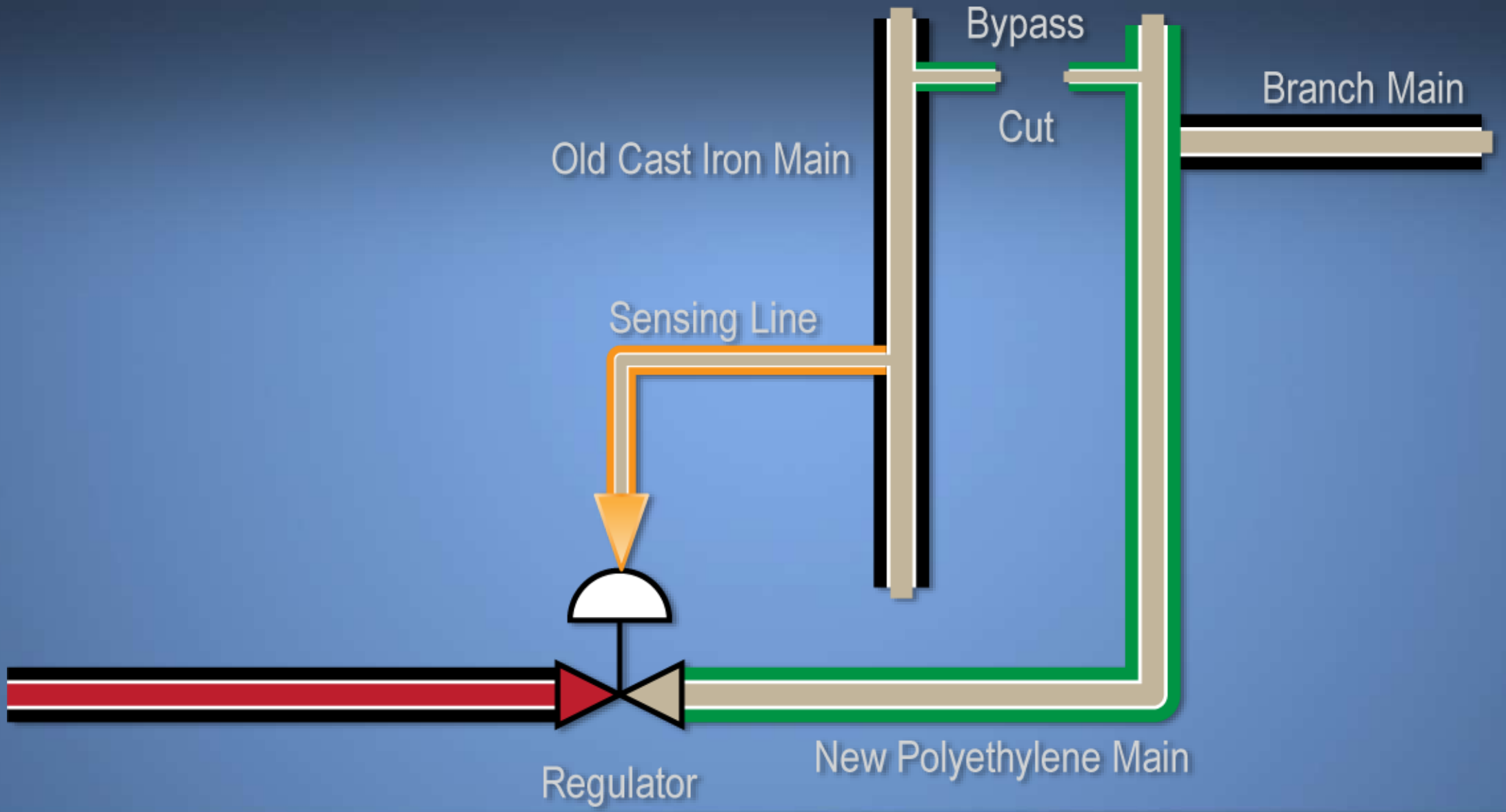
New Polyethylene Main

NTSB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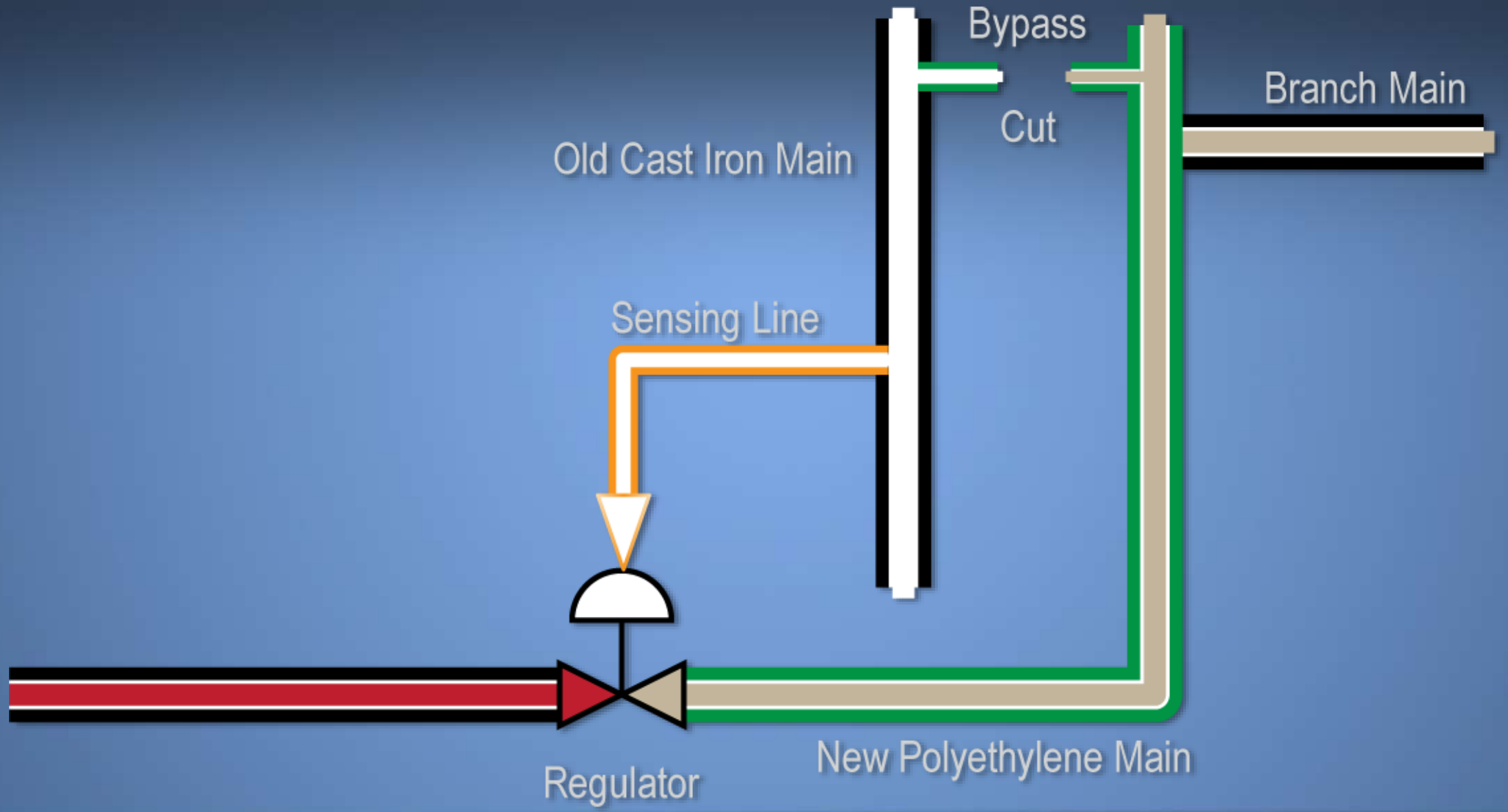
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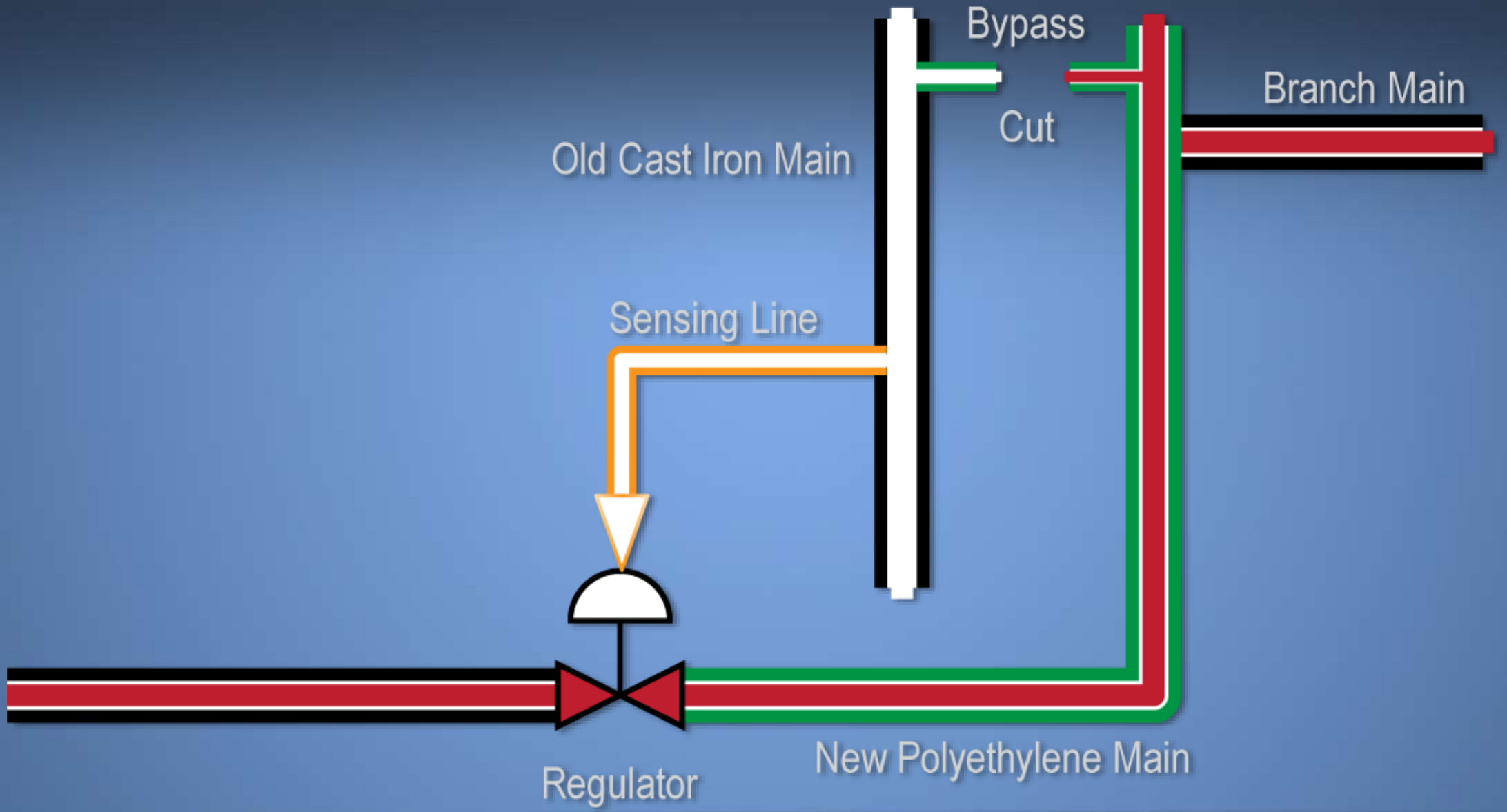
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- 14 findings
- 5 new safety recommendations
  - Pipeline and Hazardous Materials Safety Administration
  - Massachusetts Executive Office of Public Safety and Security
  - NiSource
  - 31 States
- Probable Cause

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Selected Findings

- NiSource's engineering risk management processes were deficient.
  - It failed to identify the possibility of human error that led to the over-pressurization.
- The Columbia Gas of Massachusetts constructability review process was insufficient and did not detect the omission of a work order to relocate the sensing lines.
- The delay between the development of the initial project work order and its execution had no impact on this accident.

Selected Findings

- The Columbia Gas incident commander faced multiple competing priorities, such as communicating with affected municipalities, updating the emergency responders, and shutting down the natural gas distribution system, which adversely affected his ability to complete his tasks in a timely manner.

- Columbia Gas was not adequately prepared with the necessary resources to assist with the emergency.

Probable Cause

Columbia Gas of Massachusetts' weak engineering management that did not adequately plan, review, sequence, and oversee the construction project that led to the abandonment of a cast iron main without first relocating regulator sensing lines to the new polyethylene main.

Contributing to the accident was a low-pressure natural gas distribution system designed and operated without adequate overpressure protection.

Safety Recommendations

To Pipeline and Hazardous Materials Safety Administration

- Make sure low-pressure natural gas distribution systems are protected against single operator error or equipment failure.

- Alert all natural gas system operators to the possibility of an overpressure event like the one in Merrimack Valley, and urge them to prevent such a failure on their system.

Safety Recommendations

To 31 States that don't require PE seal:

- Change your laws to require a professional engineer's seal on public utility engineering drawings.

Safety Recommendations

To Massachusetts Executive Office of Public Safety & Security:

- Develop guidance for effective first responder communications in a large-scale emergency event.

Safety Recommendations

To NiSource:

- Revise your response training for large-scale emergency events, so that timely information can be provided to first responders.

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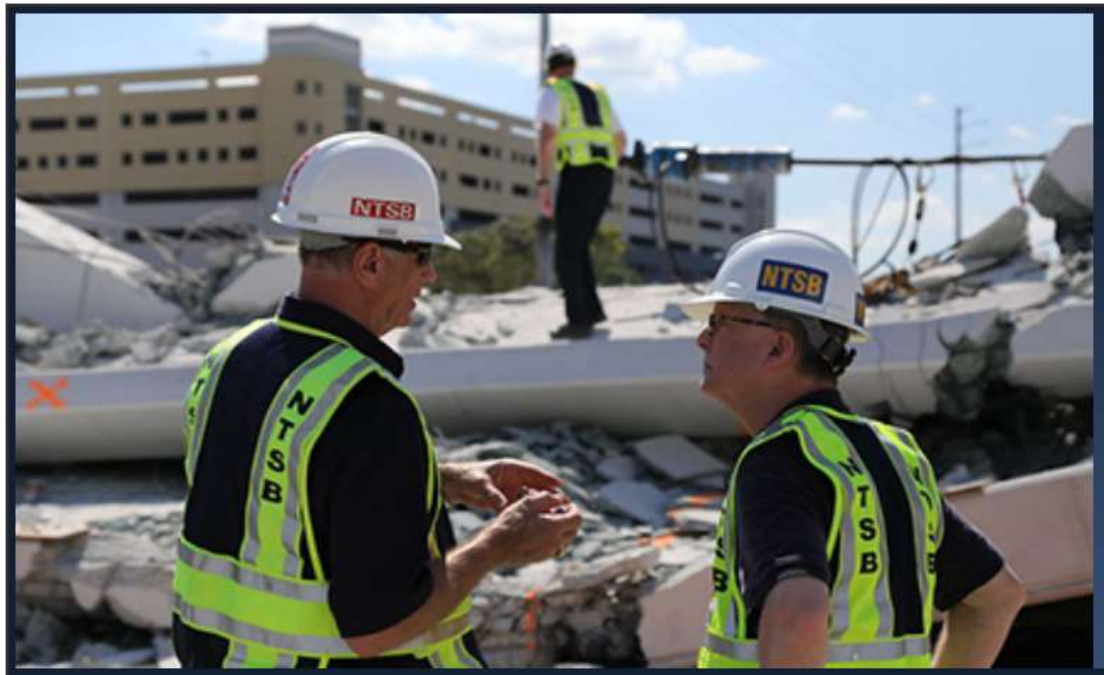

NTSB Photo by Chris O'Neil

NTSB News

The National Transportation Safety Board determined, during a public board meeting held on October 22, 2019, that load and capacity calculation errors made by FIGG Bridge Engineers, Inc., are the probable cause of the fatal, March 15, 2018, Florida International University pedestrian bridge collapse in Miami.

Read More

1 2 3

Accident Dockets | Safety Recommendations | Aviation Accident Database | Data & Stats | Training Center

Publications are formal reports produced by the National Transportation Safety Board.

Accident Reports

Reports which contain the facts, conditions, circumstances, analysis, conclusions and probable cause of accident investigations are published for all accidents which resulted in an investigation involving the launch of a team of specialists.

- Aviation Accident Reports
- Hazardous Materials Accident Reports<
- Highway Accident Reports
- Marine Accident Reports
- Pipeline Accident Reports
- Railroad Accident Reports

Safety Studies

Examination of the effectiveness of or need for policies, programs, program management and operating practices, regulations, rulemaking, or other actions of a Government agency in reducing transportation losses; the technical aspects of a transportation system, subsystem, or component; accident data through statistical analysis techniques; or the history and progress of safety improvements undertaken to solve a particular problem in aviation, highway, railroad, pipeline, marine, or hazardous materials transportation.

- Safety Alerts
- Safety Studies
- Safety Recommendations

Forms

Report An Aviation Accident

- Submit a Traffic Collision and Alerting System (TCAS) Report
- Report All Other Accidents/ Incidents (Form 6120.1)

For Parties to Accident/Incident Investigations

- Certification of Party Representative - [PDF, 146 KB]

Contact Us Online

- Online Comments

Pipeline Accident Reports

The NTSB issues an accident report following the investigation. The reports listing is sortable by the event date, report date, city, and state. Click on any of those headings to sort the data.

Showing 1 to 10 of 137 entries

First Previous 1 2 3 4 5 Next Last

Report Number	NTSB Title	Accident Date	Report Date	City	State	Country	NTIS Number	Report
PLD19FR002-preliminary-report	Preliminary Report Pipeline: Enbridge Inc. Natural Gas Pipeline Rupture and Fire	8/1/2019	10/8/2019	Danville	KY	USA		PDF
PAR1902	Overpressurization of Natural Gas Distribution System, Explosions, and Fires in Merrimack Valley, Massachusetts	9/13/2018	9/24/2019	Merrimack Valley	MA	USA	PB2019-101365	PDF
PAR-19-01	Building Explosion and Fire	8/10/2016	4/24/2019	Silver Spring	MD		PB2019-100722	PDF
PLD19MR001-preliminary	Preliminary Report PLD19MR001	2/6/2019	2/27/2019	SanFrancisco	CA			PDF
PAB1901	Pipeline Accident Brief: UGI Utilities Natural Gas-Fueled Explosion Millersville, Pennsylvania July 2, 2017	7/2/2017	2/25/2019	Millersville	PA	USA		PDF
PAB1802	Pipeline Accident Brief: Third-party Damage by Sure Shot Communications to Ameren	11/16/2016	12/3/2018	Canton	IL	USA		PDF

Overpressurization of Natural Gas Distribution System, Explosions, and Fires in Merrimack Valley, Massachusetts

Executive Summary

On September 13, 2018, about 4:00 p.m. local time, a series of structure fires and explosions occurred after high-pressure natural gas was released into a low-pressure natural gas distribution system in the northeast region of the Merrimack Valley in the Commonwealth of Massachusetts. The natural gas distribution system was owned and operated by Columbia Gas of Massachusetts, a subsidiary of NiSource, Inc. Columbia Gas of Massachusetts delivers natural gas to about 325,000 customers in Massachusetts. One person was killed and 22 individuals, including three firefighters, were transported to local hospitals due to injuries; seven other firefighters incurred minor injuries. The fires and explosions damaged 131 structures, including at least 5 homes that were destroyed in the city of Lawrence and the towns of Andover and North Andover. Most of the damage occurred from fires ignited by natural gas-fueled appliances; several of the homes were destroyed by natural gas-fueled explosions. Fire departments from three municipalities were dispatched to the fires and explosions. First responders initiated the Massachusetts fire-mobilization plan and received mutual aid from neighboring districts in Massachusetts, New Hampshire, and Maine. Emergency management officials had National Grid United States (the electric utility) shut down electrical power in the area, the state police closed local roads, and freight and passenger railroad operations in the area were suspended. Columbia Gas of Massachusetts shut down the low-pressure natural gas distribution system, affecting 10,894 customers, including some outside the area who had their service shut off as a precaution.

Probable Cause

Accident Location: Merrimack Valley , MA USA
Accident Date: 9/13/2018
Accident ID: PLD18MR003

Date Adopted: 9/24/2019
NTSB Number: PAR1902
NTIS Number: PB2019-101365

Related Report

PAR1902

PSR1802

PLD18MR003-preliminary-report

Related Recommendations

P-18-006
P-18-007
P-18-008
P-18-009

Related Press Releases

- October 21, 2019
  NTSB To Hold Community Outreach Event


Overpressurization of Natural Gas Distribution System, Explosions, and Fires in Merrimack Valley, Massachusetts September 13, 2018
pipeline
Accident Report
NTSB/PAR-19/02
PB2019-101365
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