New Hampshire Safety Division

- Underground damage prevention
- Pipeline safety
- Electrical safety & reliability
- Emergency preparedness & response
- Physical & cyber security
- Engineering, GIS, technical and analytical expertise

http://www.puc.nh.gov/Safety/safety.htm

New Hampshire Safety Division

Disclaimer: The following slides are often preliminary based on limited information and should not be substituted for actual reports. These do not reflect the NH PUC, NTSB, PHMSA or MA DPU.

Columbia Gas of Massachusetts

Natural Gas Pipeline Incident

OCA Board
Meeting November
19, 2018

Source: Associated Press

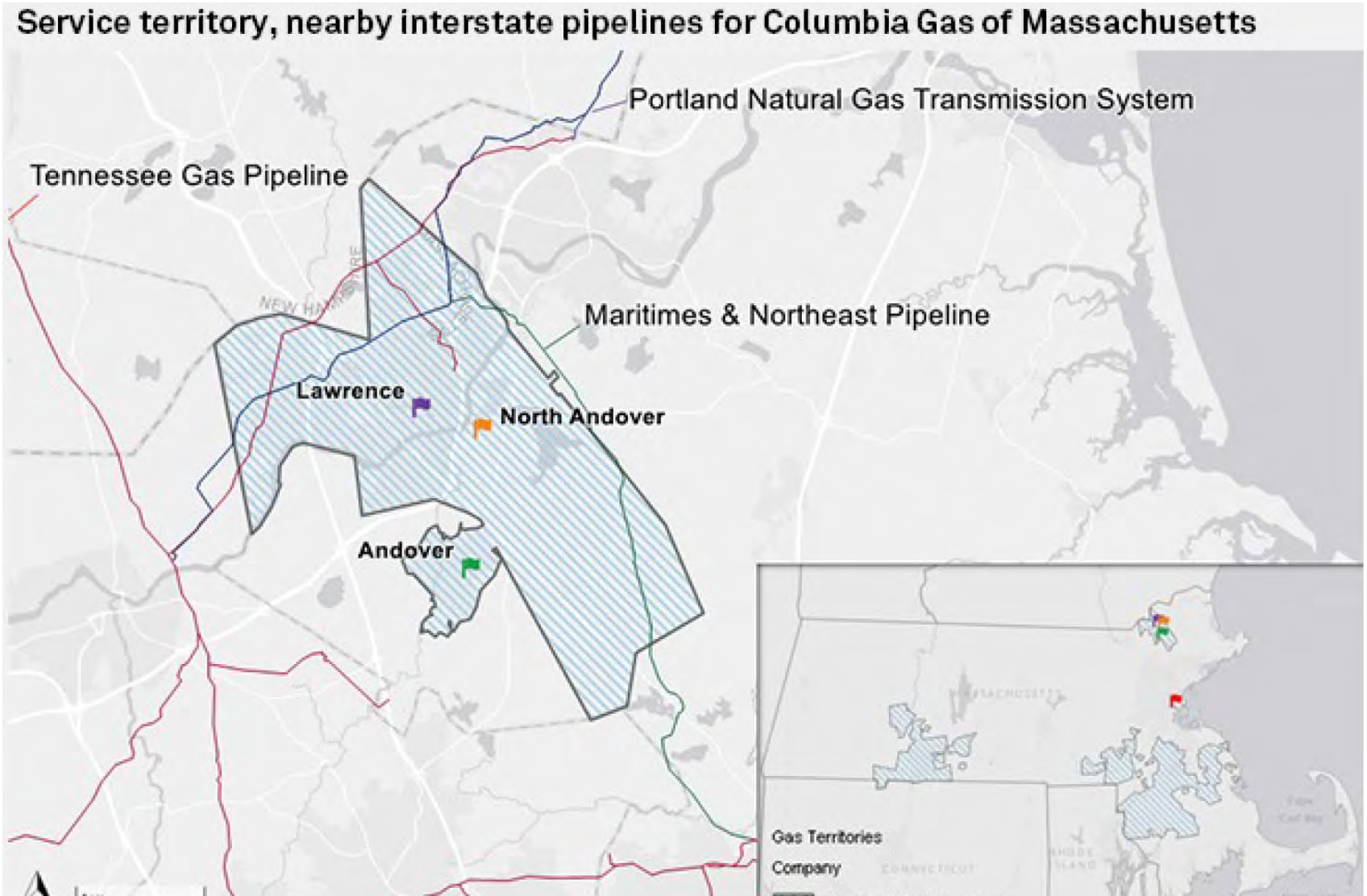
Background

- Merrimack Valley region is centered upon the Merrimack River which flows from Franklin, NH through Concord, Manchester & Nashua, continuing through Lowell, Lawrence and ending at the town of Merrimack which empties into the Atlantic Ocean
- Lawrence is a former Mill town housing textiles and shoe manufacturers but those industries have been converted to housing, incubators, electronics and educational facilities
- Lawrence, Andover and North Andover affected
- The three communities house more than 146,000 residents about 26 miles north of Boston, near the New Hampshire border.
- Lawrence, the largest of them, is a majority Latino city with a population of about 80,000.

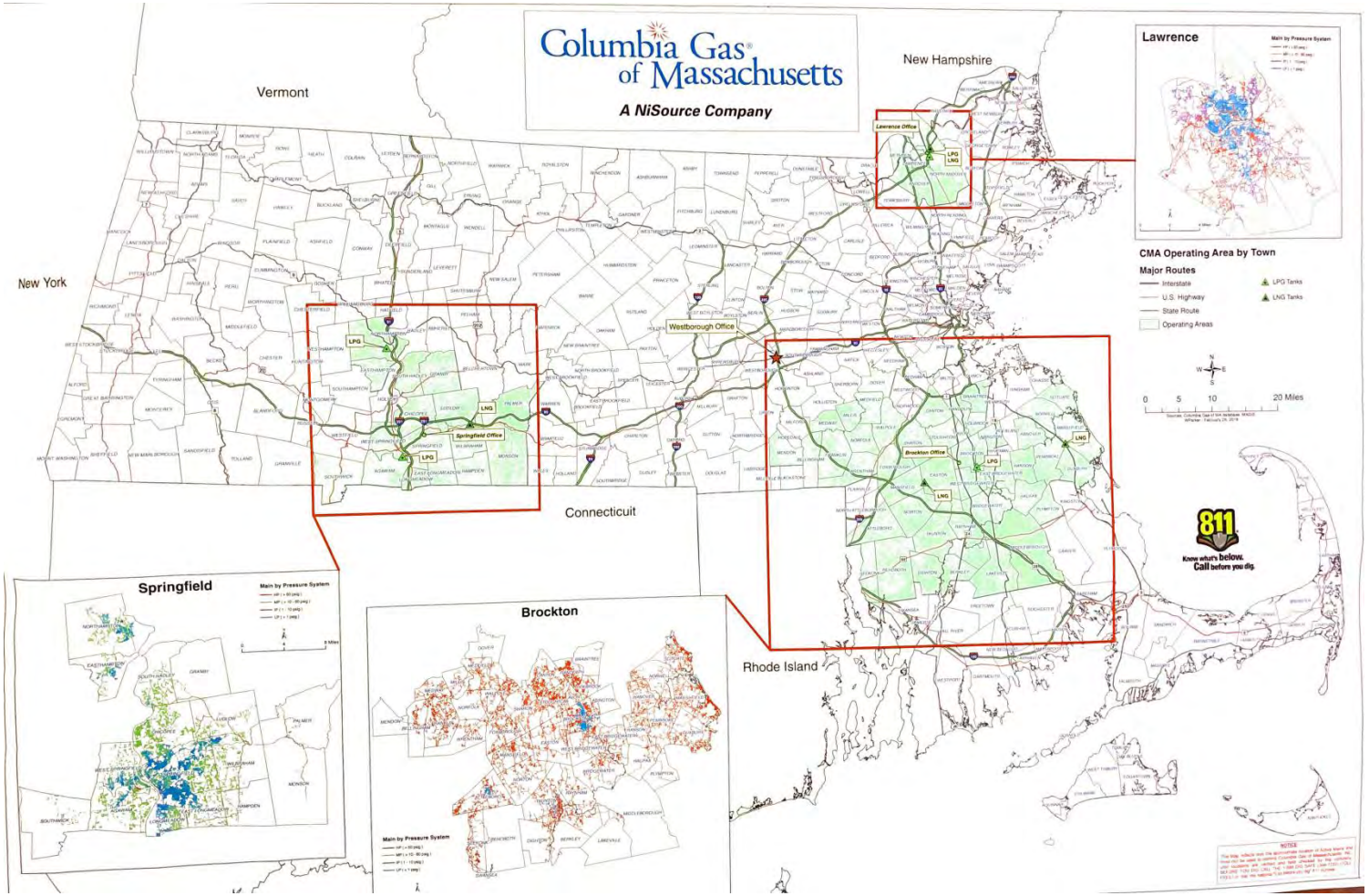
Background

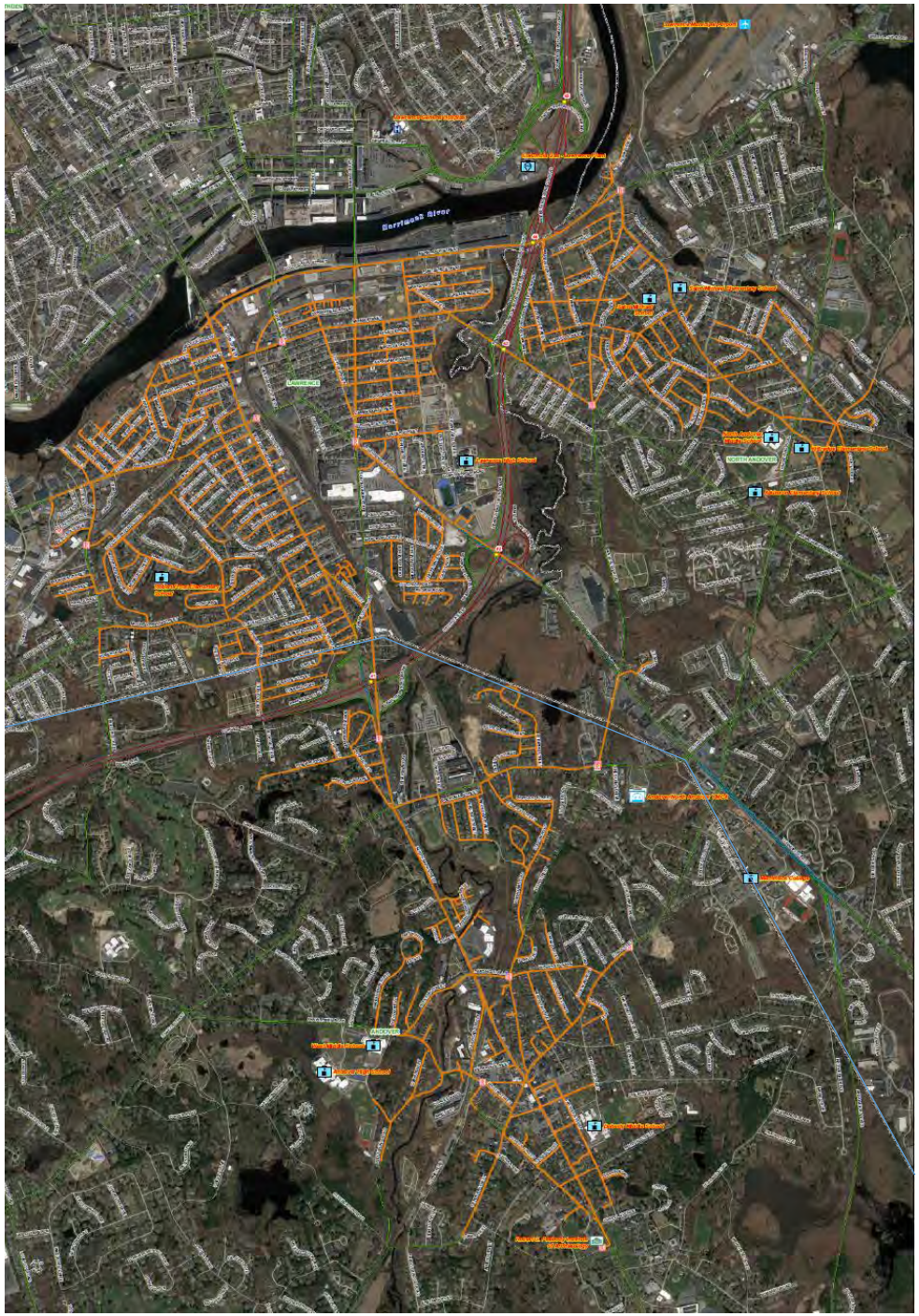
- The residences of Lawrence, Andover and North Andover vary greatly in age and style, this wide disparity makes restoration take much longer
- The majority homes have inside meters
- Best practices used today indicate that terminating the service and installing the meter outside is preferred

Background Service Territory & Interstate Pipelines



Columbia Gas of Massachusetts





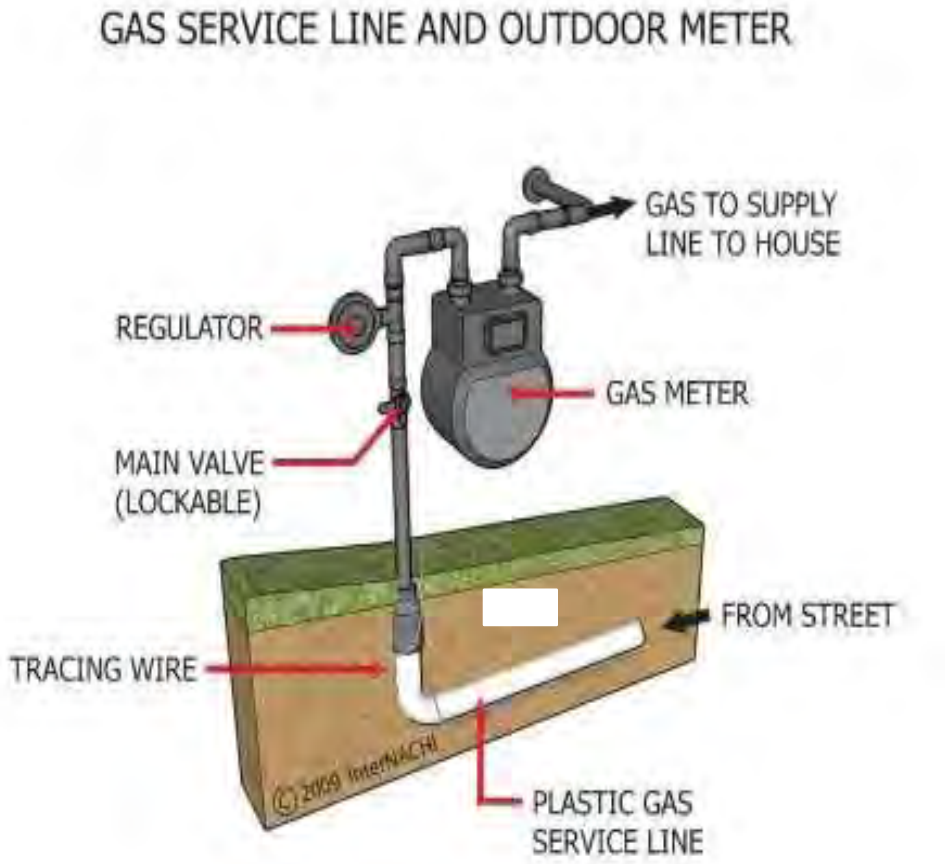
Lawrence Low Pressure system fed from 14 different high pressure underground vaults.

The Low Pressure System encompasses 3 town borders

Orange represents the low pressure system

Low Pressure System

- The Columbia Gas of Massachusetts local distribution system is a low pressure system (.5 psig)
- Regulators are not required to be installed on service lines less than 2 psig.
- The over pressurization allowed 75 psig to flow into the low pressure system.



Incident Summary

- 5:08 PM ET, September 13, 2018: Columbia Gas of Massachusetts (subsidiary of NiSource) notified the National Response Center that a house exploded due to over pressurization.
- ~6:00 PM ET, September 13, 2018: National media outlets were reporting multiple explosions, and towns of Lawrence, Andover, and North Andover Massachusetts were evacuated.
- 3:01 AM ET, September 14, 2018: Columbia Gas of Massachusetts provided an updated report to the NRC that there was 1 fatality and 25 injuries due to the incident.

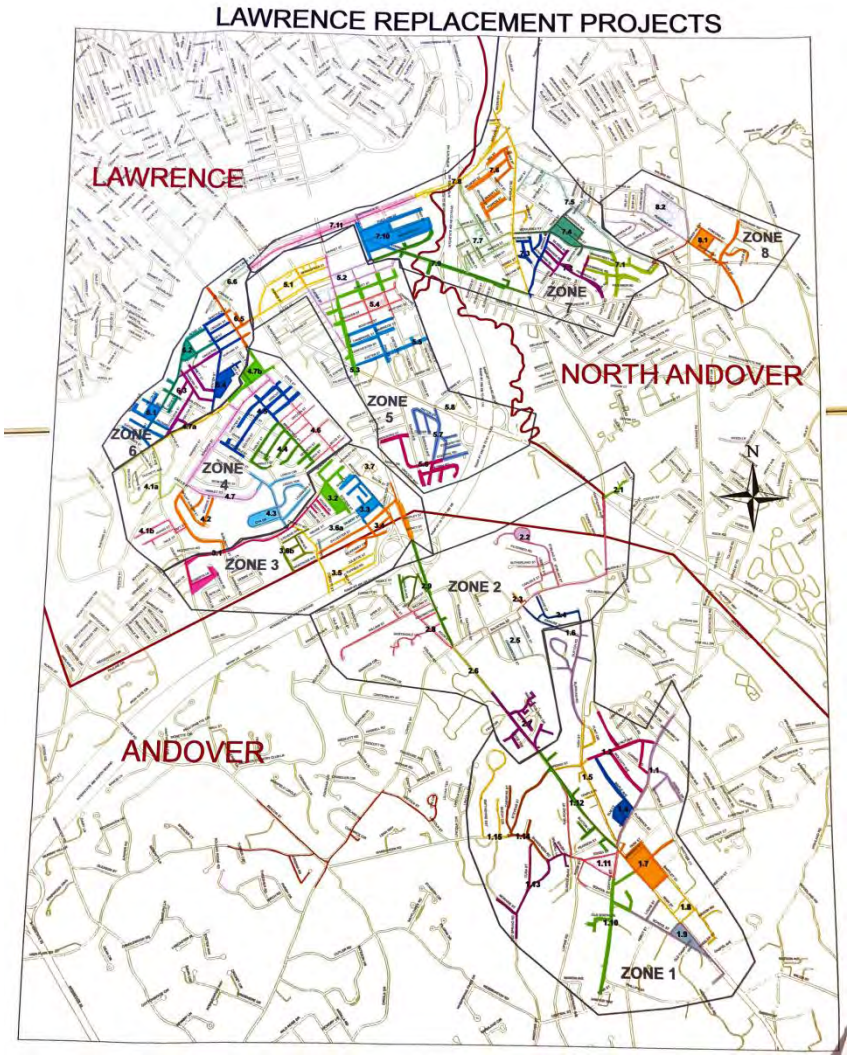
Source:
CNN

New Media Accounts were instantaneous

https://boston.cbslocal.com/video/3935161-merrimack-valley-explosions-lawrence-fire-dispatch-recordings/

Multiple calls for leaks, odors, fires and explosions throughout the area

Chickering Street, Lawrence scene of house explosion and fatality



Restoration Process was broken into 8 zones

All zones were converted to high pressure.

Low pressure mains were inserted with high pressure. Low pressure services are being brought outside and repiped and new meter installations.

Appliance installation has taken the longest because of lack of resources and the unique situation of each house (age, style, piping)

Chickering Street, Lawrence scene of house explosion and fatality

Jefferson Street, Lawrence

On September 13th power was shutoff to 18,000 addresses as a precaution to avoid ignition sources. The only lights were from fire trucks attending the situation


53

Jefferson Street, Lawrence


GALLANT

Over Pressurization Timeline – September 13, 2018

4:04 PM
- First over pressurization alarm.

5:20 PM
- Columbia Gas of Massachusetts decided to shutdown the local distribution system.

6:17 PM
- Pipeline over pressurization alarm ceased.

7:24 PM
- Columbia Gas of Massachusetts local distribution system shut down.

Massachusetts State Actions

- The Massachusetts Emergency Management Agency (MEMA) established an Incident Command on September 13, 2018 for the natural gas incident.
- The Massachusetts Department of Public Utilities (MA-DPU) which has regulatory authority over Columbia Gas of Massachusetts deployed an investigation team to the scene upon notification of the incident.
- Governor Baker of Massachusetts declared a State of Emergency in Lawrence, Andover, and North Andover on the following day

Source: Andover Patch

Governor Baker with City of Lawrence Mayor

PHMSA Actions

- September 13, 2018 - PHMSA deployed eight pipeline safety staff to the incident scene to provide onsite technical support to the MA-DPU, in addition to the NTSB. This lasted for the first few days while NTSB was present.
- September 13, 2018 - PHMSA deployed a Community Liaison to support the MEMA Incident Command
- September 24, 2018 - PHMSA deployed a member of its State Programs Division to Massachusetts to assist and support the MA-DPU for a week.
- Ongoing – PHMSA continues to support the NTSB and MA-DPU remotely.

State Program – NAPSR Actions

- Several state programs have volunteered qualified inspectors to help oversee the operator and contractors pipeline replacement and service tie in efforts.
- NH, PA, AZ, CT, MN, MI, OH, NY, VA and OR have volunteered and are sending personnel using state emergency mutual aid process.
- NAPSR has had discussions at the NAPSR National Meeting in Santa Fe the week of October 15.
- NAPSR has continued to offer support to the MA pipeline program.

Incident Investigation

- The National Transportation Safety Board deployed a “go-team” to the incident scene in the early morning of September 14, 2018. The “go-team” included two board members.
- The NTSB established two teams for the investigation: Operations and Emergency Response. Massachusetts Department of Public Utilities (MA-DPU) with PHMSA support had multiple staff members on each team.
- Approximately 120 fires were reported during the investigation interviews.
- The NTSB held a press conference on September 16, 2018 outlining a

Source: @NTSB_Newsroom

Apparent Cause

- Columbia Gas of Massachusetts had contractors onsite earlier on September 13, 2018 working on a cast-iron replacement project.
- Onsite reports indicate the regulator system's pressure sensing lines may have not been moved from a replaced depressurized older pipeline segment to the new pressurized pipeline put into service the day of the incident.

Apparent Cause (continued)

- The pressure sensing line directs the regulator to open/close based on the pressure it determines is needed.
- Since the sensing lines were connected to old depressurized pipeline, they registered “zero” pressure for the active pipeline when in fact the active pipeline did have adequate pressure.
- In this case the sensing line directed the regulator to fully open, allowing high pressure gas to feed into the low-pressure distribution system.

Underground Vault that was source of the high pressure mains (99 psig MAOP) operating at approximately 76 psig on Sept 13, 2018.

This reduces to inches of water column (0.5psig)

There is are 2 sensing lines that provides the downstream pressure to both regulators (worker/monitor)

Regulators can be designed to fail open or to fail close

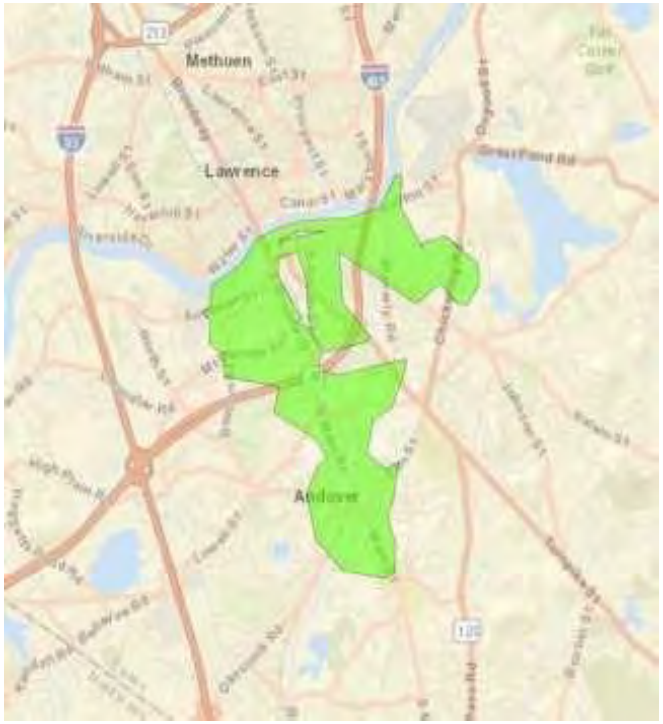
Impacts

Community Impacts

- 8,570 Gas Meters in Lawrence, North Andover, and Andover remain shut off
- Target date for full restoration is ~~November 19, 2018~~

  December 19, 2018

Impacted Service Area



Things for Operators to Consider

- Do you have a procedure that calls for a written plan when working in the vicinity of new or replacement regulator stations?
- Similar to an uprating plan, a written plan would identify key steps and personnel and help ensure that a critical step is not missed.
- At a minimum, is a tailboard session conducted prior to any job that involve pressure regulation tie-ins', tie-overs, key valve opening or closing, or any operation that could result in over-pressure of a system?
- Are you instilling a "safety culture"?

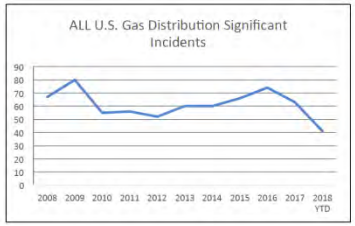
Things for Regulators to Consider

- How good is the Public awareness system actually? Does it require consistent messaging to the public from first responders and the gas operator
- Emergency plans are scalable but how have operators really put thought into plans into wide scale outages?
- Why don't you sectionalize? Tertiary OPP? Excess flow valves on low pressure?
- What directives have you issued? PA, NY, NH, IN, MD, OH have issued some sort of review
- Commissions can expect scrutiny of the safety Program, enforcement actions, hiring and sufficency

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration

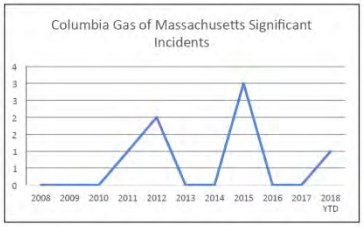
PHMSA Pipeline Incidents: (1998-2017)
Incident Type: Significant **System Type:** GAS DISTRIBUTION
Companies: ALL COMPANIES ENTIRE U.S.

Calendar Year	Number	Fatalities	Injuries	Total Cost Current Year Dollars
2008	67	6	47	$20,767,955
2009	80	9	47	$26,763,193
2010	55	8	39	$20,497,511
2011	56	11	48	$23,442,367
2012	52	7	43	$24,954,682
2013	60	7	34	$37,020,712
2014	60	18	92	$73,320,857
2015	66	2	32	$30,579,618
2016	74	10	74	$53,952,014
2017	63	4	29	$68,370,642
2018 YTD	41	2	29	$33,015,106



PHMSA Pipeline Incidents: (1998-2017)
Incident Type: Significant **System Type:** GAS DISTRIBUTION
Companies: Columbia Gas of Massachusetts

Calendar Year	Number	Fatalities	Injuries	Total Cost Current Year Dollars
2008	0	0	0	$0
2009	0	0	0	$0
2010	0	0	0	$0
2011	1	0	0	$113,116
2012	2	0	17	$1,759,635
2013	0	0	0	$92,055
2014	0	0	0	$69,660
2015	3	0	0	$2,755,562
2016	0	0	0	$0
2017	0	0	0	$0
2018 YTD	1	0	2	$188,516



Immediately within days many articles regarding Cast Iron Statistics, Bare Steel Statistics, Accidents and Incidents National versus State Comparisons

Expect comparison rates on leaks, miles of cast iron or bare steel, incidents

Significant Gas Distribution Pipeline Incidents In Massachusetts By Cause - 2008 - 2017

Portal - Data as of **9/13/2018**
Data Source: US DOT Pipeline and Hazardous Materials Safety Administration

Reported Cause of Incident	Incident Cause SubType	Number	%	Fatalities	Injuries	Total Cost
ALL OTHER CAUSES	MISCELLANEOUS	3	14.3%	0	0	$755,649
ALL OTHER CAUSES Total		**3**	**14.3%**	**0**	**0**	**$755,649**
EXCAVATION DAMAGE	THIRD PARTY EXCAVATION DAMAGE	5	23.8%	1	0	$830,860
EXCAVATION DAMAGE Total		**5**	**23.8%**	**1**	**0**	**$830,860**
INCORRECT OPERATION	DAMAGE BY OPERATOR OR OPERATOR'S CONTRACTOR	1	4.8%	0	17	$1,310,300
	INCORRECT INSTALLATION	1	4.8%	0	0	$123,490
	OTHER INCORRECT OPERATION	2	9.5%	0	0	$609,451
INCORRECT OPERATION Total		**4**	**19.0%**	**0**	**17**	**$2,043,241**
NATURAL FORCE DAMAGE	EARTH MOVEMENT	1	4.8%	0	0	$632,000
	OTHER NATURAL FORCE DAMAGE	1	4.8%	0	0	$1,097,565
	TEMPERATURE	3	14.3%	0	2	$1,079,618
NATURAL FORCE DAMAGE Total		**5**	**23.8%**	**0**	**2**	**$2,809,183**
OTHER OUTSIDE FORCE DAMAGE	INTENTIONAL DAMAGE	1	4.8%	1	0	$106,436
	OTHER OUTSIDE FORCE DAMAGE	2	9.5%	0	0	$2,515,980
	VEHICLE NOT ENGAGED IN EXCAVATION	1	4.8%	0	0	$315,400
OTHER OUTSIDE FORCE DAMAGE Total		**4**	**19.0%**	**1**	**0**	**$2,937,816**
Grand Total		**21**	**100.0%**	**2**	**19**	**$9,376,749**

Industry Efforts

- AGA Board of Directors is working on a safety project to address the elements of the Merrimack Valley incident
- If approved, a working group will be formed to review and come up with guidelines to help prevent over-pressure incidents
- Other groups such as the American Public Gas Association (APGA) may also focus on preventing over-pressurizations
- These groups can issue white papers, studies, advisories and other communications to their member operators, thus it is another good avenue to get the word out

Massachusetts Federal Delegation has been active

- Senator Warren's office and Senator Markey's office
- Issued a number of requests to NiSource and Columbia Gas
- Issued a number of requests to PHMSA
- Had briefings with NTSB
- Have called for field hearing November 26 at Lawrence Middle School 9 am

Criminal Investigation launched

- There have only been 3 federal criminal investigations launched
- 49 U.S. Code § 60123 - Criminal penalties
- Olympia Pipeline, WA, 1999 (3 people died and 225,000 gallons gasoline spilled into a river) – 3 employees went to jail & $112 million in fines
- San Bruno, CA Transmission Incident, 2010, $ 6 million in 11 felony criminal violations as a company for PGE, no jail for employees
- Lawrence, MA Distribution Overpressurization 2018 launched grand jury subpoenas on Sept. 24 by US Attorney's office of MA.

“San Bruno of the East”

- Almost 8 years after San Bruno, CA Gas Explosion that affected a transmission pipeline with 8 fatalities
- This will affect the Pipeline Reauthorization of 2020 that is currently underway.
- Expect NTSB recommendations
- The effects of Lawrence will be felt for years, coast to coast – this is not just a cast iron issue or a Northeast issue.

“Overpressurizations should NEVER occur ”

- It is not acceptable to have even minor over pressurizations. They are indicators of poor practices and policies. There are basic steps to avoid this.
- No customer should ever have to worry about an overpressurization occurring.
- Avoiding Overpressurizations are in all subparts of Part 192. (Design, Materials, Personnel, Operations, Maintenance, Integrity Management)

Bloomberg Energy Quote Oct 22, 2018

Business: Ryan Beene Naureen S Malik By ,and Jim Efstathiou Jr
Updated on October 12, 2018 2:12 PM
Pipeline Blasts Tied to Utility Work Plans Draw Senate Hearing

What happened in Massachusetts "cannot and should not ever happen," Randy Knepper, director of safety and security at the New Hampshire Public Utilities Commission, said in an email Thursday. "Pipeline safety is built around the cornerstone of never over-pressuring a system" and much of that depends on communications and monitoring of different systems, he said.

Response by NH PUC Commission

- The Commission ordered on September 28, 2018 Unitil and Liberty to complete within 60 days a review regarding Documentation and Safety Procedures in another effort to avoid wide spread Over-Pressurizations
  1. Consider using tertiary overpressure protection devices
  2. Identify all areas where multiple pressure mains coexist and update details including services and identification of facilities
  3. Documented Sign offs now required for work plans where these are located
  4. Priority must be given for record updates in these area

Response by NH PUC Commission

- The Commission ordered on September 28, 2018 Unitil and Liberty to complete within 60 days a review regarding Documentation and Safety Procedures in another effort to avoid wide spread Over-Pressurizations
  5. Review existing safeguards
  6. Review historical incidents in other states
  7. Highlight existing safeguards explicitly contained in procedures
  8. Annotate any new safeguards that may improve those in place
  9. Develop Specific emergency actions/plans for each retirement/abandonment project in case something goes wrong

Response by NH PUC Commission

- The Commission ordered on September 28, 2018 Unitil and Liberty to complete within 60 days a review regarding Documentation and Safety Procedures in another effort to avoid wide spread Over-Pressurizations

10. Include as much detail as possible for district regulating stations, both internally and externally to vaults and above ground stations
11. Include other utilities infrastructure and surrounding geographic features on plans involving district regs
12. Qualified personnel who work on those stations must be present when work is conducted in vicinity of those stations for 1st, 2nd, 3rd party excavations

Questions?