



National Transportation Safety Board

A Review of Significant Incidents

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Pipeline Accident Investigator

Overview

- Organization & History
- Investigative Process
- Lessons Learned in Recent Investigations
- Pipeline Safety Management Systems

NTSB Board and Organization



Honorable Robert L. Sumwalt,
Chairman



Honorable Bruce Landsberg,
Vice Chairman



Honorable Jennifer Homendy,
Member



Honorable Michael Graham,
Member



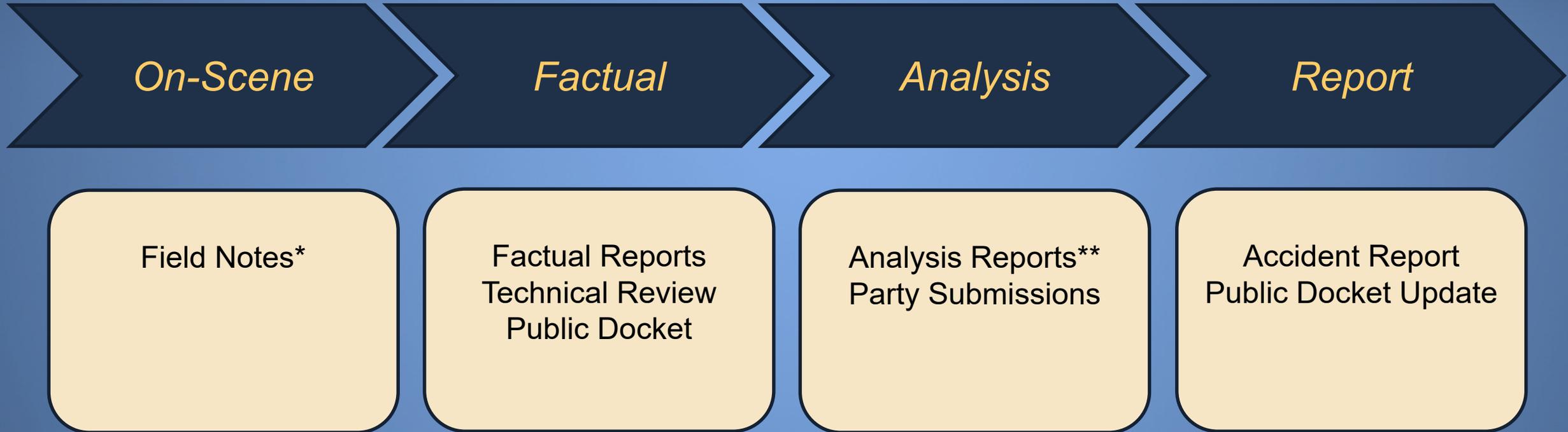
Honorable Thomas Chapman,
Member

NTSB Statutory Authority – Pipelines

Independent Safety Board Act of 1974

- NTSB investigates to determine
 - Facts and circumstances
 - Probable cause
- Criteria for determining when to investigate

Investigative Process

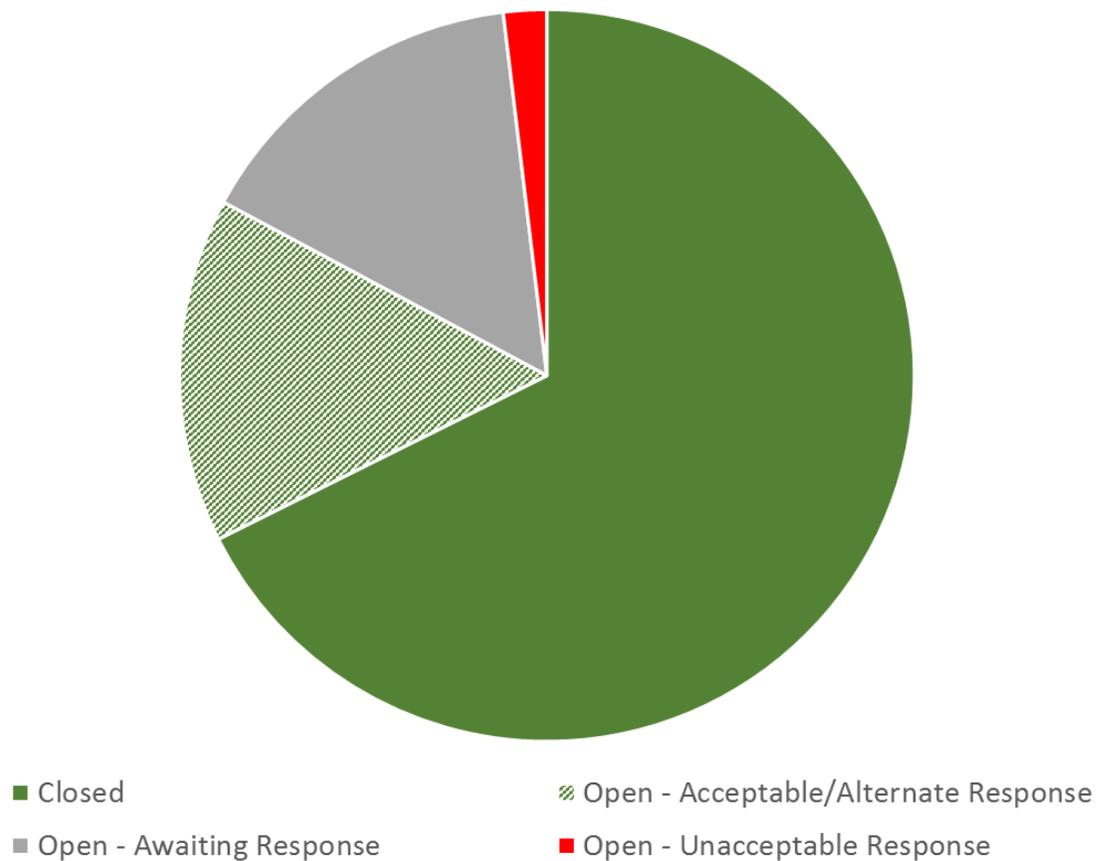


*preliminary

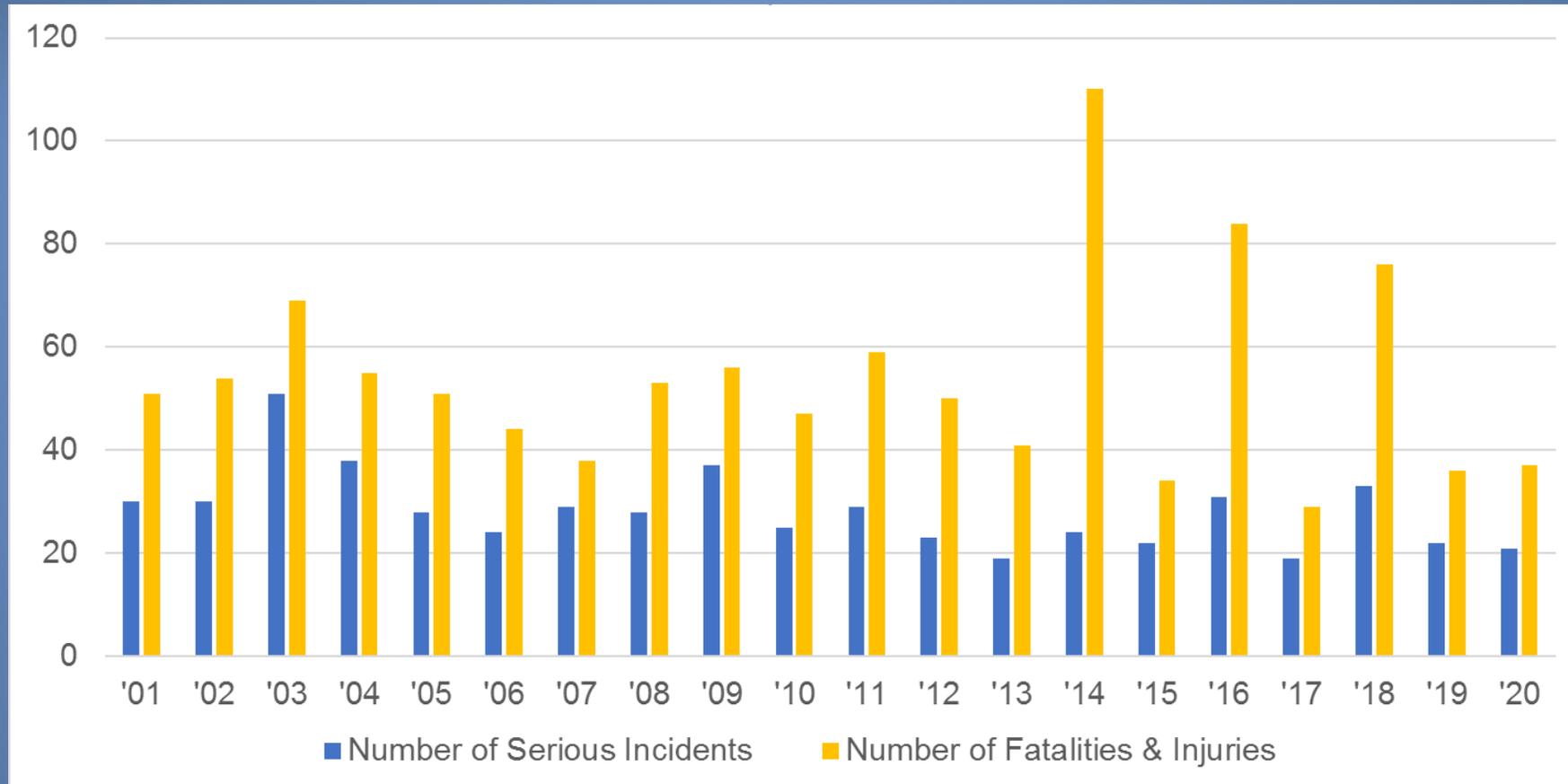
**pre-decisional

Safety Recommendations

Pipeline Safety Recommendations Since 2010



Gas Distribution Pipeline Incident Trends



Pipeline Investigations – Last 10 years

Natural gas distribution

- *San Francisco, CA – 2/6/2019
- Merrimack Valley, MA – 9/13/2018
- Dallas, TX – 02/23/2018
- Minneapolis, MN – 8/7/2017
- Millersville, PA – 7/2/2017
- Canton, IL – 11/16/2016
- Silver Spring, MD – 8/10/2016
- New York, NY – 3/12/2014
- Birmingham, AL – 12/17/2013

*Ongoing Investigations

Hazardous liquid

- *Corpus Christi, TX – 8/21/2020 (Propane)
- Amherst, SD – 11/16/2017 (Crude oil)
- Tekamah, NE – 10/17/2016 (Anhydrous ammonia)
- Helena, AL – 10/31/2016 (Gasoline)
- Centreville, VA – 9/21/2015 (Light non-aqueous phase liquid)

Natural gas transmission

- *Hillsboro, KY – 5/04/2020
- *Danville, KY – 8/1/2019
- Sissonville, WV – 12/11/2012

Natural gas gathering

- Firestone, CO – 4/17/2017

Open Investigations Involving Pipelines*

August 1, 2019 – Danville, KY



August 21, 2020 – Corpus Christi, TX



February 6, 2019 – San Francisco, CA



Photograph by Santiago Mejia, *The Chronicle*

May 4, 2020 – Hillsboro, KY



Source: Kentucky Public Service Commission

Background Source: Google Earth

Source: Orion Marine Group

*Preliminary factual information from ongoing investigations

Dallas, Texas

Event 1

February 21, 2018 – 5:49 a.m.
Explosion and fire reported



3527 Durango Drive
One injury - second-degree burns

Event 2

February 22, 2018 – 10:21 a.m.
Fire reported



3515 Durango Drive
One injury - second-degree burns

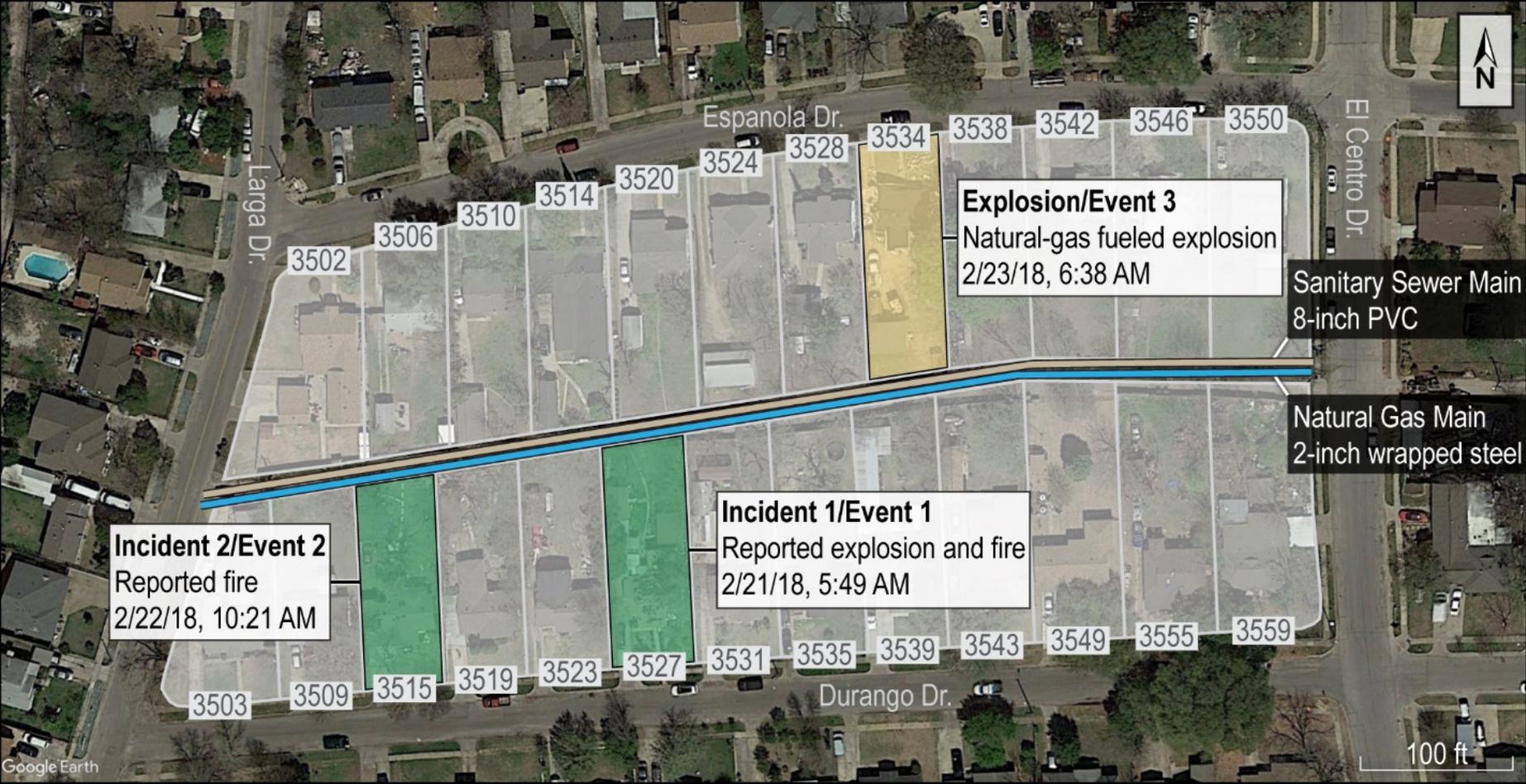
Event 3

February 23, 2018 – 6:38 a.m.
Explosion reported

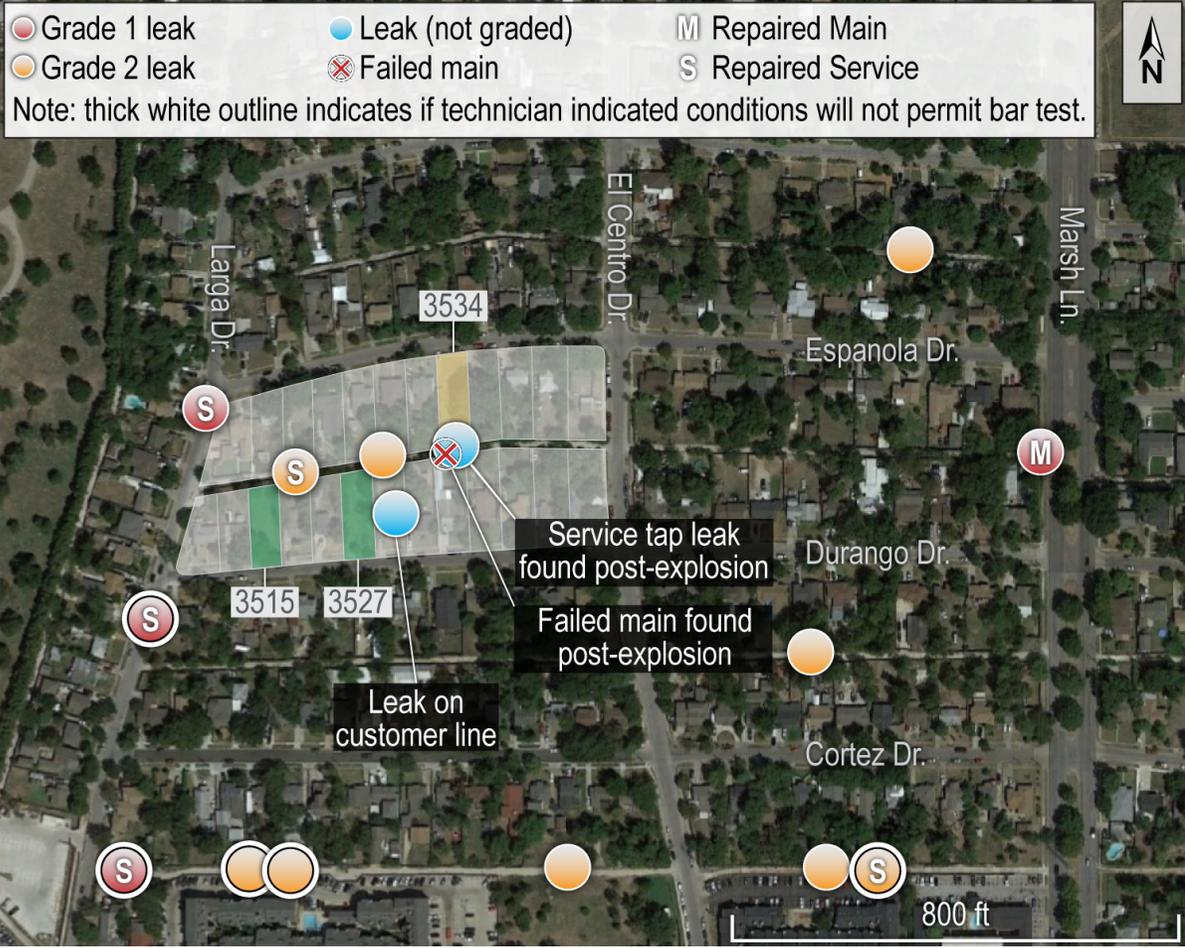


3534 Espanola Drive
Five injuries - one fatal

Dallas, Texas



Dallas, Texas

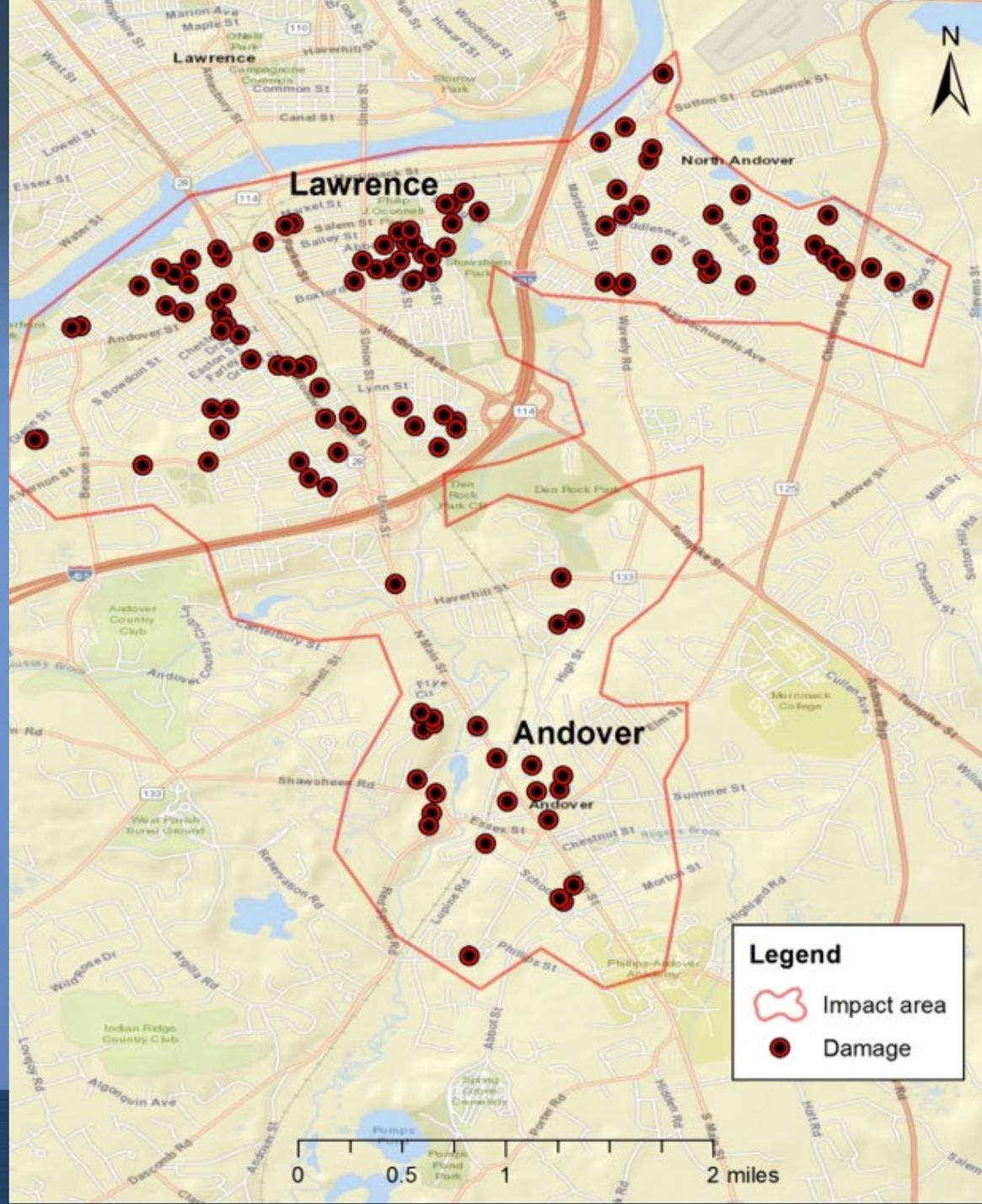


Photograph courtesy of Atmos Energy Corporation

Previous NTSB Investigated Accidents

Subsurface Natural Gas Migration, Odor Stripping, and Methane Detection

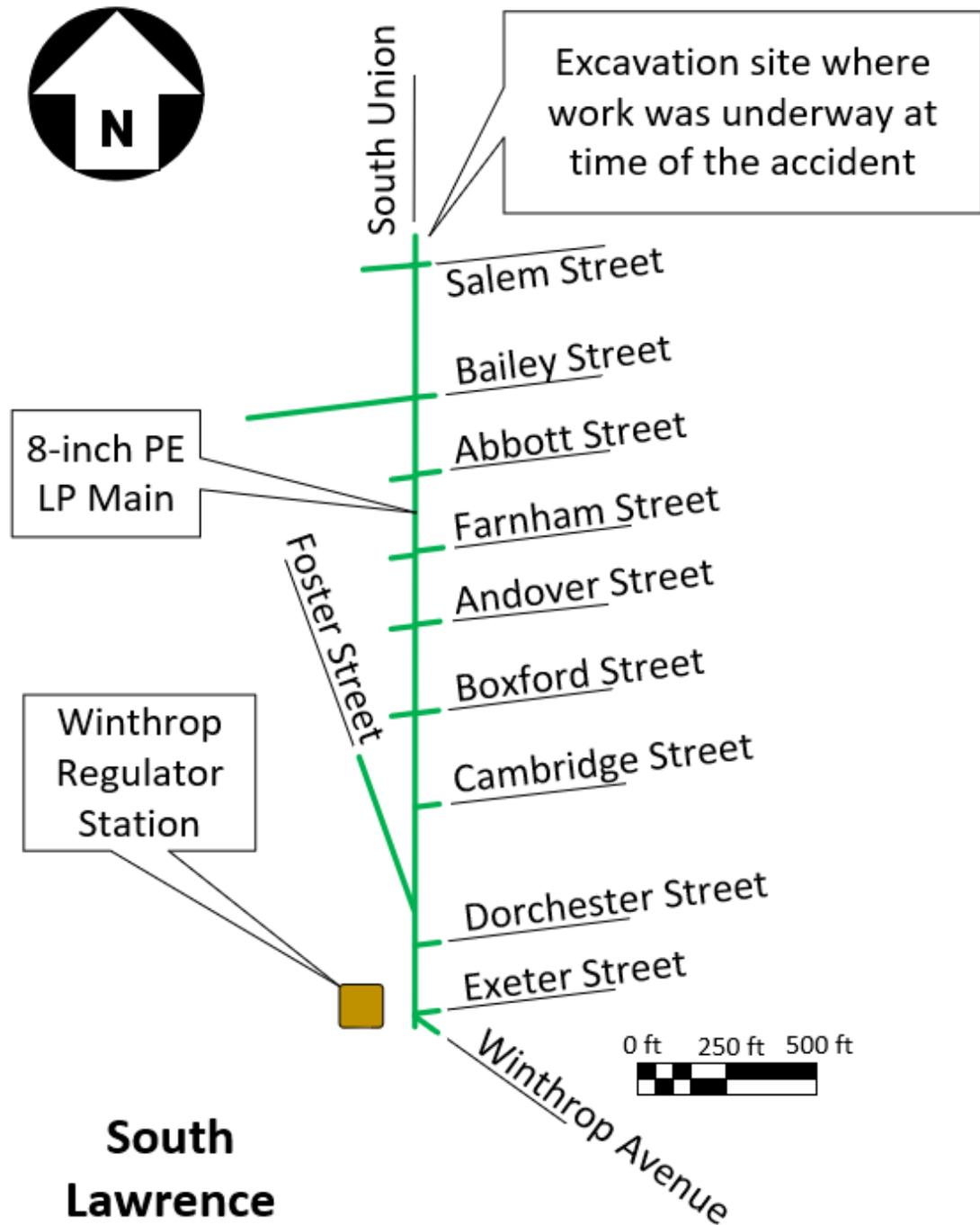
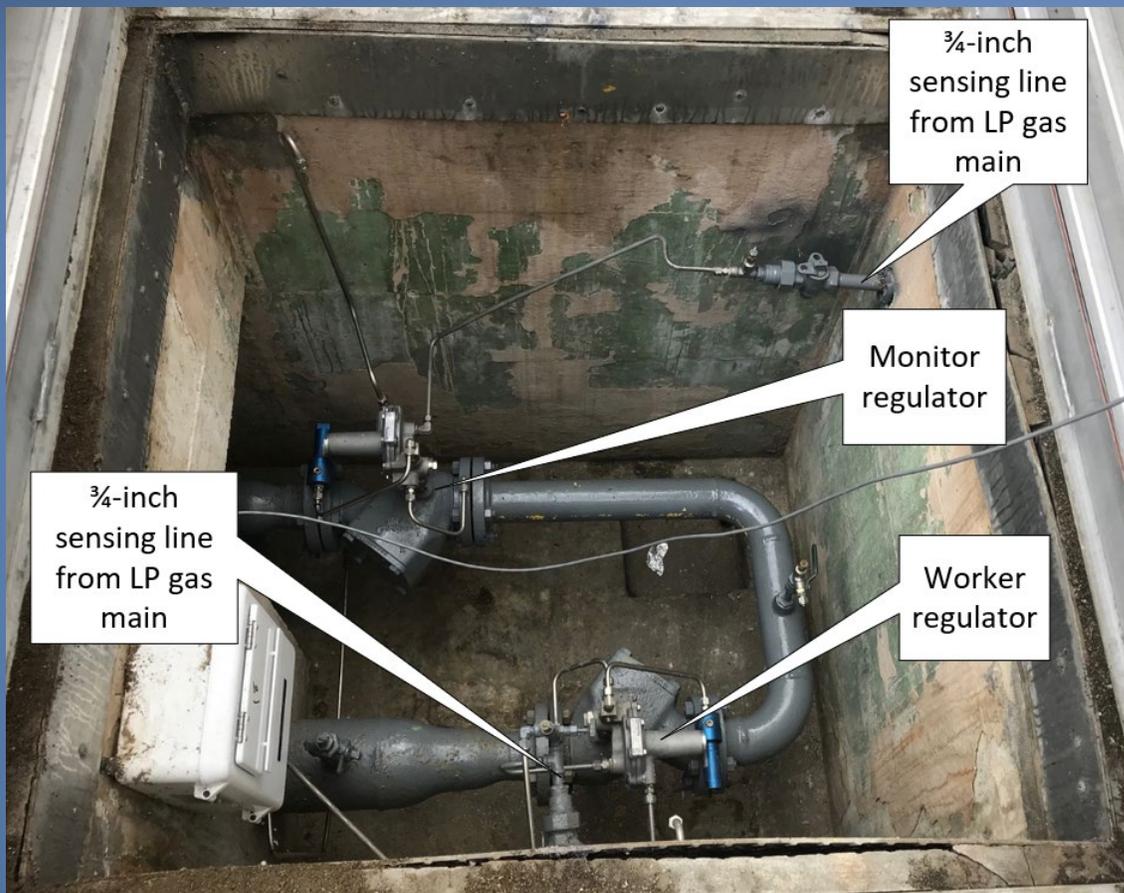
- Building Explosion and Fire, Silver Spring, Maryland, August 10, 2016
- Natural Gas Company, Leak, Explosion, and Fire, Plum Borough, Pennsylvania, March 5, 2008
- Natural Gas Distribution Pipeline Explosion and Fire, Allentown, Pennsylvania, June 9, 1994
- Natural Gas Explosion and Fire, Portales, New Mexico, June 28, 1982
- Explosion, New York, New York, April 22, 1974 (PAR-76/02)
- Bowie, Maryland, June 23, 1973



Merrimack Valley, Massachusetts



Merrimack Valley, MA



Predecessor Accidents

Unintentionally Defeated Overpressure Protection for Low-Pressure Natural Gas Systems

- Over-Pressure of Low-Pressure Distribution System, Chicago, Illinois, January 17, 1992
- East Boston, Massachusetts, September 23, 1983 (PAR-84-05)
- Natural Gas Fires, Centralia, Missouri, January 28, 1982
- Mansfield, Ohio, May 17, 1978
- El Paso, Texas, August 9, 1977
- Low-Pressure Natural Gas Distribution System, Burlington, Iowa, November 6, 1969
- Low-Pressure Natural Gas Distribution System, Gary Indiana, June 3, 1969

Minneapolis, Minnesota

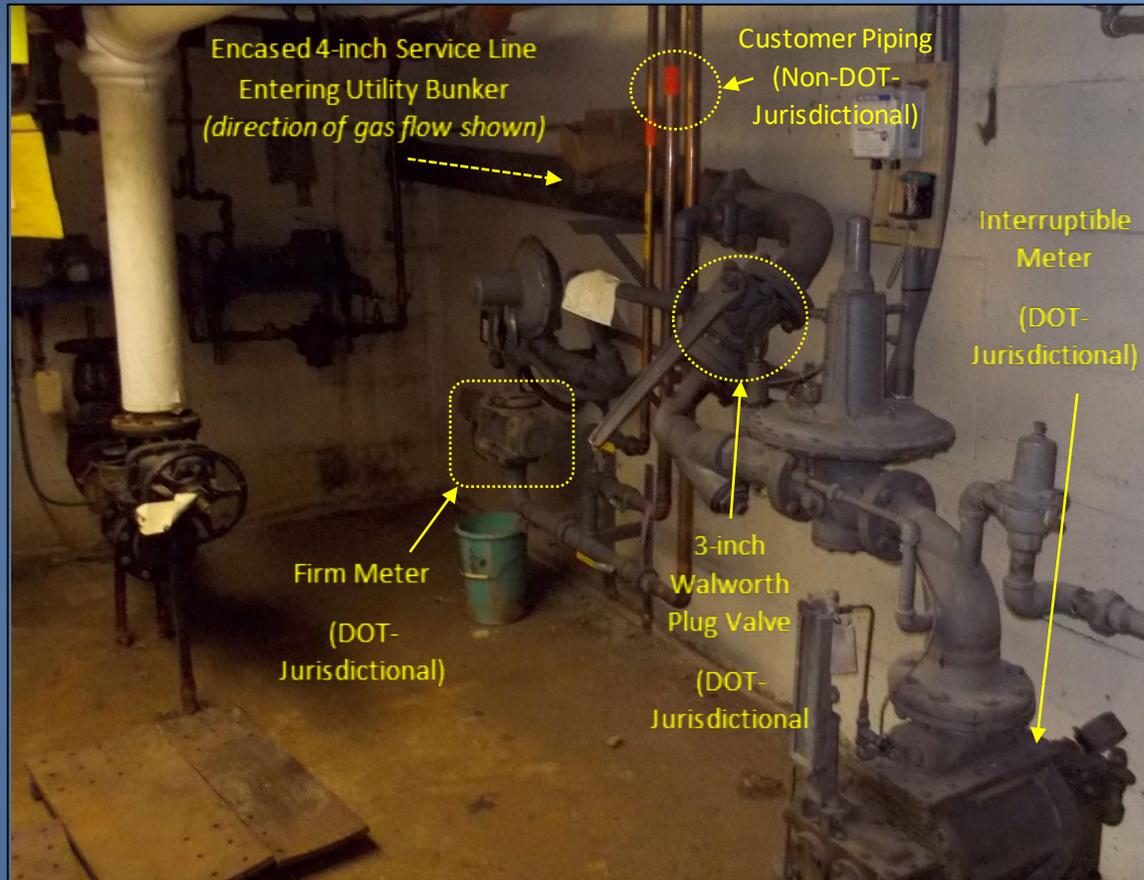


Source: Google imagery



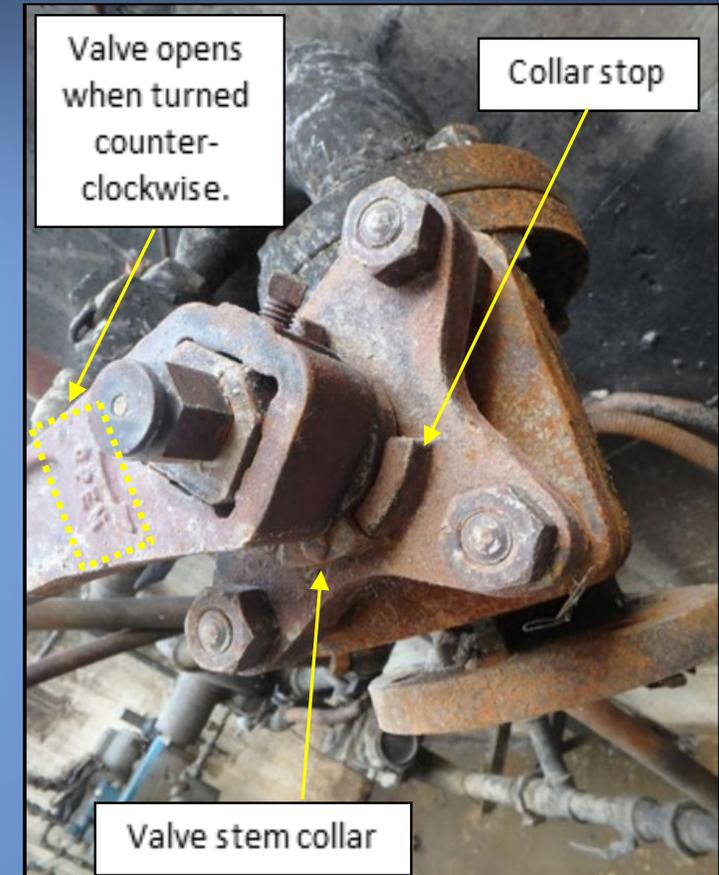
Source: Minneapolis Fire Department

Minneapolis, Minnesota



Minneapolis, Minnesota

Accident valve: Peak torque measured during opening and closing		
Action	Torque (lb-ft)	Tool used
1 st Closing attempt - no movement	430	Valve wrench
2 nd Closing attempt - no movement	409	Valve wrench
3 rd Closing attempt - no movement	721	Valve wrench with 4' extension
The valve was attached to the band saw table for better leverage and the torque transducer was not used to close and open the valve once using the 4' extension		
1 st Closing (after valve was opened and closed once)	243	Valve wrench with 4' extension
1 st Opening (after valve was opened and closed once)	185	Valve wrench with 4' extension

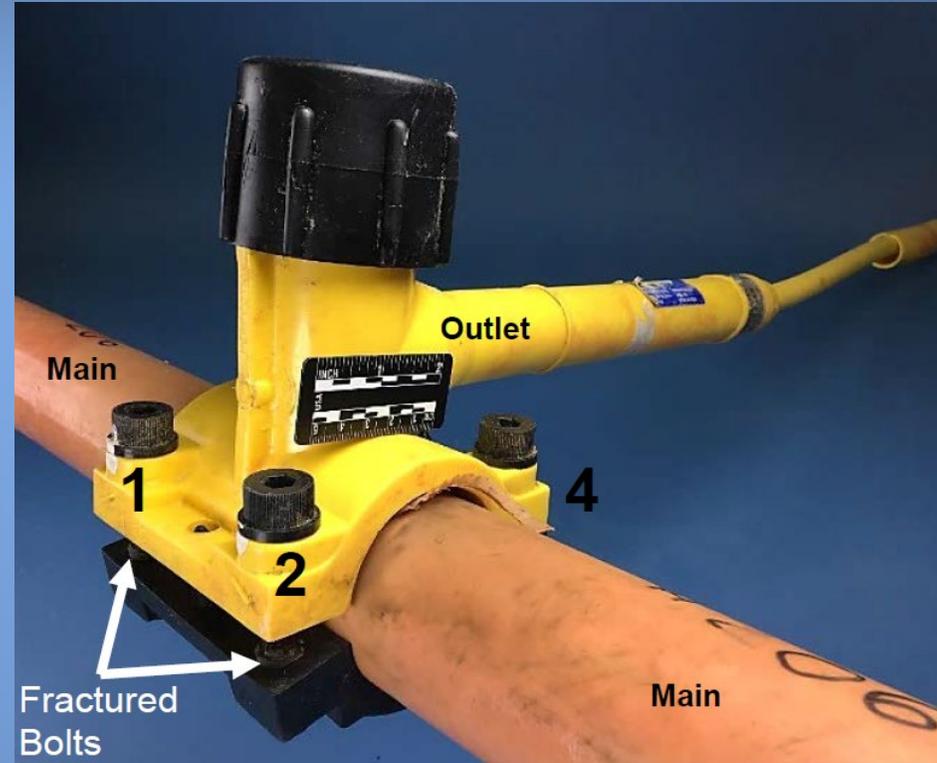


Predecessor Accidents

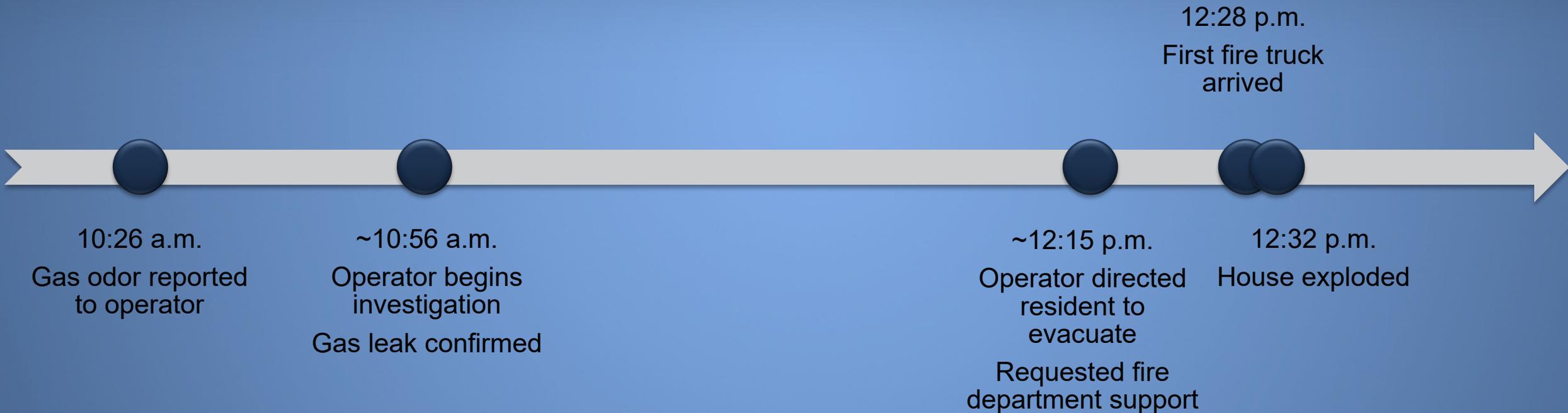
Excess Flow Valves, Valve Operability

- Natural Gas Explosion and Fire, South Riding, VA, July 7, 1998
- Natural Gas Distribution Pipeline Explosion and Fire, Allentown, PA, June 9, 1994
- Natural Gas Pipeline Puncture, San Francisco, CA, August 25, 1981
- Coopersburg, PA, February 21, 1973
- Oklahoma City, OK, April 23, 1978

Millersville, Pennsylvania



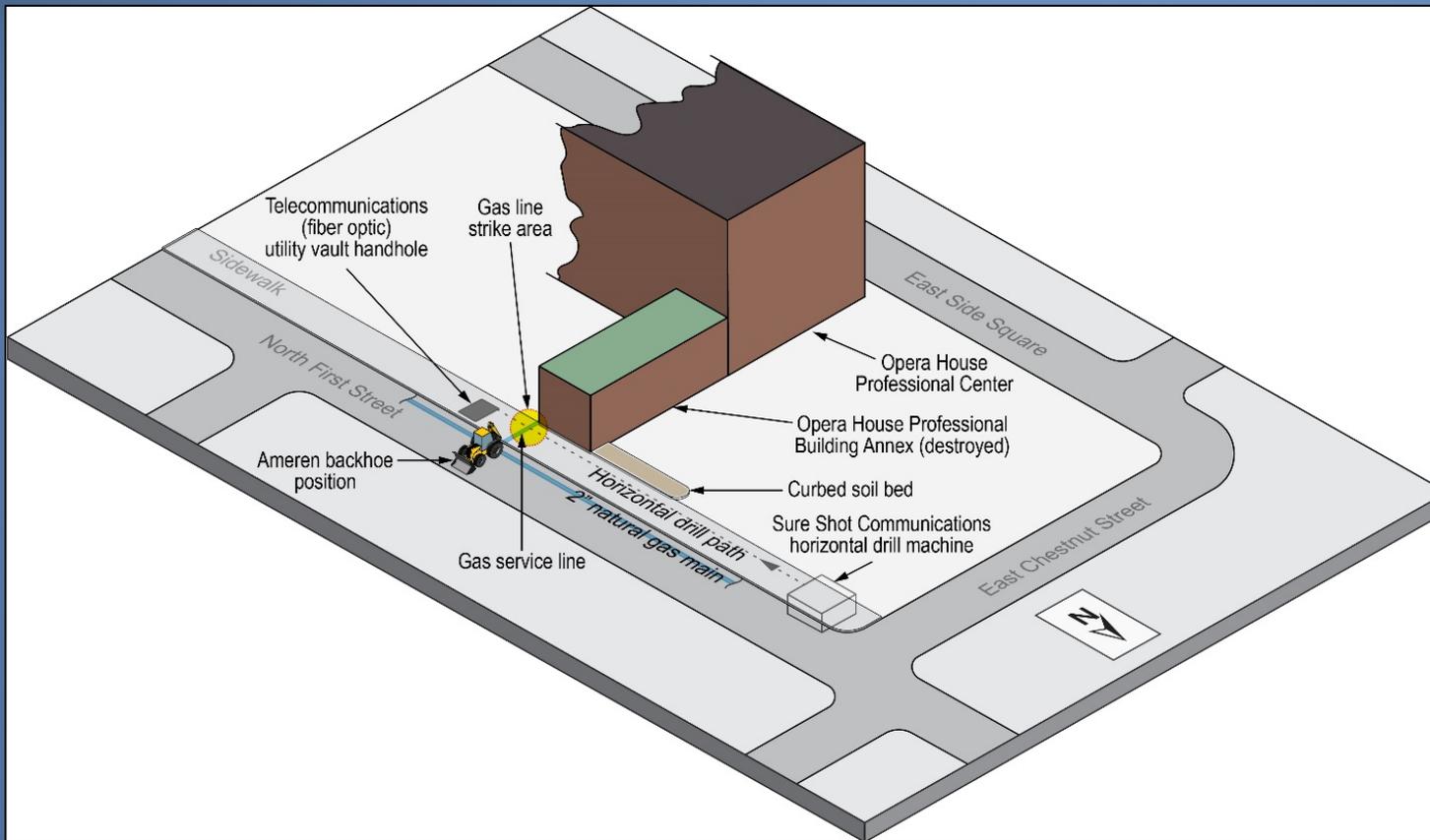
Millersville, Pennsylvania



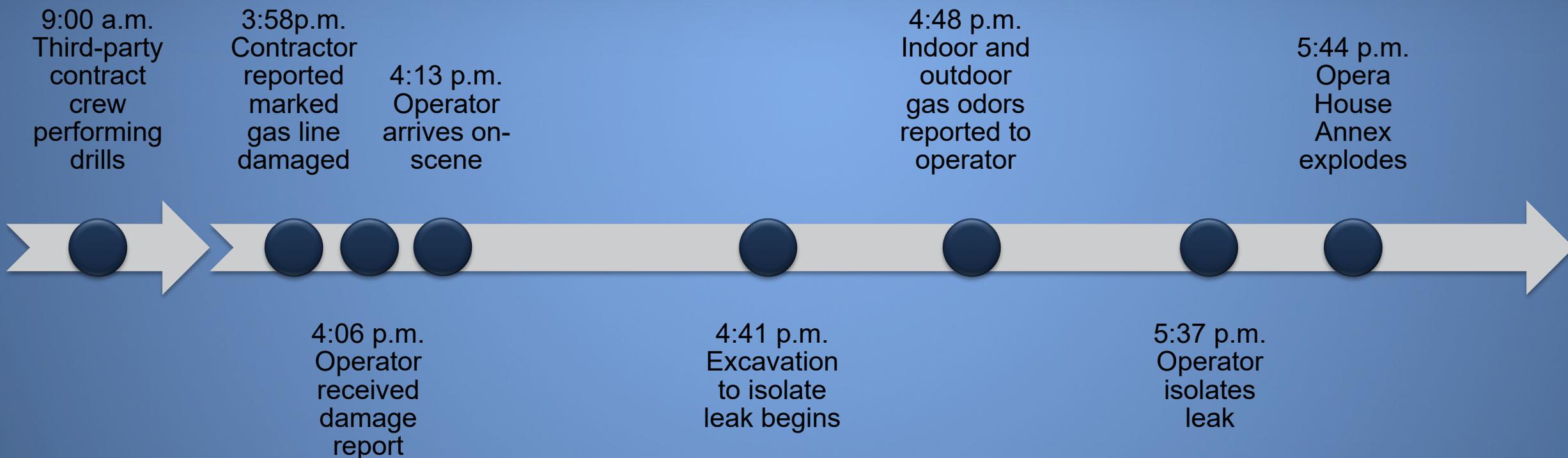
Canton, Illinois



Canton, Illinois



Canton, Illinois



Other HDD Incidents

January 1, 2017 Aurora, CO



July 10, 2018 Sun Prairie, WI



Feb. 19, 2013 Kansas City, MO



April 10, 2018 Durham, NC



Silver Spring, Maryland

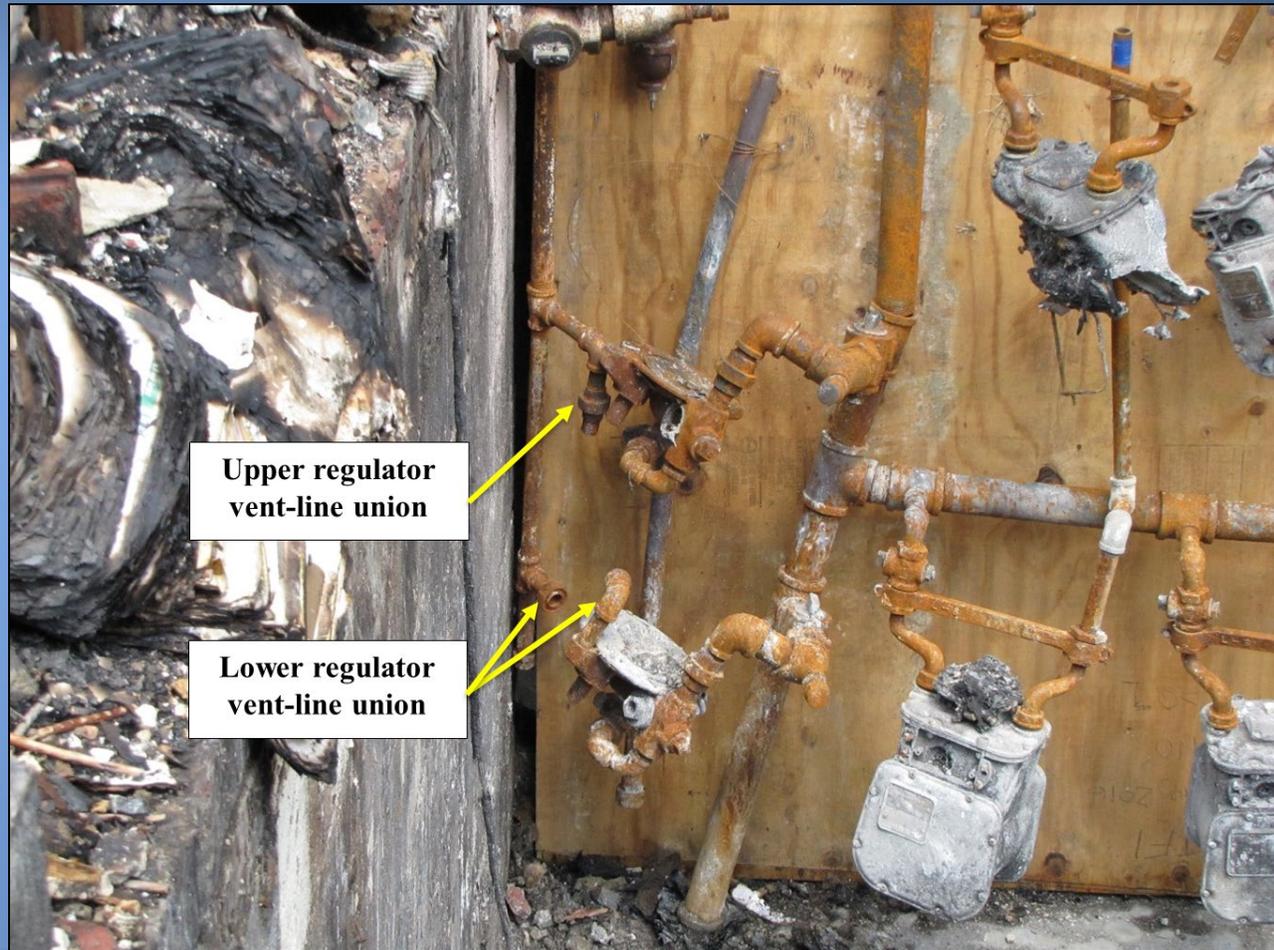
Flower Branch Apartment Complex in November 2015



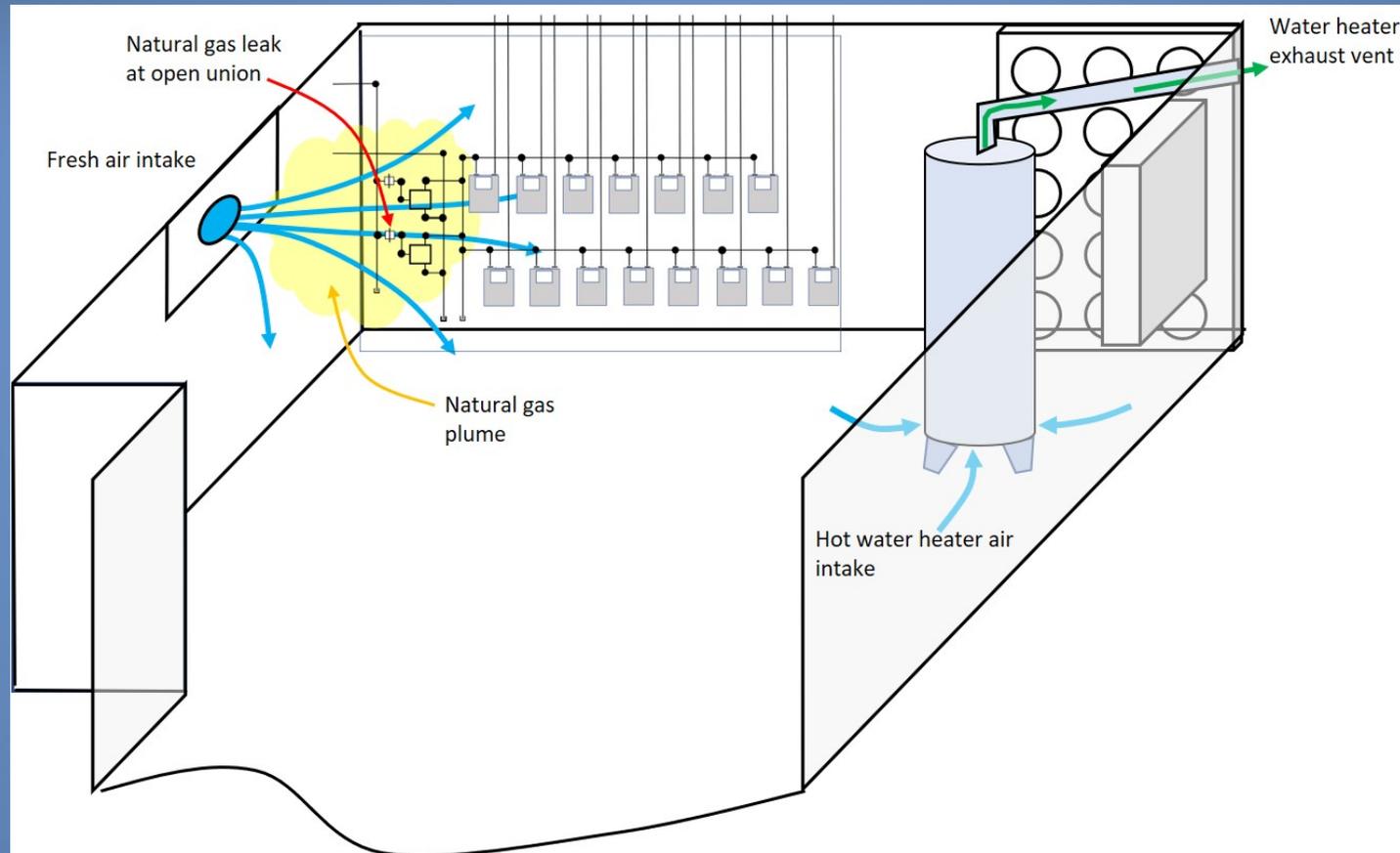
Flower Branch Apartment Complex on August 11, 2016



Silver Spring, Maryland



Silver Spring, Maryland



Predecessor Incidents

- Service regulator failures previously experienced by the operator
- Service regulator vent lines tested for single family homes but not multi-family dwellings
- While gas odorant is an important safety strategy, it does not always effectively mitigate the safety risk

Pipeline Safety Management Systems

Canton, IL – 11/16/2016
1 fatality, 11 others injured



Millersville, PA – 7/02/2017
1 fatality, 3 others injured



Merrimack Valley, MA – 9/13/2018
1 fatality, 22 others injured



Minneapolis, MN* – 8/02/2017
2 fatalities, 9 others injured



Dallas, TX – 2/23/2018**
1 fatality, 4 others injured



Learning from Each Other

- Enhancing industry-wide lessons learned processes
- Incident data should be easily accessible to a variety of stakeholders
- CAROL Query will improve accessibility of publicly available NTSB records



The screenshot displays the CAROL (Case Analysis and Reporting Online) interface, NTSB's Query Tool. At the top center is the NTSB logo, featuring an eagle with wings spread, holding a shield, with the text "NATIONAL TRANSPORTATION SAFETY BOARD" around it. Below the logo, the text reads: "Welcome to CAROL (Case Analysis and Reporting Online), NTSB's Query Tool to find information about accidents and recommendations." This is followed by "CAROL includes:" and a bulleted list: "Surface modal data from 1/1/2010 and later.", "Aviation data from 1/1/2008 and later.", and "All data for Safety Recommendations." Below this, there are two lines of text: "For aviation investigations before 2008, use [Aviation Database](#)." and "For the Docket Management System, use [Accident Dockets](#)." The next line says: "To begin your search, select Investigations or Recommendations. Then enter data into any or all the search boxes below." Below this is a search bar with two radio buttons: "INVESTIGATIONS" (selected) and "RECOMMENDATIONS". Underneath is a section titled "COMMON INVESTIGATION FIELDS" with a warning icon and text: "Data available from 2010 and later". There are three input fields: "Event date: from" followed by a line, "to" followed by a line, and "Event date: to" followed by a line. Below these is a "City" input field.

Voluntarily Implementing Safety Improvements



The graphic features the NTSB logo on the left, which includes an eagle and the text "NATIONAL TRANSPORTATION SAFETY BOARD". To the right of the logo, the text "2021-2022 NTSB MOST WANTED LIST OF TRANSPORTATION SAFETY IMPROVEMENTS" is displayed in white. Below the text is a horizontal row of five panels, each with a white icon above a corresponding image. The panels are: 1) an airplane icon above a blue sky with white flight paths; 2) a truck icon above a perspective view of a road; 3) a ship icon above a white wake on blue water; 4) a train icon above a perspective view of railroad tracks; 5) a cargo ship icon above a view of two large ship funnels.



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