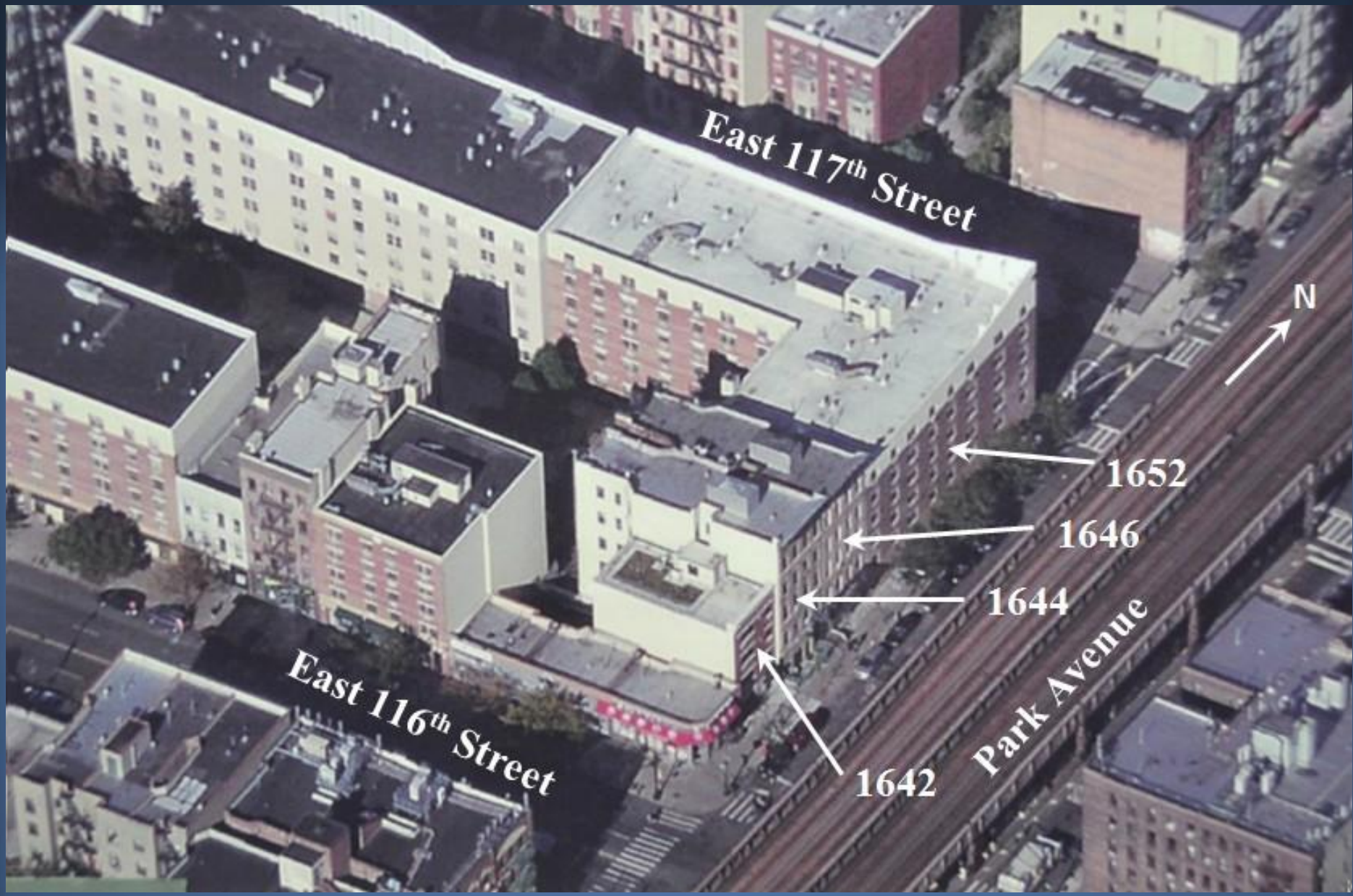
National Transportation Safety Board

Natural Gas Pipeline Accident

Manhattan, New York

March 12, 2014


East 117th Street
N
1652
1646
1644
Park Avenue
East 116th Street
1642

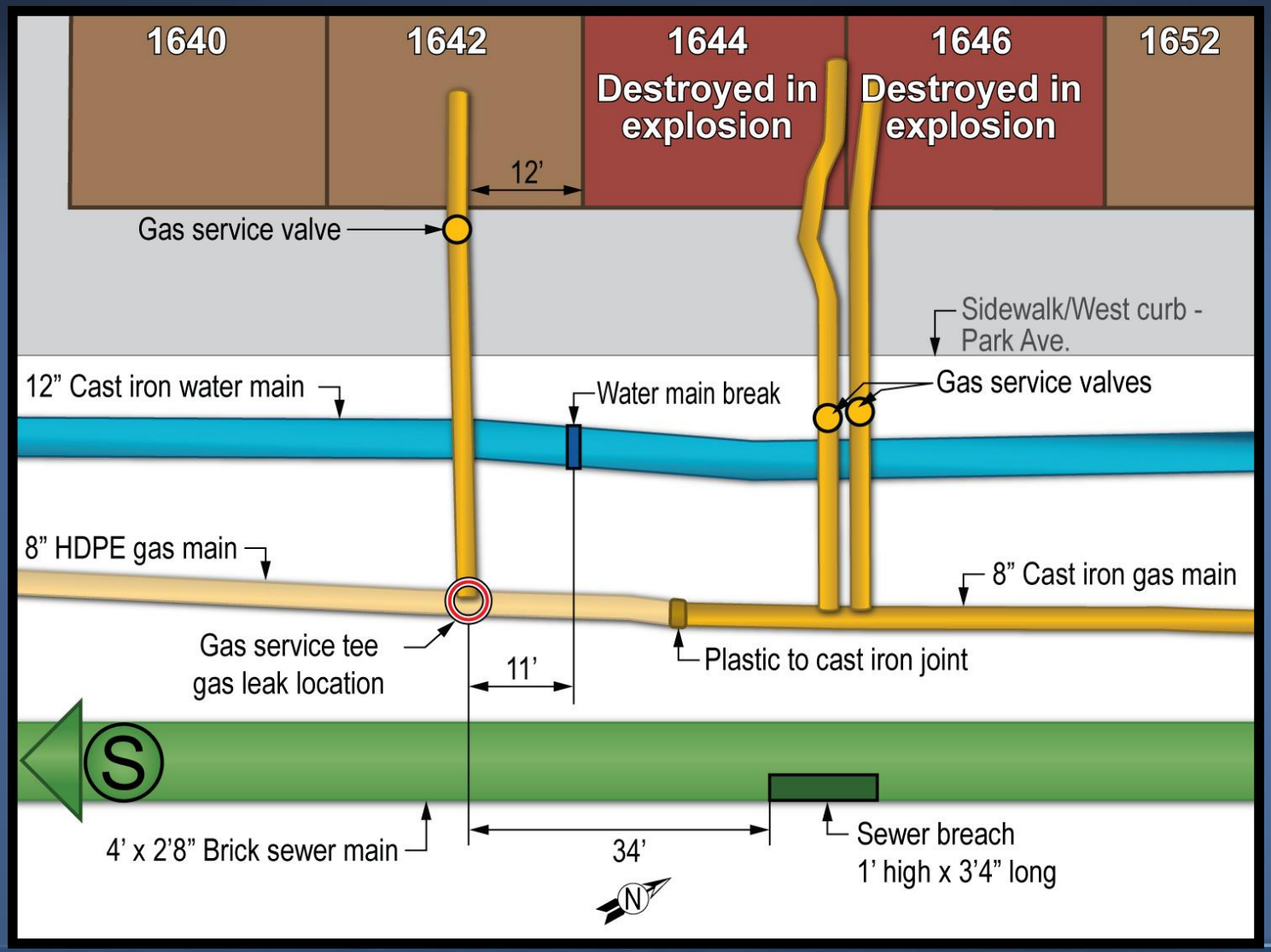
NTSB

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

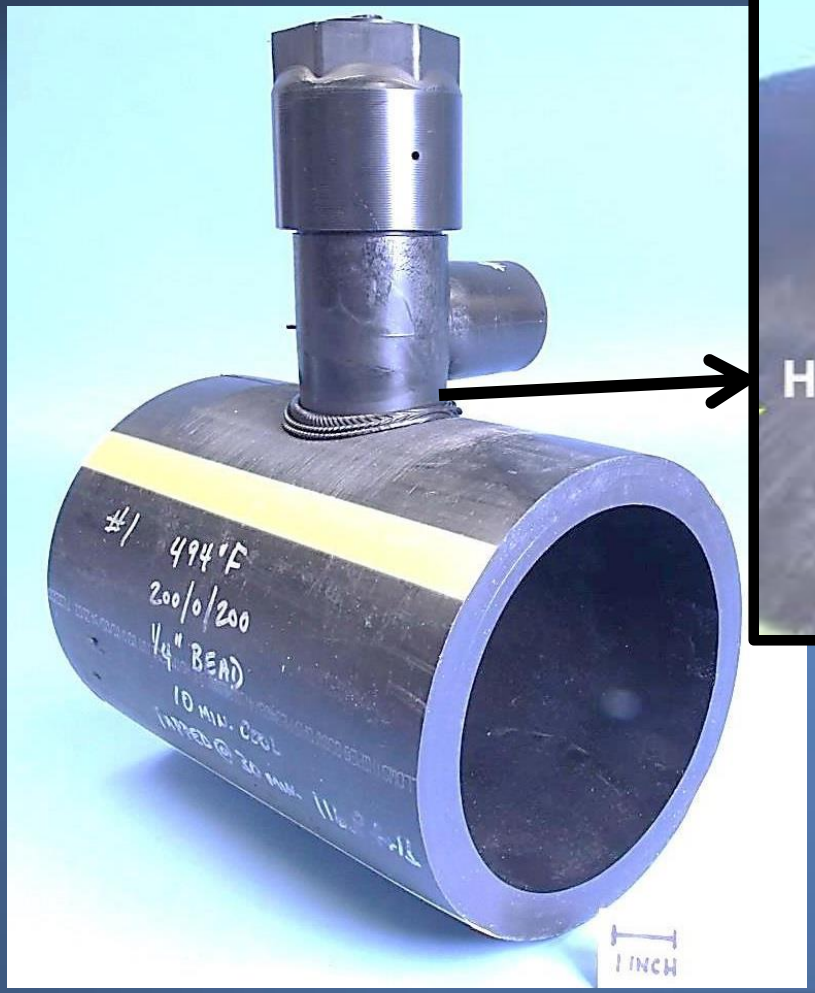
NTSB

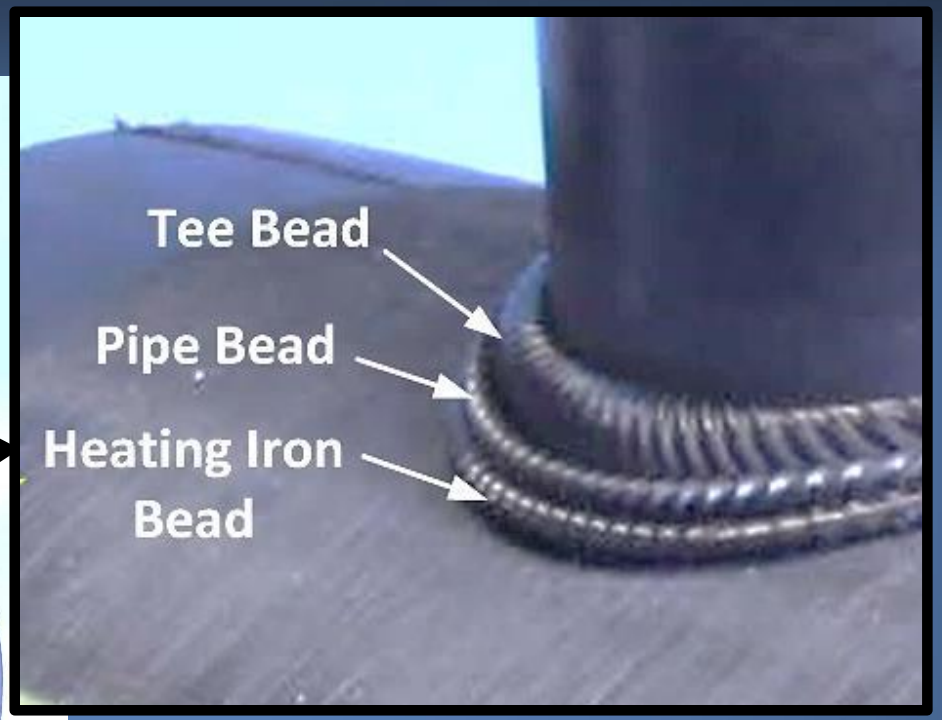
Utilities in the Accident Block



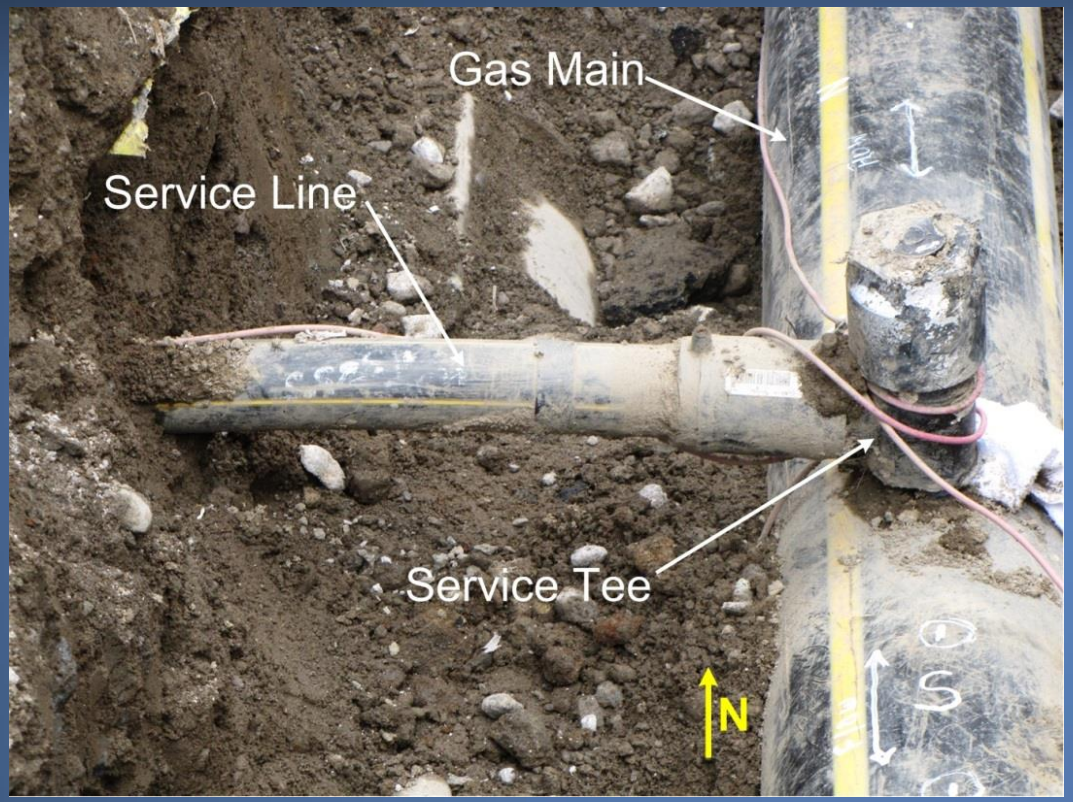
NTSB

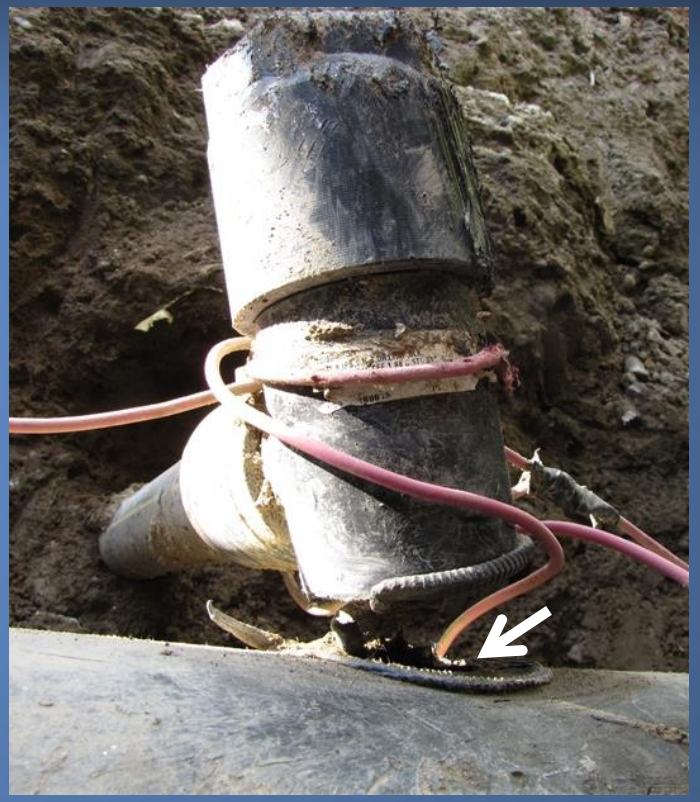
Saddle Fusion Joint Exemplar Test Piece



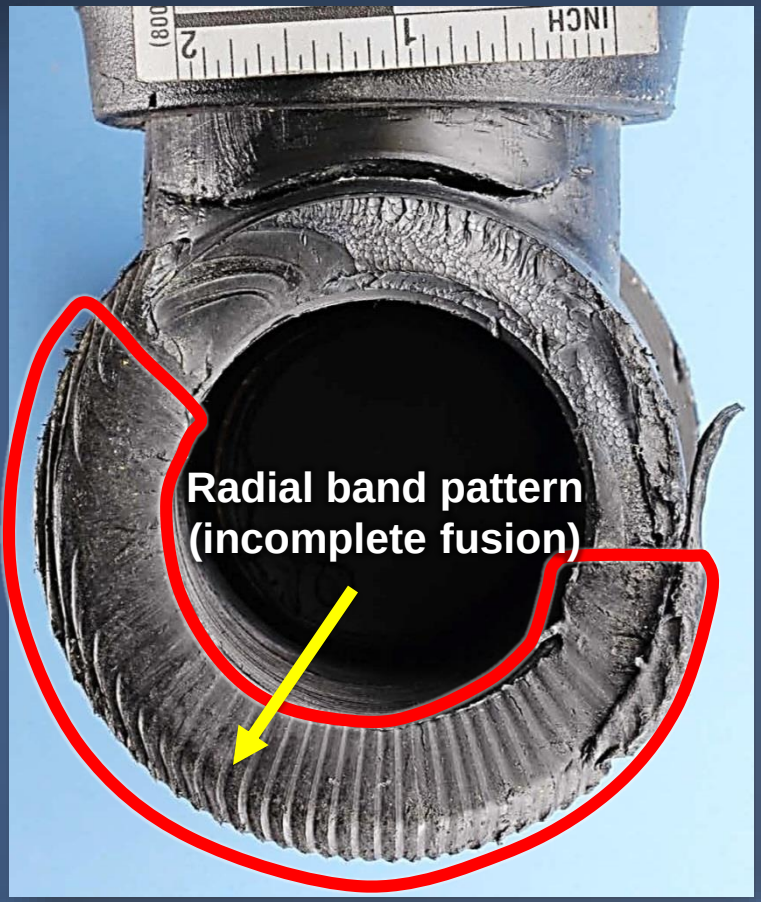


On-Scene Activities - Service Tee





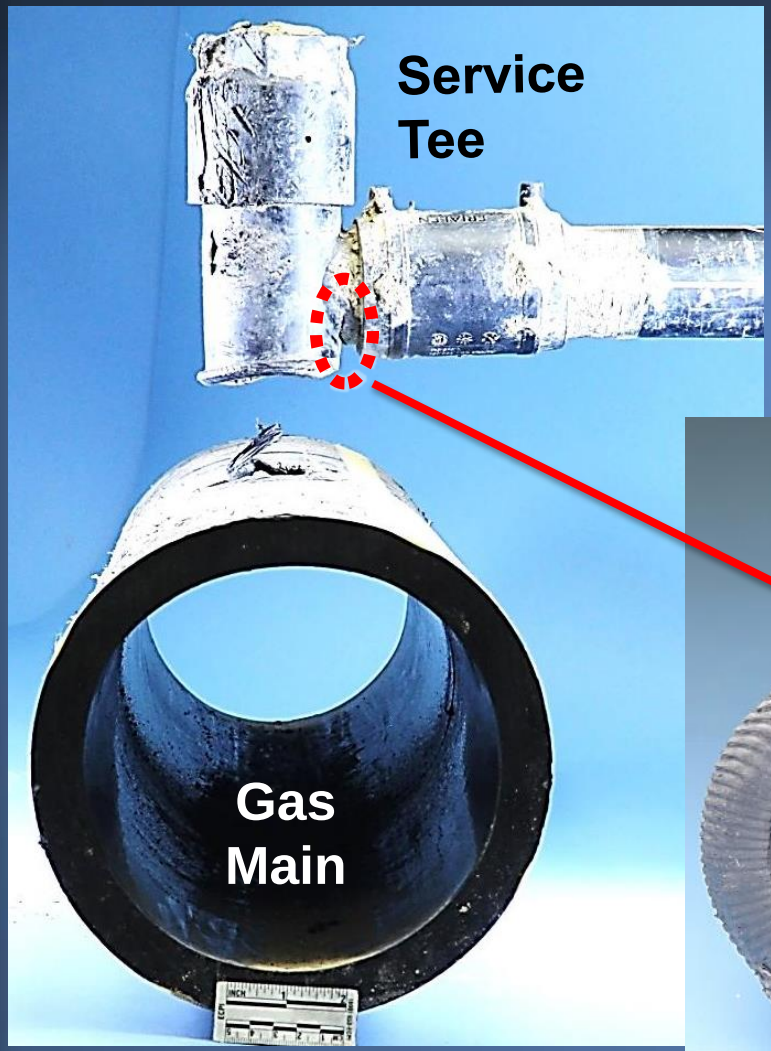
Fusion Joint – Incomplete Fusion



Service Tee Fracture Face

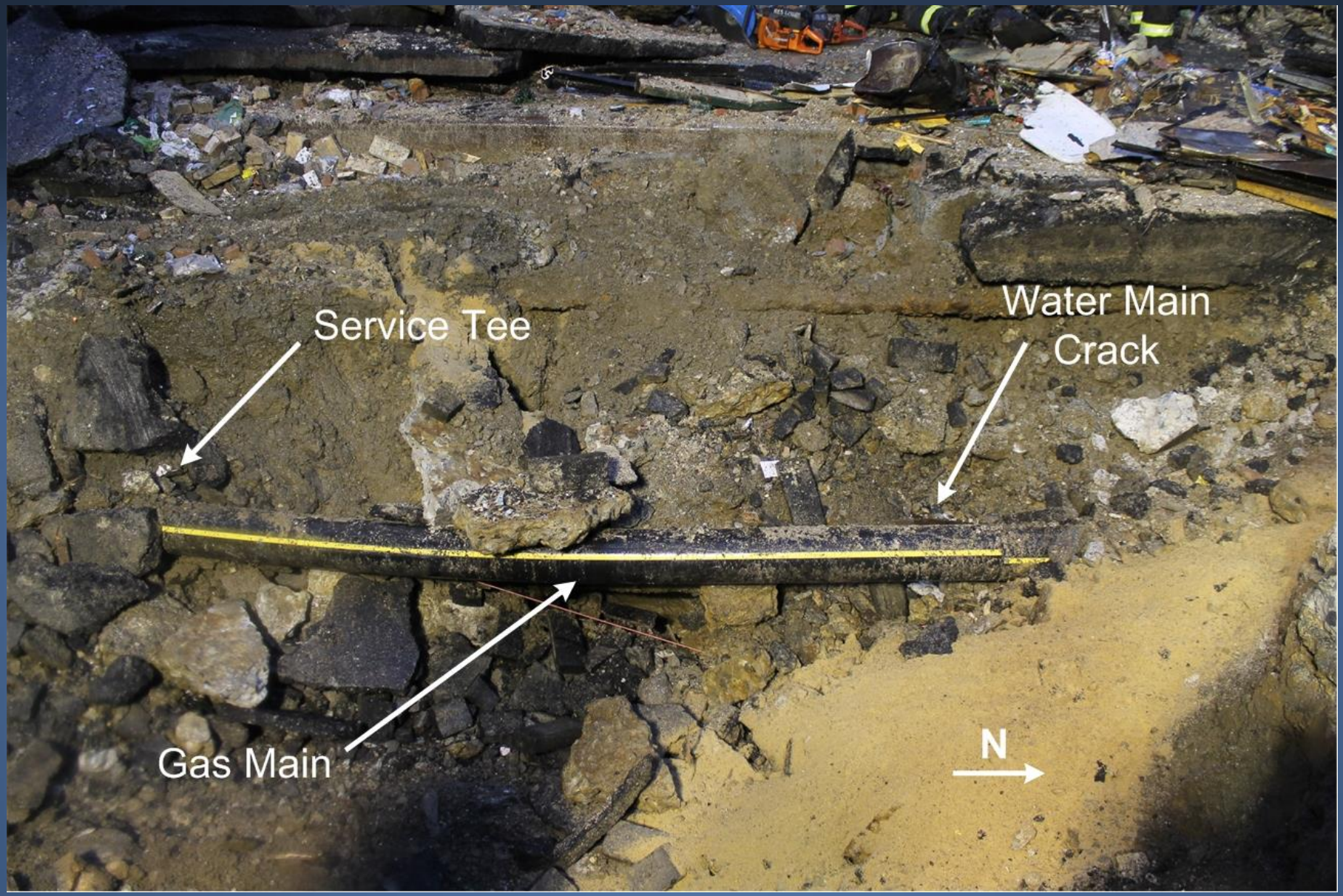
- Radial band pattern (60%)
- Is incomplete fusion
- Is a weld defect
- Weak bond strength
- Caused by contamination or inadequate surface preparation before fusion welding

Service Tee – Crack at Outlet



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

NTSB



NTSB

2014 Sewer Main Damage

NTSB

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

National Transportation Safety Board

Robert J Hall

Director Office of Railroad Pipeline and Hazardous Materials Investigations

202-314-6463
Robert.hall@ntsb.gov