



# National Transportation Safety Board

Washington, D.C. 20594

Office of Railroad, Pipeline and Hazardous Materials Investigations

July 20, 2020

## Investigator-in-Charge's Accident Summary

NTSB Accident #PLD18FR002  
Natural Gas-Fueled Explosion of Residence  
February 23, 2018, Dallas, Texas

On Friday, February 23, 2018, at 6:38 a.m. Central Standard Time, the City of Dallas Fire-Rescue Department (DFR) Communications Division dispatcher received several 911 calls reporting an explosion at 3534 Espanola Drive, Dallas, Texas. DFR first responders arrived on scene at 6:44 a.m. and observed that the one-story two-bedroom residence sustained major structural damage, but there was no smoke or fire (Figure 1). The greatest structural damage occurred at the northwest corner of the house, where its exterior walls were blown outward and the roof had partially collapsed. The east and south walls of the house were displaced outward as well. Two family members reported hearing a low pop noise in the general area of the kitchen the night before the explosion, however none of the occupants reported smelling gas odors. At the time of the accident, five family members were in the home; four were injured and one was killed.

Atmos Energy crews, who were already in the area repairing leaks, heard the explosion and began evacuating the neighborhood. They worked with DFR who arrived minutes later to initially evacuate a 2-block area. DFR expanded the evacuation area three times to include residences to the north, south and west of the accident site, the nearby Stephen C. Foster Elementary School, and then 60 single-family homes to the east of the accident site. In total, about 300 single-family homes, 250 apartment units, and 600 students were evacuated from the area until February 24, 2018 at 3:30 p.m.

Following the accident, NTSB investigators located a through-wall crack in the 2-inch diameter gas main which had been installed in the alley behind 3534 Espanola Drive in 1946. Further examination found the crack originated from a dent that was situated beneath a 6-inch diameter sanitary sewer lateral that had been installed in 1995 above and within 0.5 inches of the gas main. NTSB investigators also found five major gouges in the pipe wall along a 22-inch length of the gas main near the dent. NTSB investigators pressurized the cracked pipe in the NTSB Materials Laboratory after it was excavated and calculated the leak rate based on observed and extrapolated data. The leak rate for natural gas was between 8 and 14 cubic feet per minute at the operational pressure range of the system in the days prior to the accident (17 – 45 pounds per square inch). NTSB investigators found that 6.14-inches liquid-equivalent precipitation was

recorded between February 20-22, 2018 about 1-mile south of the accident, the record three-day total for the month of February since August 1939.

In the days before this accident, two gas-related incidents<sup>1</sup> occurred at houses on the same block that were served by the same natural gas main. The first incident occurred on February 21, 2018, at 5:49 a.m. and resulted in one injury involving second-degree burns and significant structural damage to 3527 Durango Drive. DFR arson investigators determined that the incident occurred shortly after the occupant reignited an attic-mounted HVAC pilot light that had shut off after making popping sounds. DFR firefighters reported flames at the back of the house and in the crawlspace, while the left front of the house appeared to have outward displacement. A responding Atmos Energy technician conducted an investigation, detected no gas outside of the house and spoke with a DFR arson investigator, who told the technician it was probably an inside gas leak. The Atmos Energy technician then documented this in the service order and left the scene about 30 minutes after arrival. The customer-owned natural gas piping at 3527 Durango Drive was later tested by a representative of the homeowner and determined to be intact.

The second incident occurred on February 22, 2018, at 10:21 a.m., and resulted in one injury involving second-degree burns and significant structural damage to 3515 Durango Drive. The injured resident told DFR arson investigators that he was boiling water on the kitchen stove when the burner flames grew out of control and flashed over him. A responding Atmos Energy technician was unable to conduct bar hole testing under the gas meter because of pooling rainwater but did perform several bar hole tests on the customer's property. He stated that he could not test the customer-owned piping because the house was destroyed in the fire. DFR incident commander notified him of the other gas-related fire at 3527 Durango Drive, which led the technician to call his supervisor who sent out additional personnel to assist in surveying the area. Atmos Energy personnel began a leak investigation by taking gas measurements, where possible, around the perimeter of this house, as well as around the perimeter of 3527 Durango Drive and detected no gas. Technicians also performed bar hole testing about every five feet above the gas main in the alley, finding leaks they determined to be non-hazardous behind 3519 Durango Drive and 3524 Espanola Drive. The technicians who were performing bar hole testing found no further detections along the gas main in the direction of 3534 Espanola Drive, though they indicated that the hydrological conditions presented challenges. Atmos Energy's Director of Operations called in two leak survey specialists to conduct a leak survey of an approximate 8 block area which began that afternoon. These specialists were equipped with remote methane leak detectors (RMLDs). One survey specialist told NTSB investigators that his RMLD indicated gas generally throughout the entire alley. The customer-owned natural gas piping at 3515 Durango Drive was later tested by a representative of the homeowner and determined to be intact.

Parties to the investigation include the Pipeline and Hazardous Materials Safety Administration, the Texas Railroad Commission, DFR, and Atmos Energy.

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<sup>1</sup> The term "incident" is used throughout this report in reference to the events at 3527 Durango Drive and 3515 Durango Drive. Use of this term does not indicate that these events meet the Pipeline and Hazardous Materials Safety Administration's definition of incident as promulgated in 49 CFR §192.3.



*Figure 1. Front of 3534 Espanola Drive after the Explosion. Photo by DFR on February 23, 2018.*