



PRELIMINARY REPORT PIPELINE

Natural Gas-Fueled Explosion of Residence Dallas, Texas

February 23, 2018

PLD18FR002

The information in this report is preliminary and will be either supplemented or corrected during the course of the investigation.

On February 23, 2018, about 6:38 a.m. central standard time, a natural gas-fueled explosion occurred at a newly renovated single-story residence at 3534 Espanola Drive in Dallas, Texas. The Dallas Fire-Rescue Department (DFRD) quickly dispatched units to the scene. The DFRD reported significant structural damage to the house; however, neither smoke nor fire was present.

Due to the nature and the number of leaks discovered in this residential neighborhood, more than 300 residences evacuated. This evacuation was in place until February 24, 2018. Figure 1 shows the post-explosion view of the residence at 3534 Espanola Drive.



Figure 1. Post-explosion view of the residence at 3534 Espanola Drive.

When the explosion occurred at 3534 Espanola Drive, a family of five was asleep in the residence. Four family members were injured, and a 12-year-old juvenile was killed. The family was transported to a local hospital.

The injured residents told the DFRD arson investigators that the night before the explosion, they had heard “popping” noises, but they were unable to discover the source. They had not smelled any natural gas prior to the explosion.¹

In the 48 hours prior to the accident at 3534 Espanola Drive, work crews from Atmos Energy (Atmos) were in the neighborhood to investigate gas-related fires at two residences on Durango Drive. Figure 2 shows the location of the steel 2-inch-diameter pipeline and the three residences.



Figure 2. This highlighted grid shows the location of three destroyed residences: yellow indicates the residence destroyed by an explosion on February 23, 2018; green indicates the two residences destroyed by fire on February 21-22, 2018. (Photo provided by Atmos Energy.)

On February 21, 2018, about 5:49 a.m., an explosion and subsequent fire occurred at 3527 Durango Drive. (This site is about 415 feet from the Espanola Drive house explosion.) The resident told arson investigators from the DFRD that about 2:00 a.m. he awoke to a “popping” noise from his heating, ventilation, and air conditioning (HVAC) unit. When he went to the attic, he saw the cover plate for his HVAC unit was on the floor; the loose cover plate was not mounted on the unit as usual. He also noticed that the pilot light on the HVAC unit was not working. When he placed the cover plate on his HVAC unit, an explosion occurred. He was thrown several feet; he received second degree burns. Figure 3 shows the post-explosion view of the residence at 3527 Durango Drive.

¹ Natural gas is an odorless, combustible gas; however, Title 49 *Code of Federal Regulation* 192.625(a), states, “a combustible gas in a distribution line must contain a natural odorant or be odorized so that at a concentration in air of one-fifth of the lower explosive limit, the gas is readily detectable by a person with a normal sense of smell.” Properly odorized natural gas may be stripped of its odorant, if the gas travels through soil.



Figure 3. Post-explosion view of the residence at 3527 Durango Drive.

On February 22, 2018, about 10:21 a.m., a structural fire occurred at 3515 Durango Drive. (This location is less than 310 feet from the Espanola Drive house explosion.) The resident told DFRD arson investigators that while he was boiling water on the stove in his kitchen, the flames from the stove were “red and out of control.” The resident had second degree burns to his right arm and right leg. As the fire moved from the stove to the attic, it caused significant fire and smoke damage. As a result, the residence was a total loss. Figure 4 shows a post-fire view of the residence.



Figure 4. Post-fire view of the residence at 3515 Durango Drive.

Prior to the explosion at 3534 Espanola Drive, the DFRD arson investigators had classified both incidents on Durango Drive as an “undetermined” cause. However, based on the nature of these two incidents, the NTSB is investigating whether these three incidents are related.

Due to the two incidents on Durango Drive, Atmos assessed the neighborhood. Atmos identified multiple leaks at various leak grade levels.² Atmos started repairs on February 22. A review of odor reports and the activity by Atmos in the neighborhood shows that leaks were first detected on January 1, 2018. Atmos had performed various repair work prior to and during the days these three incidents occurred.

Numerous other leaks have since been identified throughout the neighborhood. On February 23, 2018, after the explosion on Espanola Drive, Atmos shutdown the natural gas main pipeline between Espanola Drive and Durango Drive. On March 1, 2018, Atmos shut down its natural gas distribution system for 3-plus weeks. This shutdown impacted about 2,800 residences. These residents were not required to evacuate.

On scene, the NTSB formed the following three technical investigative working groups:

- Pipeline Operations and Pipeline Integrity Management
- Human Performance and Safety Management Systems
- Emergency Response/Hazardous Materials

During the investigation, the NTSB investigators: (1) inspected the incident sites, (2) pressure-tested the pipe, (3) collected records of the pipeline operations, the pipeline integrity management program, and the emergency response, and (4) interviewed personnel from Atmos and the DFRD.

While on scene, the NTSB investigators identified three sections of the pipe that failed a pressure test. One section was behind the residence at 3534 Espanola Drive; it had a circumferential crack. Sections of the pipe that failed the pressure test were shipped to the NTSB metallurgical laboratory in Washington, DC. Figure 5 shows the circumferential crack on the pipeline.

² Leaks are graded by class. A Grade 1 leak represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous. A Grade 2 leak is recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard. A Grade 3 leak is non-hazardous at the time of detection and can be reasonably expected to remain non-hazardous. (Source: Gas Piping Technology Committee's "Guide for Gas Transmission and Distribution Piping Systems," published by the American Gas Association)



Figure 5. Circumferential crack in steel 2-inch-diameter pipeline.

Parties to the investigation include Atmos Energy, the Pipeline and Hazardous Materials Safety Administration, the Texas Railroad Commission, and the Dallas Fire-Rescue Department.