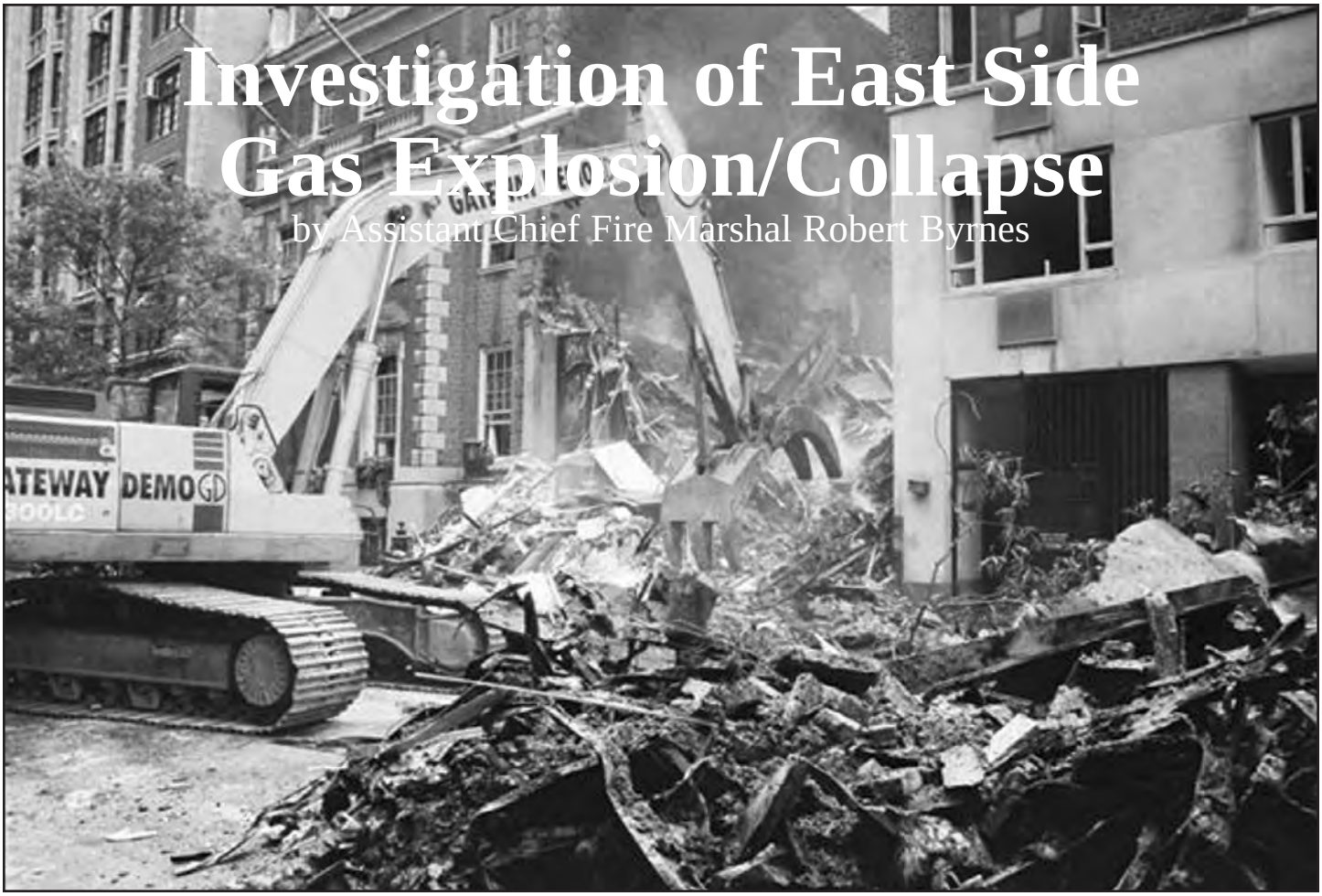
Investigation of East Side Gas Explosion/Collapse

by Assistant Chief Fire Marshal Robert Byrnes



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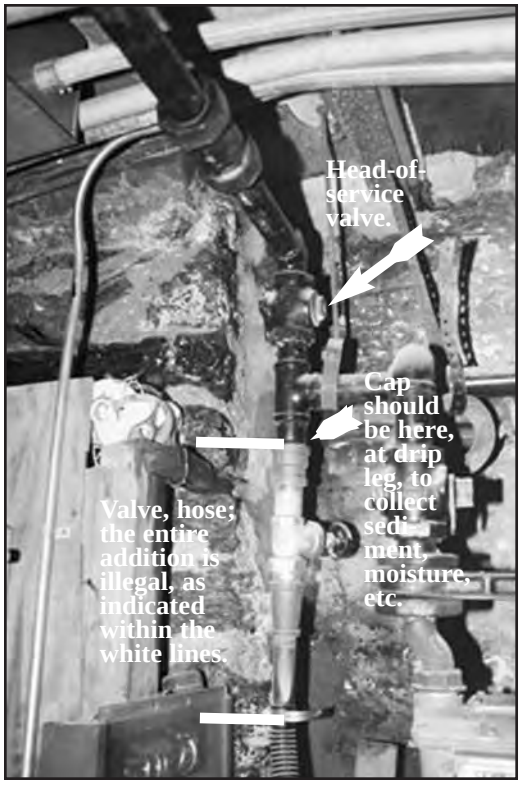
Heavy equipment operates, while Firefighters sift through debris at East 62nd Street. Fire Marshals examined the debris, seeking evidence.

Members of the Bureau of Fire Investigation (BFI) Citywide Command were monitoring the Department radio for an explosion and collapse on the morning of July 10, 2006. They responded immediately and, on arrival, Fire Marshals observed a building that was completely collapsed and on fire. The debris from the explosion/collapse extended approximately 50 feet east and west on East 62nd Street, Manhattan.

Fire Marshals began a thorough canvass of the area in order to locate potential witnesses. Preliminary information and observations indicated that this incident was the result of a natural gas explosion. Fire Marshals observed the damage to the building and its surrounding area and found it consistent with this conclusion. The walls were pushed away from the building and the roof and floors had collapsed. The debris field and damage were not consistent with an explosion caused by an Improvised Explosive Device (IED) or bomb. Fire Marshals conferred with members of the NYPD Bomb Squad, who concurred.

At 0804 hours--prior to the explosion--Con Edison was dispatched to 36 East 62nd Street (exposure #2) for a strong odor of gas. The doorman from this building reported that he smelled gas in the entrance and on the fifth floor of the building. A Con Ed worker arrived at 0820 hours and began his investigation. The worker was investigating inside the basement of 36 East 62nd Street for approximately 20 minutes when he heard a loud explosion from outside. The doorman stated that the building had collapsed all at once and, initially, there was no fire; just some dust and smoke. He added that approximately one to two minutes later, fire appeared on the right-hand side from the rear to the middle of the building. The doorman's observations were corroborated when investigators recovered a surveillance video of the actual explosion from a building across the street.

Investigators learned early on that the occupant/victim who was removed from the building was a physician named Nicholas Bartha. Dr. Bartha had sent a lengthy e-mail to his ex-wife, some of the local media and several politicians at approximately 6:29 a.m. In this e-mail, Dr. Bartha indicated that he was divorced from his wife and there was an issue over the forced sale of the building that Dr. Bartha used as both a residence and medical office. He also indicated that



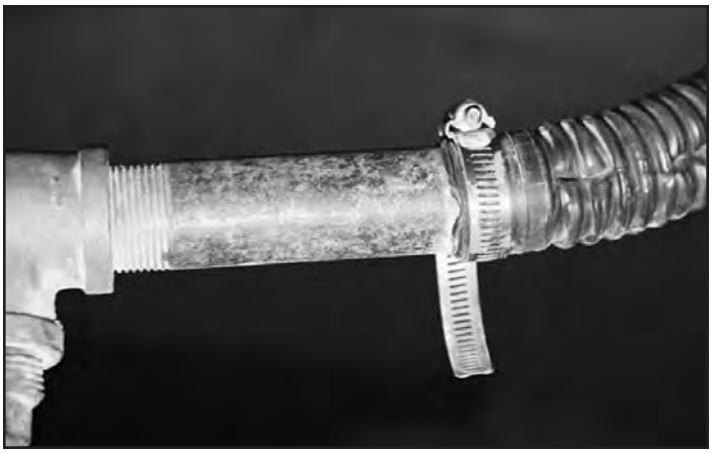
Illegal hookup in basement meter room.

View of stoves in the street.

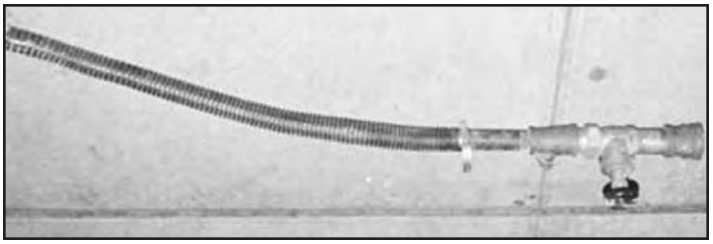
(Left) Close-up of uncompromised threads of stove #1. (Right) Uncompromised threads on connection of stove #2. Both were disconnected (as opposed to blown apart by an explosion), showing evidence of tampering.

he was going to commit suicide and the building never would be turned over to his wife or sold for her benefit. Investigators also learned that on Friday, July 7, Dr. Bartha was served with court papers regarding sale of the building. There was also information that there had been at least one previous attempt at suicide by the doctor.

Based on this information, members of the BFI now were responsible for proving this explosion was the result of an intentional act or accidental gas leak. In order to prove that a crime was committed, all accidental causes had to be eliminated. BFI members realized that the investigation into this natural gas explosion would be very complex and began coordinating the investigative effort with the various agencies that would be involved. This investigation required the assistance of Con Edison, the gas service provider to this location; the Public Service Commission (PSC), which oversees all public utilities and ensures that proper procedures and protocols are followed; the NYPD, which assisted in the investigation and provided site security; the New York City Department of Housing Preservation and Development (HPD), which provided the heavy equipment necessary for the systematic examination of the scene; FDNY Operations, whose members were the overall Incident Commander; and the Office of Emergency Management (OEM), which coordinated with all the agencies involved.



(Above) Hose connected to nipple. This is the bottom part of the illegal connection shown on page 5. (Below) Hookup in street.



The BFI requested that Con Edison provide a history of all leaks in the immediate area, as well as a history of meter readings to be used as a comparison for gas consumption. Con Edison also was directed to ensure that the ground outside the incident location was examined for any residual gas that could be trapped under the pavement or roadway as a result of an underground leak. The service line from the main in the street to the head-of-service valve also had to be pressure-tested to ensure its integrity. Gas in the area also had to be tested to see if the odorant mercaptan was present. These tests are all necessary because natural gas can migrate underground and into buildings. These tests were all performed with satisfactory results, indicating that there was no gas leak from outside the building.

The next phase of the investigation involved the use of heavy equipment to surgically remove debris from the site. The examination of the scene was similar to an archeological dig, with debris removed in layers in order to reconstruct past events. This process was time-consuming. Fire Marshals ensured that evidence was not discarded or destroyed and the FDNY Incident Commander, who had overall control of the site, ensured that all personnel on the scene operated safely. The debris removal began at the area where the gas service entered the building, where the meters were located. The meters had to be removed without compromising their integrity.

The meters can provide information on current consumption, which can be used to compare previous usage. Also, the meters should be pressure-tested to eliminate them as a possible source of a leak. The debris from the area above meters was removed slowly, under the direction of Fire Marshals, and placed into the street where Fire Marshals examined it for any possible evidence before removal to containers. After several hours, the stairs and door to the meter room in the basement were uncovered. Fire Marshals, along with Con Ed personnel, were able to gain entry into the meter room and discovered that the meters were still intact and apparently undamaged by the collapse.

Investigators also discovered that the piping between the head-of-service valve before the meters had been tampered with. The cap from the drip leg had been removed and a $1^1/_4$-inch brass gate valve was connected. The gate valve was in the open position.

Background

The following is some basic information that may be necessary for the investigation of a natural gas explosion:

Properties of Natural Gas

- Natural gas is made up of 96 percent methane, two percent ethane and small amounts of CO2, propane, butane and other hydrocarbons.
- Natural gas is lighter than air. (Specific gravity is .6.)
- Limits of flammability are approximately five to 15 percent in air.
- Ignition temperature is approximately 1100 degrees Fahrenheit.
- Natural gas is non-toxic and odorless. For safety reasons, mercaptan is added to give it a distinct odor.
- An explosion at the upper limits generally will produce a rolling flame front with a sustained fire and minimal explosive damage. The ensuing fire generally will be more damaging than the explosion.
- An explosion at the lower limits usually will produce more significant explosive damage and minimal fire propagation. When ignition of gas occurs in the lower explosive range, a large amount of heat is produced. This heat rapidly expands the surrounding atmospheric gases, causing a low-intensity pressure wave of a few pounds per square inch. This pressure wave can push walls, break glass and move roofs up and out. This heat is generated for such a short period of time that it will only ignite or char light combustibles such as curtains or papers. People in the area of origin may suffer only minor thermal injuries.
- Natural gas can leak from supply piping underground. Natural gas may escape harmlessly into the atmosphere, but there are instances where the gas can migrate underground and into buildings. The odorant (mercaptan) can be filtered out by certain soils, which can cause the leak to go undetected for longer periods of time.

Distribution and Transmission of Natural Gas in New York City

- Both Keyspan Energy and Consolidated Edison supply natural gas in the five boroughs.
- Gas is supplied at high pressure above (one psi) and low-pressure (1/4 psi). High pressure is reduced by the use of pressure regulators prior to entry at the meter.
- Flow rates of natural gas: 1/2-inch-diameter pipe = 150 CFH @ 1/4 psi; 3/4-inch-diameter pipe = 400 CFH @ 1/4 psi; one-inch-diameter pipe = 800 CFH @ 1/4 psi
- Gas pressures will fluctuate depending on demand and weather conditions.
- Governor stations located throughout the City monitor and regulate the pressure in the supply system.
- Gas is transported in cast-iron, steel or plastic piping. Steel piping is subject to corrosion. The responsible supply company provides corrosion protection. Cast-iron piping is susceptible to cracking and no longer is used. Plastic pipe currently is being used and is leak-resistant. Copper pipe also is used to repair leaks in existing steel piping. Copper pipe is not susceptible to corrosion and also is used when plastic piping cannot be employed.
- There are several types of valves used to regulate the flow of gas. These valves are located in the street underground (curb valves), inside buildings at the end of the service pipe (head-of-service valve) and at the meter inlet (meter valves).

Objectives

- To determine whether natural gas was a contributing factor to the incident
- To identify the source of the natural gas (utility company side or customer side of service)
- To ascertain whether the leak occurred at an appliance, supply piping or fitting
- To locate the ignition source if possible
- To determine if the leak/explosion was accidental or there was any negligence or criminal liability that may have caused the leak/explosion

Attached to the valve were a reducer and nipple. Attached to the nipple with a hose clamp was a 24-foot length of plastic pool hose, which was approximately one inch in diameter. (See photos on page 6.) The hose was stretched from the meter room toward the rear of the basement and recovered in an area at the base of the stairs.

Due to the collapse of the structure, it was impossible to determine the exact location of the hose prior to the explosion. This evidence was photographed in place and removed for safekeeping. This was clear evidence that the gas supply system inside the building was compromised and tampered with. Because this device was attached before the meters, it was not possible to obtain an accurate meter reading for comparison against previous gas consumption. The investigation continued by slowly and methodically removing all gas appliances and piping for examination to determine if there was any additional foul play.

Fire Marshals observed the removal of all debris from the building; each piece of pipe, appliance and shut-off valve was examined, photographed and secured. Fire Marshals also recovered several hacksaws, which could have been used to alter the gas piping or appliances. These saws were secured for possible tool mark comparison.

Fire Marshals learned there were several stoves that were located on the second and third floors in the building. Additionally, there was a gas-fired clothes dryer and a gas boiler, which were located in the basement. All these appliances eventually were recovered and examined. The boiler and gas clothes dryer showed no evidence of tampering. In fact, the gas supply valve to the boiler was in the closed position.

Examination of the first stove recovered showed that it was physically disconnected from the piping in the wall. The flexible connection was not torn or stretched, indicating that it was not connected to the wall piping at the time of the explosion and collapse. A second stove also was recovered and the connection showed evidence of being tampered with. (See photos on page 6.) This was clear evidence that these appliances had been disconnected intentionally and the gas was left on to flow freely from the open gas supply piping.

Conclusions

Based on all the available information, the cause of this explosion/collapse was intentional. From the limited fire condition at the onset of this incident, along with initial observations, surveillance video and interviews conducted with eyewitnesses, investigators were able to determine the explosion most likely originated while the concentration of natural gas was at its stoichiometric or ideal mixture on the upper floors and basement of the structure. There were numerous sources of ignition present in the building and Fire Marshals were unable to determine the exact ignition source.

Dr. Bartha succumbed to his injuries several days after the incident and was unable to be interviewed due to his medical condition. There were no charges filed. This investigation showed that even though there was almost complete destruction of the building, the Bureau of Fire Investigation, through its experience in investigating natural gas explosions, can make an accurate determination regarding the cause of the incident. The success of this investigation can be attributed to the tremendous cooperation by all agencies involved.

About the Author...

Assistant Chief Fire Marshal Robert Byrnes is a 25-year veteran of the FDNY. He is assigned to the Bureau of Fire Investigation at Headquarters. He holds a bachelor's degree in Education from Brooklyn College. He attended the FDNY West Point Counter-Terrorism Leadership program and is a graduate of the Federal Bureau of Investigation's National Academy. This is his first contribution to WNYF.