

# Broadway Gas Explosion

By Deputy Assistant Chief Joseph A. Ferrante, Jr., Brooklyn Borough Commander, and Battalion Chief Paul Conrad

**T**he long Thanksgiving holiday weekend was coming to a close when Division 3 units were reminded that no alarm can be considered routine. An initial smoke investigation eventually revealed a gas leak, which led to a serious explosion. Only the aggressive actions taken by FDNY units prevented this incident from having a tragic outcome.

## Overview of the Incident

At 1544 hours on Sunday, November 25, 2018, Manhattan Communications received a phone alarm reporting smoke in the basement of 2465 Broadway, between West 91<sup>st</sup> and West 92<sup>nd</sup> Streets. A first-alarm assignment of Engines 76, 74 and 23 and Ladders 22 and 25 was dispatched to Manhattan Box 1213, under the command of Battalion Chief Paul Conrad, Battalion 11. En route, the Manhattan Dispatcher advised the responding units that a Class 3 alarm also was received for that address. The structure at 2465 Broadway is a three-story, 100- by 140-foot, Class 1 building, occupied by an Equinox gym. The gym was open and fully occupied at the time of the alarm.

Ladder 22, under the command of Captain Brendan Delaney, entered the building and initiated standard operating procedures to investigate the reported smoke condition. Encountering a light haze, but no fire, Ladder 22's inside team proceeded toward the electrical meter room, located at the front of the building. Entering the meter room, an electrical burning odor was noticed and Ladder 22's CO meter began to alarm. Although there was no obvious heat source, a muffled popping sound could be heard at the electrical conduit entrance to the building.

Checking his CO meter, Captain Delaney found it was reading "OL," indicating CO levels of more than 999 ppm. Informed of this, Chief Conrad ordered the evacuation of all occupants, while simultaneously ventilating the building. Additionally, he requested the response of Con Ed electric via the Dispatcher.

Now believing that he had either a transformer or manhole fire, Chief Conrad ordered Ladder 25 to check the manholes in front of the building. Led by Lieutenant Richard Carroll, Ladder 25 members, using their Sirius meter, began monitoring along Broadway. CO readings of 215 ppm were detected in the manholes and 200 ppm with 15 percent LEL of gas was found at the gas and hydrant shutoff valves. Ladder 25 then proceeded to check the surrounding properties which, at this time, proved negative.

Due to the detection of natural gas in the street, Chief Conrad requested the response of Con Ed gas operations personnel and ordered the adjoining occupancies at 2463 and 2473-75 Broadway to be evacuated. Additionally, the apparatus were ordered repositioned away from the front of the building to the cross streets, establishing a potential blast/collapse zone on the southbound side of Broadway. Two 2½-inch hand-lines were stretched on either side of the building, outside the collapse zone. Primary, secondary and eventually tertiary searches were made in all the occupancies to ensure all 90 civilians were safely evacuated.

At 1700 hours, a Con Ed electrical crew arrived at the scene. In an effort to determine if power to the building could be shut down safely, the Con Ed crew accompanied Ladder 22 into the basement of the gym. Entering the meter room, Ladder 22's CO meter again went into the "OL" readings, along with Con Ed's CO meters, which went into high alarm. Now, however, the Altair Digital Gas Meter was reading 70 percent LEL. Realizing that the atmosphere was likely in the explosive range, Ladder 22 and Con Ed immediately retreated from the buildings.

Due to the elevated gas readings in the building and the increasingly strong odor in the street, Chief Conrad transmitted an All Hands at 1720 hours. Transmission of the 7-5 signal brought Engine 47, Ladder 35 as the FAST Unit, Battalion 9, Rescue 1, Squad 41 and Division 3 to the scene. The Con Ed gas operations crew also arrived on-scene and began to check the street for the source of the natural gas leak. As Con Ed began their search, all FDNY members were pulled out of the blast/collapse zone and ordered to stand fast. At 1751 hours, then-Deputy Chief Joseph A. Ferrante,



*Damaged plastic gas supply line. Photo by Lieutenant Clifford Freer, Haz-Mat Training, FDNY.*

Jr., Division 3, reported using the All-Hands assignment for an electrical fire and gas leak in the basement of 2465 Broadway.

## Explosion

While Con Ed crews were attempting to locate and shut down the gas and electrical services to the building, a significant explosion occurred at 1819 hours. The explosion originated in the basement of the gym and sent a column of pressurized smoke and flame up the stairs and out into the street. Window frames, doors, building debris and a huge amount of shattered glass were blown out onto Broadway. Although partially damaged by the force of the explosion, the building sprinkler system quickly extinguished any incipient fire in the basement area.

Chief Ferrante immediately conducted an Emergency Roll Call of all units at the scene. After confirming that all FDNY personnel were safe and accounted for, he verified with the Con Ed supervisors that all of their crew members were safe. Finally, the ranking NYPD supervisor was asked to account for all of the police officers assigned to the incident. After confirming that everyone was safe, an assessment of the building damage was initiated. Units verified that no damage had occurred on the exposure #3 side of the building and all the surrounding multiple dwellings on West 91<sup>st</sup> and West 92<sup>nd</sup> Streets were unaffected by the blast.

Representatives from New York City Emergency Management (NYCEM), Department of Buildings (DOB) and the NYC Transit Authority were requested via the Dispatcher to respond to the scene. Haz-Mat 1 and the Haz-Mat Battalion also were requested for the use of their advanced metering capabilities. Additionally, a special-called company—Ladder 26—checked the nearest subway station located at Broadway and West 96<sup>th</sup> Street for any damage or natural gas readings. Subsequent searches of both the station and the tunnels for the IRT 1, 2 and 3 lines on Broadway all proved negative for damage and gas readings.

At 1850 hours, the Con Ed electrical supervisor confirmed that power had been cut to the building. However, gas operations per-





Explosion damage to the building.



Basement walls blown down by the force of the explosion. Except where noted, all photos by Deputy Chief Joseph N. Carlsen, Division 3 Commander.

sonnel still were in the process of locating the appropriate street valves. At 1941 hours, the Command Chief, Assistant Chief John J. Hodgins, arrived and assumed command. Con Ed gas operations initially shut down two gas valves on Broadway. However, a third valve required the street to be excavated in order to gain access. At 2047 hours, five hours and three minutes into the incident, the final gas valve located at the intersection of West 92<sup>nd</sup> Street and West End Avenue was shut down.

Upon confirmation that gas was shut down, PPV fans were used to pressurize the basement and second-floor stairwells of the gym. After completion of the ventilation, the Haz-Mat Battalion, Haz-Mat 1 and Engine 44 initiated metering and searches of 2465 Broadway, along with the surrounding properties. Units metered and surveyed all floors of the buildings and provided natural ventilation where possible. At 2205 hours, all CO and natural gas readings were down to acceptable levels and the incident was placed under control.

A complete survey of the Equinox gym and the surrounding properties revealed significant destruction to the basement and first-floor areas. Cinder block walls were knocked down in the basement, along with damage to the sprinkler system. Walls and ceilings on the first floor also were marred, in addition to damaged walls in exposure #4. A watch line was established overnight, awaiting the arrival of DOB representatives. Following an inter-agency meeting, the building was turned over to DOB and all FDNY operations were concluded on Monday, November 26<sup>th</sup>, at 1127 hours.

The cause of the explosion was a hole that burned into the plastic natural gas piping that was supplying the building. The new plastic piping was laid next to the electrical conduit that also was feeding the gym. The original manhole fire caused the electrical conduit to become overheated, which eventually burned through the piping. The arcing wires triggered the explosion when the natural gas levels reached the explosive range.

#### Lessons Learned/Reinforced

- Remind members not to let their guard down and become complacent. The explosion on Broadway occurred two hours, 35 minutes, into the operation.
- Do not position apparatus directly in front of the buildings at gas leak investigations. Keep units outside of the potential blast/collapse zone.
- Natural gas is lighter than air, with a vapor density of 0.56 to 0.59 and an explosive range of five to 15 percent. If natural gas ignites in a confined area (indoors), it will explode with destructive force. In an unconfined area (outdoors), it will ignite; not explode.
- At confirmed gas leaks, consider special-calling a SOC Support Ladder Company for its metering capability.

- Request the response of Haz-Mat 1 and the Haz-Mat Battalion to further evaluate the buildings and surrounding properties. At this alarm, Haz-Mat used its laser methane detector to evaluate the atmosphere in the building.
- Carry the Altair Digital Gas Meter when investigating all gas leaks and manhole incidents. The Altair alerted members that the gas levels were approaching the explosive range.
- Consider calling Con Ed gas operations, along with the electric crew, to manhole fires. Request the response of a Con Ed supervisor for both gas and electric operations.
- Assign an Officer or senior Firefighter to stay with the utility supervisors. This will establish continuous radio contact between the Incident Commander (IC) and the Con Ed representative.
- Be aware that high-, medium- and low-pressure gas distribution mains may be plastic. Plastic piping also is being used to replace metal service supply lines. The plastic gas service supply line on Broadway was installed in 2016.
- Gas supply piping usually is placed alongside water, steam and electrical lines. When operating at any of these types of emergencies, be aware that they may affect each other and request representatives from each operation category early in the incident.
- A protective Fiberglass shield is supposed to be placed in between the incoming service lines when they are laid next to one another. This shield was not present at the Broadway explosion and the utility lines were approximately two inches apart.
- Immediately following an explosion or structural collapse, the IC shall conduct an Emergency Roll Call of all FDNY members. Contact the supervisors of other agencies operating at the scene and have them account for their members, too.
- Remember, while Con Ed is responsible for the utility services, the FDNY is responsible for the **overall safety** of the operation. The utility crews can be allowed to operate only in areas we have deemed to be safe.
- Identify the location of the Command Post and request the response of other agencies, such as NYCEM, NYC Transit, etc., early in the operation.






Explosion debris strewn along Broadway.



Wall and ceiling damage in basement.



**CO Incident** – Readings of 9 PPM or less.

**CO Emergency 2 types:**

- Over 9 PPM **but Less than 100 PPM**
- Readings of **100 PPM or greater.**
  - Evacuation of occupants must begin.

CO meters will display **readings up to 999ppm.** If readings of 1000 ppm or more are detected, the CO meter will display "OL", indicating an over limit condition.


**(LEL) 12.5% - (UEL) 74%**

**Symptoms of CO Poisoning:**

- Low Level CO Poisoning- can mimic flu symptoms, headache (mild/severe), fatigue, nausea, dizziness, confusion, irritability.
- Medium Level CO Poisoning- vomiting, drowsiness, loss of consciousness.
- High Level CO Poisoning- seizure, coma, permanent brain damage, death.

**FDNY Indoor Action level for Natural Gas is 10% of the LEL.**

A **combustible gas reading of 100% indicates the atmosphere is above 100 % of the LEL** – an explosion hazard exists



The Explosive range of Natural Gas **(LEL) 5% - (UEL) 15%**

The MSA Altair Digital gas meter is the only meter available to ladder companies to determine the LEL of natural gas.

Carbon monoxide slides from After-Action Review PowerPoint.

- Make sure any adjacent subway stations and tunnels are checked with meters for any gas readings or potential damage.

**Conclusion**

Natural gas emergencies and fires will continue to be problems for the FDNY. How we respond to these natural gas incidents can mean the difference between life and death for civilians, as well as FDNY personnel. Gas emergencies never can be considered a routine or nuisance alarm. The units that responded to the alarm on Broadway were not complacent and that made all the difference. The companies provided accurate information to the ICs, so they could make the proper decisions. Even though a serious explosion occurred, not one civilian or Firefighter suffered any injuries. ■

**References**

1. *Operational Procedures at Emergencies*, Natural Gas Emergencies and Fires.
2. *Communications Manual*, Chapter 9, Addendum 2, Emergency Roll Call Procedures.
3. *Fire Tactics and Procedures*, Hazardous Materials 4, Carbon Monoxide.
4. "Emergency Roll Calls," by Deputy Chief Nicholas Corrado and then-Battalion Chief Frank Leeb, in the 4<sup>th</sup>/2016 issue of *WNYF*.
5. "Roll Call: The Firefighters' Competitive Advantage," by then-Battalion Chief Frank Leeb, in the 4<sup>th</sup>/2017 issue of *WNYF*.
6. "Understanding Oxygen in Your Atmosphere," by Captain Carlos Vazquez, in the 4<sup>th</sup>/2012 issue of *WNYF*.
7. "When a 'Routine' Call is Anything But Routine," by Battalion Chief James Kane, in the 3<sup>rd</sup>/2015 issue of *WNYF*.

**About the Authors**



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