

8701 Arliss Street

Brief intro:

On August 10, 2016 at approximately 2353 hours Montgomery County Public Safety Communications Center began receiving numerous calls for a building fire in the area of Arliss and Piney Branch Roads in Silver Spring, Maryland. Call takers processed the call and dispatched the box alarm assignment which brought Fire/Rescue units from Montgomery County and Prince George's County. Two Montgomery County Police Officers were within a thousand feet of the building when they heard an explosion and began to investigate. Within a minute or two, the two officers located a severely damaged three-story garden apartment (8701 Arliss Street) at the corner of Arliss Street and Piney Branch Road. What remained of the building, was on fire. The officers called out on the radio, informed the dispatcher of the incident and requested additional help. Within minutes of the dispatch the first fire engine arrived on scene and they too requested additional resources.

Injured residents were wandering the streets looking for family members. Occupants trapped in their apartments were crying out for help. One such family, trapped on the top floor and hanging out their window dropped their infant child four stories into the arms of a stranger. Those too injured to move were scooped up by Police and other first responders and carried to a treatment area nearby. A triage area was established across the street where approximately 30 residents were treated and transported. Of those treated and transported, several were Fire Rescue personnel. All of those treated at local hospitals were released within several hours except for two residents with serious injuries.

Fire/Rescue crews immediately began making rescues and initiating the suppression effort. The bulk of the fire was brought under control, however; because the fire was gas (natural) fed, an area of fire to the left side of 8701 was allowed to burn. Allowing gas fed fires to burn until the gas has been controlled is a standard practice and is a benchmark in firefighting classes. Once the gas was controlled by Washington Gas the remaining fire was extinguished.

Investigation:

Montgomery County Fire/Explosive Investigators responded and quickly requested assistance from the ATF. The ATF responded and assembled their National Response Team. Scores of other agencies responded to assist Montgomery County. The initial priority was locating the tenants of both 8701 and 8703 Arliss Street. This task was hampered by the fact that the occupant manifest provided by Kay Management was limited to the names provided by the lessee at the time of the lease inception. It was learned very quickly that numerous individuals and families were living in the building unbeknownst to Kay. Ultimately, an accurate list was compiled and it revealed seven individuals were unaccounted for. In the days immediately following the explosion, investigators conducted hundreds of interviews with the victims of 8701 and 8703 Arliss Street, witnesses and as well as canvasses of the surrounding buildings.

A systematic scene examination began on August 11, 2016 and continued until August 17, 2016. During this examination, the bodies of the seven missing victims were located. Ultimately the debris pile formed by the collapse 8701 Arliss Street was layered through and removed. Based on the examination of the physical evidence, the seat of the blast was determined to be the meter room of 8701 Arliss Street. The natural gas regulators and meter rack were reconstructed on a temporary wall as the collapse of the building damaged the piping. The damage to the regulators, meters and piping was consistent with damage from the explosion/collapse and subsequent flame impingement except for one item. That one item was a three-piece union which connected the lower of the two regulators to the vent line. The vent carries gas outside in the event of a regulator malfunction or failure. This connection (union) would have been in the inside corner of the foundation walls. This corner would have been formed by the front wall of 8701 and the side wall diving 8701 from 8703. Prior to the event access to this union (oriented in a horizontal position) for the purpose of separating or joining the union would have been difficult at best due to its proximity to the walls and the need for two wrenches to work on it.

It is unlikely and unreasonable that someone would intentionally disconnect this union in an attempt cause a gas leak for several reasons;

- 1) Due its location and difficulty to operate two wrenches in close quarters
- 2) If the regulators are functioning properly disconnecting the union would not result in fugitive gas escaping

After more than a week of painstaking work, detailed examinations and associated investigations at the Arliss Street scene **NO** criminal nexus was uncovered. During investigations, investigators routinely encounter leads or are provided information which could be construed by those people as being significant to the investigation. Those leads are investigated or reviewed by investigators with an extensive knowledge of the case as they relate to the totality of the event. No criminal intent was uncovered.

During the investigation, several people who may have held a grudge against Kay Management were investigated. Those individuals ranged from former employees to disgruntled tenants. Based on testimony from NTSB interviews and physical evidence from the scene, those individuals would not have had access to the **locked and alarmed** meter room of 8701 Arliss Street. Alarm history shows no alarms prior to the event and those who accessed the alarm panel were authorized to do so. The idea or suggestion that a subject(s) would intentionally target the meter room of 8701 Arliss Street makes no sense. The building had a daily police presence and was where officers signed in and used the office. Surrounding buildings in the Flower Branch complex had similar gas meter rooms/laundry facilities which were unsecured and would provide a much easier target in a criminal endeavor.

During the explosion and collapse the high-pressure service pipe broke and the escaping gas ignited. The resulting fire severely damaged components of the gas distribution system. The items in close proximity to the severed pipe were more damaged than those further away. The first two meters in the upper row of the meter rack were far more damaged than any of the others due to their proximity to the gas fire emanating from the broken service pipe. The upper of the two regulators was more damaged than the lower regulator. The lower regulator still had the alloy top cover in place; it was damaged but not gone. The vent pipe coming from the upper regulator was pulled from regulator housing. The male threads of the pipe were damaged. The deformity to the threads was consistent with the pipe and regulator being pulled apart; however, the three-piece union (in a vertical orientation) just above the regulator was still intact.

These facts are important when attempting to understand how the lower union became disconnected. During the NTSB investigation, Washington Gas, a party member was surmising the separated union on the lower regulator occurred because of heating which cause the female portion of the union to expand and separate from the male threaded portion. This theory is flawed for one reasons:

- 1) Based on the damage to the regulators, the greatest amount of heat and fire impingement was to the upper regulator yet that union remained together.

Washington Gas also introduced another theory regarding the separation of the union as having been the result of the collapse. The collapse of this building was in a downward motion and not lateral. The collapsed material stayed within the footprint of the building. The separated union in question was oriented in a horizontal plane. The union to the upper regulator which remained connected was oriented vertically. One would expect that the downward forces caused by a collapse would pull apart a connection that's oriented vertically rather than one that's in a horizontal configuration. The upper union was subjected to far more heating than the lower union, endured the downward forces of the collapse yet remained together and intact.

The only reasonable explanation for the disconnected union is that it was disconnected in the course of maintenance and the technician neglected to reconnect it.

Based on the investigation, the explosion was caused by fugitive gas in the meter room of 8701 Arliss Street. The service pipe serving 8701 had a gas inlet pressure of 20 psig and the regulators step that pressure down to approximately $\frac{1}{4}$ psig. The natural gas is then distributed to 15 meters serving the 14 apartment units and one meter for the hot heater. Based on interviews, the meter room was not an airtight room. There were two small windows at the upper portion of the front wall. At least one of the windows was covered with a piece of plywood with holes drilled in it. This allowed the window to remain open and provide ventilation to the room while preventing unauthorized entry. Being that the meter room also contained electric meters it was the hub for utility distribution to the individual units. Utility chases (void spaces to run plumbing, electric and gas) originated in the meter room and were routed up and away from meter room. These chases provide a natural and unobstructed path for smoke, fire and vapors which are lighter than air.

In cases of natural gas leaks fugitive gas will migrate upwards and these chases provide an easy path of travel. In the case of small leaks where a small volume of gas is escaping, gas will rise into these void spaces and out ventilation openings such as the window in the meter room and be less likely to accumulate at the point of the leak. During the scene examination, it was determined the seat of the blast was in the meter room of 8701. In order to get an explosive mixture of gas in the meter room the concentration of gas would need to be between 5 and 15 percent. It is reasonable to believe that for this to happen the upper floors of the apartment building would have entered the explosive range prior to the meter room because gas rises. The gas stoves in 8701 had a standing pilot light which would have provide a competent ignition source to ignite the fugitive gas. Another issue to consider with a slow leak is that as the gas is migrating up and out more people are likely to smell mercaptan, the odorant in natural gas.

In leaks where large volumes of gas are escaping, it is reasonable to believe that the gas will still migrate to utility chases but will also likely accumulate in the area where the leak originated such as the meter room of 8701 as the chase and ventilation opens can't dissipate the fugitive gas as quickly as the gas is flowing in.

Based on interviews during the investigation a witness who lives in 8701 was identified. He was interviewed numerous times, both on the scene, as well as later at NTSB headquarters. His statement is crucial in developing a time line for this event. He states he arrives home less than one hour before the blast. At the time of his arrival there was no odor of natural gas in or around the building. Just prior to the explosion he took the trash out. As he descended the stairs he could smell gas. Smelling gas was not unusual as he has smelled it in the building before, however, this was a very strong odor. The odor intensified at the basement level. At the time, he was on his cell phone and decided to continue with his call while he took the trash to the dumpster. If the odor was still present when he returned he would call 911. He exited the building and prior to reaching the dumpster the building exploded.

This information is critical in attempting to understand what caused the explosion that destroyed a three-story apartment building. The main entryway into building was one short flight of stairs away from the door to the meter room. Based on this witness statement, in less than one hour, the presence or odor of gas went from nothing at all to a volatile mixture capable of leveling a portion of the building. This statement lends weight to the fact that an unknown failure caused a rapid/large volume release of natural gas in the meter room.

Based on information gleaned during the NTSB portion of the investigation, it was learned that mercury regulator can and do fail. A failed regulator would cause gas to vent through the vent pipe, and if connected properly, to the exterior of the building. A disconnected vent pipe, as is believed to be the case in 8701 Arliss Street paired with the fact that the incoming gas pressure was 20 psig, would allow a large volume of gas to vent into the meter room. Competent ignition sources were present in the meter room.

Recommendations to prevent similar accidents in the future

- 1) Move high pressure gas lines outside of the structure
- 2) Implement a life expectancy on mercury regulators and replace
- 3) Discontinue the current approach to compensating gas technicians (piece work or paid by the job). This type of payment promotes quantity vs. quality. A technician who is not rushing to complete an assigned task is more likely to do thorough job and may find other deficiencies or issues
- 4) Improved record keeping regarding service calls, replacement of regulators and meters
- 5) Kay and other management companies who take calls from tenants reporting odors of gas should immediately call 911 and initiate a fire department response
- 6) Management companies should insure their tenant manifest and the contact information is accurate and up to date in case of an emergency

Closing Thoughts

I know the party system is the NTSB way and I don't have an issue with that. At times during this investigation, Washington Gas treated meetings and interviews more like a court room cross examination than a joint investigation geared at finding the cause of a tragic accident. I feel that Washington Gas overlooked testimony provided to the NTSB during field interviews and questioned the validity of the facts. In numerous emails over several months, Washington Gas questioned the factual content of the ATF report and the on-scene investigative efforts. It was disheartening to think that party members would take pieces of information from NTSB meetings, then turn around and attempt to cast doubt or insinuate criminal nexus to diminish culpability.

In closing, I would like to commend the NTSB investigators for their professionalism, their methodical and scientific approach to this tragic accident. I feel fortunate to have been selected as a party member to represent Montgomery County Fire/Rescue and to see the investigation through to a conclusion. It has been an honor to work side by side with your dedicated and driven investigative team. It is my hope that this investigation will assist in preventing future accidents such as this one.

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Montgomery County Special Operations, Fire/Explosive Investigations