



MONTGOMERY COUNTY FIRE AND RESCUE SERVICE
POST INCIDENT ANALYSIS

Date of Incident: February 13, 2002
Incident No.: 02014239
Location: 17517 Charity Lane
Magnitude: Large Loss House Fire (>\$1,000,000)
Box Alarm, Safety and Task Force

Safety

No fire rescue personnel or civilians were injured. Due to the initial units operating in an IDLH (Immediately Dangerous to Life and Health) atmosphere, Ambulance 319 (A319) was assigned as the "two-out" or standby crew. They were positioned in the yard on Side A within view and immediate reach of the Incident Commander. A safety dispatch was requested by command 2 minutes and 50 seconds after arrival. Upon arrival of the safety units, Engine 331 (E331) was assigned as the Safety Company with the unit officer assigned as the Incident Safety Officer.

Welfare

Canteen 3 arrived on the scene early into the incident and positioned in the neighbor's driveway in close proximity to the incident, but outside of the operational area. A rehab section was established next to the Canteen. Bus 27 also arrived early into the incident and was positioned next to the Canteen as well. Rotation of personnel was not a significant issue at this incident for several reasons. First, the weather was relatively mild. In addition, the personnel were not exerting themselves significantly since they were staged for an extended period of time awaiting continuous water supply and once water supply was established, the operation shifted into a defensive operation using master streams.

Building and Topography

The building was a two-story, wood-frame, colonial with a full basement and attached two-car garage on Side B (the writer estimates the total enclosed space of the structure to be approximately 4500 square feet). Side A of the structure faced nearly due north and had a brick veneer. Sides B, C, and D had aluminum siding. The roof was hip design with the garage roof and the main house roof intersecting with possible openings between the two attic spaces creating a large interconnected attic. The roofing material was wood shakes. Wood shakes are known to significantly add to the fuel load, increasing required water application rates and complicating extinguishment efforts. In addition, they are associated with a much higher risk of igniting exposure fires. The house also had a large attached, multi-level deck on Side C. A shed, pool house, and in-ground pool were located at the corner of Sides B and C.

The lot was partially wooded and sloped from the front to the rear steeply at the corner of sides C & D. Trees restricted apparatus access to the rear.

Access

Access from Charity Lane to the house was enhanced by the presence of three parallel black top driveways leading to the incident location and the two adjacent houses. This provided numerous options and excellent access for the heavy apparatus. In order for Truck 29 (T29) and Tower 8 (AT8) to enter the driveway from the road, the mailbox was cut down. Then to get AT8 in position on Side A of the house, two trees were cut down. As noted above, trees and the slope of the lot limited access to Side C & D. No other impediments to access were encountered.

Weather

The primary weather-related issue was the presence of a strong wind from the west (the writer estimates approximately 20 – 25 mph with stronger gusts). Strong winds, in conjunction with wood shake shingles, are known to significantly increase fire spread and the incidence of exposure fires. Numerous brush fires resulted from flying brands, but no other structures were damaged beyond the initial fire building. The intense winds contributed significantly to the rapid spread of fire throughout the attic, hampering extinguishment efforts by interior crews, and causing the fire to extend into the second floor of the house.

Suppression Agent Logistics

The lack of immediate and adequate support of the water supply was the single most significant factor in the eventual outcome of this fire. Engine 311 (E311), the first due and first arriving engine company, laid out a single 3-inch supply line from the end of the driveway in preparation for a tanker shuttle operation. Engine 81 (E81), the next arriving engine company assumed the position at the end of the driveway and began to establish a dump site and prepared to draft from a folding tank. E81 had positioned strategically out of the roadway and was essentially prepared to receive the water from W9 upon W9's arrival.

District 5 (DIST5) arrived and, after several failed attempts to contact Command 31 (CM31), he designated himself as the Water Supply Sector. Upon arrival of Tanker 9 (W9), the folding tank was deployed and W9 dumped 1500 gallons into the folding tank and left to refill. Upon the arrival of Tanker 14 (W14), they also deployed the folding tank and dumped all of their water into it.

As soon as W9's water was in the folding tank, E81 began attempting to draft. Numerous unsuccessful attempts were made to establish the draft. Several off-duty firefighters arrived and attempted to help establish the draft using E81. Water Supply Sector directed the apparatus at the end of the driveway to send their tank water to E311, which was done.

While E81 continued to try to draft, Water Supply Sector directed Engine 31 (E31) into position at the side of the tank to begin drafting and E31 was able to establish a draft, but lost it quickly. It was later determined that E31 did not have a strainer on the hard sleeve and the end of the hard sleeve was sucking the sidewall of the folding tank against the sleeve opening and causing the loss of prime. After several additional attempts at priming, E31's priming motor stopped working. E31 was moved out and Engine 331 (E331) was brought in to draft.

Eventually, E81 and E331 were both able to establish and maintain drafts. Approximately 20 - 25 minutes had elapsed without any appreciable, constant water supply to E311. Once the water

supply was established, the four tankers operating the shuttle, utilizing two fill sites were able to deliver approximately 600 gallons per minute for over 60 minutes. Based on this fact, insufficient water delivery capacity via the tanker shuttle was not a factor in the incident outcome. The inability to deliver the water from the tankers to E311 was the primary failure in the water supply evolution.

Personnel

In addition to the initial Box Alarm assignment, and Safety Dispatch and a Task Force were requested. The personnel from these assignments were deployed effectively initially, but then personnel were forced to stand-by awaiting completion of the water supply operation. Once adequate water supply was established, the personnel were redeployed to finish mitigating the incident.

PEPCO was requested to control the electricity feed to the structure. The Red Cross was requested to assist the displaced family of six as well as the neighbors who temporarily lost electrical power when PEPCO controlled the electricity to the fire building. All support agencies performed effectively to support the operation.

Apparatus

CM31 requested the Safety Dispatch very shortly after arrival on the scene. DIST5, who had assumed the Water Supply sector, requested two additional Tankers very early into the water supply operation. A Task Force was also requested by CM31. Throughout the incident, adequate apparatus was available on the scene to fulfill the required functions, though several apparatus issues did impact adversely on the overall operation.

When laying out, E311 failed to leave a 2½-inch siamese at the end of the driveway as required for rural water supply operations. E81 did not carry a siamese and W9 did not provide one to E81. E311's single supply line was connected directly to a discharge on the officer's side of E81. The failure to attach a siamese on the end of the 3-inch supply line hampered efforts to establish an uninterrupted and adequate water supply to E311.

E81 (running reserve E282) experienced difficulty establishing a draft from the folding tank provided by W9. Initially, E81 lacked the correct adapters to connect the 6-inch hard sleeves to the 4½-inch front intake. Eventually, the connection was made in a non-standard configuration that prevented the use of a strainer on the intake end of the hard sleeve. Even if they would have been able to connect a strainer to the hard sleeve, E81 did not have a low-profile strainer, which is highly desirable for maximum efficiency when drafting from a folding tank. W9 had a low-profile strainer, but did not provide it to E81.

During drafting operations, E31 suffered a failure of the primer motor, rendering that unit out of service. E331 replaced E31 and, after some difficulty connecting the hard sleeve to the front intake due to needing an adapter, E331 was able to establish a draft. At this point, E81 was also able to establish a draft and an adequate and continuous water supply was maintained until the end of the incident.

Communications

In addition to using Channel 1 for the primary fireground operations, the water supply operation was switched to Channel 3. Because the Command Support unit (CS1) was involved in establishing the drafting operation at the end of the driveway for several minutes, the Incident Commander did not have a command support unit to help manage the radio traffic, provide command support equipment, or assist with other command functions until late in the operation. CM31 failed to request the necessary command support equipment from the command officers arriving on the scene. As a result -- particularly early in the incident -- a few radio transmissions went unacknowledged by CM31. Despite a couple of occasions when units made transmissions on the incorrect channel and had to be redirected by ECC, the overall communications during the incident were for the most part clear, effective, efficient, and appropriate.

Pre-Emergency Planning

CM31 was hampered in the decision-making process by a misleading map in the front of E311. Shortly after E311 arrived on the scene, CM31 checked the map in the front of E311 to confirm the location of the nearest hydrants. CM31 had knowledge of the area and suspected that some hydrants from an adjoining neighborhood off of Richter Farm Road may have been within reasonable distance of the incident. Based on the poorly drawn map that misrepresented the actual location of hydrants, CM31 discounted utilizing those hydrants and made the decision to stay with the tanker shuttle water supply operation. In actuality, there were two hydrants were in close proximity to the scene (approximately 500 feet) and could have been utilized to establish a continuous water supply from a pressurized source. Efforts have already been undertaken to correct the errors on that specific map, but the current system of primarily hand-drawn maps in the front of apparatus lends itself to the repeat of such errors. Ultimately, following the implementation of PS2000, all MCFRS apparatus will have significantly improved mapping and preplanning functionality provided on the in-unit mobile computing terminal. This will include the ability to query the system for nearby water sources, both pressurized and static.

Standard Operating Procedures

Initial water supply operations were based on the current SOP's for rural water supply operations as found in the Fire and rescue Commission Policy 24-07AM, *SOPs for Safe Structure Firefighting Ops – Amended*, 2001, Section V, *RURAL AREAS*. The units assumed their predefined positions and operational functions in accordance with the SOP as amended by CM31.

Exceptions to the application of this SOP were outlined above in the *Apparatus* section where it was noted that a siamese was not connected to the end of the supply line. This departure from the SOP was due partially to E311's failure to leave that at the end of the driveway before laying out, and also the fact that E81 did not carry a siamese.

In Section V of the current SOP, no mention is made of the first arriving tanker pumping the supply line until the drafting engine establishes the draft and assumes the primary supply role. In accordance with the current procedure, W9, the first arriving tanker, did not pump the supply line, but instead dumped all 1500 gallons into the folding tank, expecting E81 to be able to establish the draft. In addition, without realizing that there was a problem with E81 establishing the draft, W14 arrived and did the same, dumping approximately 3000 gallons in their folding tank. This resulted in approximately 4500 gallons of water being available on scene, at the end

of the driveway, but we were unable to supply the water to E311 due to the drafting problems. Had both tankers adopted a “nursing” position by pumping the supply line from the end of the driveway until the draft was established, the outcome of the incident may have been entirely different. E311 would likely not have run out of water, and additional hose lines would have been put quickly into service. It is impossible to know the exact outcome under that scenario, but it is likely that more of the structure would have been saved than what actually occurred. It should be reiterated that W9 and W14 acted in accordance with the current SOPs.

This is a shortcoming of the current policy and should be revised. Revisions of the current language on policy 24-07AM could be made to adopt this as a standard practice until such time that a stand-alone rural water supply policy is developed.

Organization

Command was established by Car 293 (K293) immediately upon arrival and maintained throughout the duration of the incident. Sectors were established as necessary and all sector officers performed effectively. As previously noted, CS1 became involved in the water supply operation at the end of the driveway and did not report to the Incident Command Post (ICP) until late in the incident. CM31, having arrived in K293, lacked adequate and appropriate command support equipment such as vests, command flow sheets, and accountability boards. CM31 improvised with resources available and command and personnel accountability did not suffer significantly.

The receipt of information and the issuance of directions by CM31 remained clear and coordinated throughout the incident. There were occasional minor lapses, but they were quickly remedied and command managed incident priorities appropriately. Throughout the incident, CM31 continually evaluated and reevaluated the current strategies and tactics and adjusted them accordingly.

Several days after the incident, Captain Lipp (CM31) was made aware of concerns regarding the clarity, appropriateness, and unity of command that were raised by Chief Bob McHenry and Deputy Chief Matt Kenworthy. A separate committee has been established by Fire Administrator Gordon Aoyagi to look into those concerns, the ramifications on incident outcome, and the actions of the individuals on scene. The results of those efforts will be addressed in the report of that working committee and will be excluded from this analysis.

Accountability

Unit and personnel accountability concerns were addressed from the beginning of the incident and a high level of accountability was maintained throughout the incident. A personnel accountability check was completed at the 20-minute mark by a “face-to-face” between CM31 and the unit officers on the scene. The second accountability check was completed by radio by CS1.

Units completed tasks as assigned, maintaining unit integrity and reported progress to CM31. There was minimal freelancing.

Strategy and Tactics

The initial strategy established by CM31 was to contain the fire to the structure of origin through the mounting of a rapid, well-coordinated, and aggressive interior attack, along with potential offensive application of elevated master streams from AT8 in an attempt to gain control of the fire in the attic. The success of this strategy required that appropriate tactics be employed within a very small window of opportunity due to the speed of fire spread, high wind conditions, and construction factors that were not advantageous.

A 1¾-inch handline was advanced to the second floor along with two crews to hook the ceiling to gain access to the fire in the attic. Two 2-inch handlines were staged by the front door awaiting the water supply being established so they could be placed into service. Ground ladders were thrown to the second floor windows on Side A. Rapid fire spread on the second floor forced units to retreat to the first floor. Once in the foyer on the first floor, additional water was applied toward the second floor in an ineffective attempt to slow the fire progression. When we ran out of water, the units were withdrawn from the building and a collapse zone was established. Brush units addressed fires in the surrounding fields and woods. Once water supply was established, master streams were placed in service, first from E311's deck gun and then ultimately from AT8's elevated master stream.

During the incident, CM31 evaluated several water supply options including neighbors' pools. Having identified a potential alternate water source, that information was transmitted by CM31 to the Water Supply Sector for follow-up. It is doubtful that the Water Supply Sector ever heard that request. CM31 did not confirm receipt of the message. However, as noted before, lack of water was not the issue – the inability to draft and pump the water created the water supply problem.

Late in the incident, a 150-lb. propane tank began venting on Side C of the structure. Based on the advice of an on-scene Hazmat Technician, the scene was evacuated; all personnel were pulled back from the immediate area to a nearby backyard north of the incident to allow the tank to finish venting. After about 10-15 minutes, the tank had slowed venting, was reassessed and personnel were sent back into the operational area to complete final extinguishment.

The final strategy adopted by CM31 was to contain the fire to the structure of origin utilizing a defensive attack.

Overall Analysis of Operations

The outcome of this incident was truly unfortunate for the family who was displaced and lost all of their possessions. Many significant factors were stacked against the success of the operation from the beginning and then several new adverse factors arose during the operations. Combined, they led to the complete destruction of the residence.

Incident Command Positions

Incident Commander: Captain Troy Lipp
Command Support: Chief Bob McHenry
FF Bill Barber
FF Scott Forbes
Safety Officer: Captain Bob Stojinski
Operations Sector: District Chief Richie Bowers
Water Supply Sector: District Chief Rusty Rothenhofer
District Chief Melvin Howard
Sector C: Captain Eric Ramacciotti
Exposure Sector: District Chief Joe Chornock

Critique General Comments

Strategy and Tactics. Some concerns have been identified regarding the application of the strategy and tactics.

- Offensive attack strategy: Faced with the large volume of fire, the wood shake roof, and the strong winds, it is questionable that the offensive attack strategy would have been successful even if the water supply problem had not occurred. The fire was progressing extremely fast and had possession of the attic area and Side C of the structure before any handlines were placed in service. In addition, some individuals have questioned the value of mounting the aggressive attack on the attic fire with a single handline (pending expanded water supply, after which multiple handlines could be deployed).
- Water supply tactic: Failure of the tankers to pump the supply line until the draft was established, though in compliance with current SOP's, placed too much reliance on the ability of the E81 to draft. Either mechanical, or personnel issues, or a combination of both, can adversely affect the ability to establish a draft. Given this reality, pumping the supply line as a tanker "nursing" operation until the draft is established is an imperative.
- Offensive Tactics on the 2nd Floor: When the handline was advanced to the second floor, no coordinated effort was mounted between the crews pulling the ceiling to open the attic and the crew on the handline. Several small, remotely located holes were opened and the handline was repositioned several times to attempt extinguishment at different locations. This ineffective effort slowed suppression operations and added unnecessary complication and exertion to the hoseline crews. Such tactics would only be successful if presented with a smaller, slower-moving attic fire.

Human factors and the Driver Training program. The Division of Fire and Rescue Services has undertaken an aggressive campaign to train additional drivers in anticipation of future retirements associated with the DROP program. It is the opinion of the writer that, though well-intentioned, the program has a significant negative impact on the ability to provide safe, efficient, and effective service to the citizens. The proliferation of new drivers in the system has created a circumstance where many drivers are not given adequate opportunity to be assigned as the heavy apparatus driver, perhaps driving only once every couple of months. New drivers are checked off then only given infrequent chance to apply the associated skill sets, hone their knowledge, and gain all-important experience. With the lack of exercise, the knowledge, skills, and abilities they once possessed atrophy and are lost. This phenomenon exists across all classes of heavy apparatus throughout MCFRS. The result is that inexperienced drivers are placed in

positions beyond their ability without adequate and appropriate supervision and the results can be catastrophic.

In addition to the goal of training new drivers to prepare for the loss of more experienced personnel to the DROP, is the fact that the heavy apparatus operator certification remains linked to the requirements for promotion to Firefighter III in DFRS. As long as these two certifications remain linked, the system as a whole is under immense pressure to produce new drivers, frequently pushing people beyond their current levels of ability. Not everyone is able to function as a heavy apparatus driver.

Further saturation of DFRS with more heavy apparatus drivers will likely increase the frequency and severity of apparatus collisions, employee injuries, and operational errors and places the drivers in the unfortunate position of bearing the responsibilities of those failures. The system should return to the concept of a specialized class of personnel such as the Technician or Fire Apparatus Driver / Operator (FADO). Allowing certain personnel with requisite abilities to focus on the FADO position will create a higher level of competence throughout DFRS. Drivers will have a broader base of experience upon which to draw and will be true specialists like the Technicians used to be. “Non-FADO” firefighters will be able to specialize and focus on the skills required of their specific jobs without being distracted by the FADO responsibilities. Employees will have a narrower set of knowledge, skills, and abilities that are required of them in the everyday performance of their jobs and overall job performance will improve.

Apparatus specifications and equipment inventories. Although most of the issues that arose during this incident are not a direct result of failures in the apparatus specification or inventories, many lessons can be learned. Apparatus inventories should be standardized so that all large diameter intakes have 6-inch NST regardless of the intake size. Apparatus should have the necessary additional priming piping for front intakes to prevent air traps and speed priming operations (a very inexpensive solution with significant benefit). Apparatus should have annual pump certification tests (similar to our current practice of annual aerial and ground ladder tests) to include dry prime tests.

In addition, MCFRS should develop a standardized equipment inventory carried by all apparatus for the purpose of implementing a rural water supply operation. History has taught us many times that no engine company in MCFRS is immune to being thrust into the middle of a rural water supply evolution. Frequent moves of reserve apparatus and daily apparatus transfers mean that any piece of apparatus may be in the critical water supply position on an upcoming incident.

Minimum equipment inventories on all engine companies should include:

- 2 ½-inch siamese (or water thief for large diameter supply line)
- two 6-inch hard sleeves (and the required adapters to connect to all large intakes)
- 6-inch by 4 ½-inch double female (for connecting to a dry hydrant)
- 6-inch floating strainer (for units adjoining rural response areas)

Minimum equipment inventories on all tankers should include:

- 2 ½-inch siamese (or water thief for large diameter supply line)

- two 6-inch hard sleeves (and the required adapters to connect to all large intakes)
- 6-inch low-profile strainer
- 6-inch floating strainer

Throughout the history of MCFRS we have been taught many hard lessons and given numerous opportunities to apply those lessons for the betterment of the services that we provide as well as improving the safety of our own personnel. Frequently, however, the lessons become lost over time and we fail to correct the shortcomings of our system. Hopefully, we will not miss this chance to take a painful lesson and turn it into a positive experience for the enhancement of the services we provide to our citizens.

Recommendations.

- Review and revise the current SOPs regarding rural water supply. Consider establishing a separate SOP specifically for rural water supply operations.
- Remove the heavy apparatus driver certification from the requirements for promotion to Firefighter III and implement F ADO certifications for Firefighter III and Master Firefighter job classes.
- Standardize apparatus inventories to ensure all apparatus is capable of supporting a rural water supply operation and guarantee compatibility with other apparatus.
- Develop a Standardized Training Program (STP) or conduct In-service training focusing on drafting and rural water supply operations based on the revised SOP.
- Perform annual engine company pump tests. Require operators to perform weekly dry prime tests and correct identified deficiencies.
- Encourage installation of residential sprinklers in rural areas through public education, tax incentives, code trade-offs, legislation, etc.
- Revise apparatus specifications for all apparatus equipped with large pumps to standardize pump intake size to 6-inch NST.
- In the course of the normal apparatus replacement cycle, when replacing engine companies in stations with primarily rural response areas, specify engine/tankers.

Prepared by Captain Troy Lipp
March 8, 2002