

MONTGOMERY COUNTY FIRE/RESCUE SERVICE
POST INCIDENT ANALYSIS



40 Upper Rock Circle
April 1, 2014

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An early view from Aerial Tower 708

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INTRODUCTION

At 0411 on April 1, 2014 Montgomery County Fire and Rescue (MCFRS) dispatched a box alarm for a reported building on fire in the area of Shady Grove Road and Gaither Road in Rockville. The Emergency Communications Center (ECC) received multiple calls from passersby reporting a building on fire in the area but none of the callers was able to provide an exact address.

With units en route to the fire, ECC began to provide location and status updates over the air. For the units responding from Fire Station 32, the first due station, there was no question that there was a building on fire because when the bay doors opened smoke poured in. Battalion 703 requested a second alarm and advised ECC to prepare for a third alarm while still almost half a mile from the scene. Fire and Rescue units would remain committed to this scene in one capacity or another for the next 30 hours. It would be hours before the main body of the fire was placed under control and nearly 24 hours before the fire was finally declared out and then only after units flowed hundreds of thousands of gallons of water into the structure.

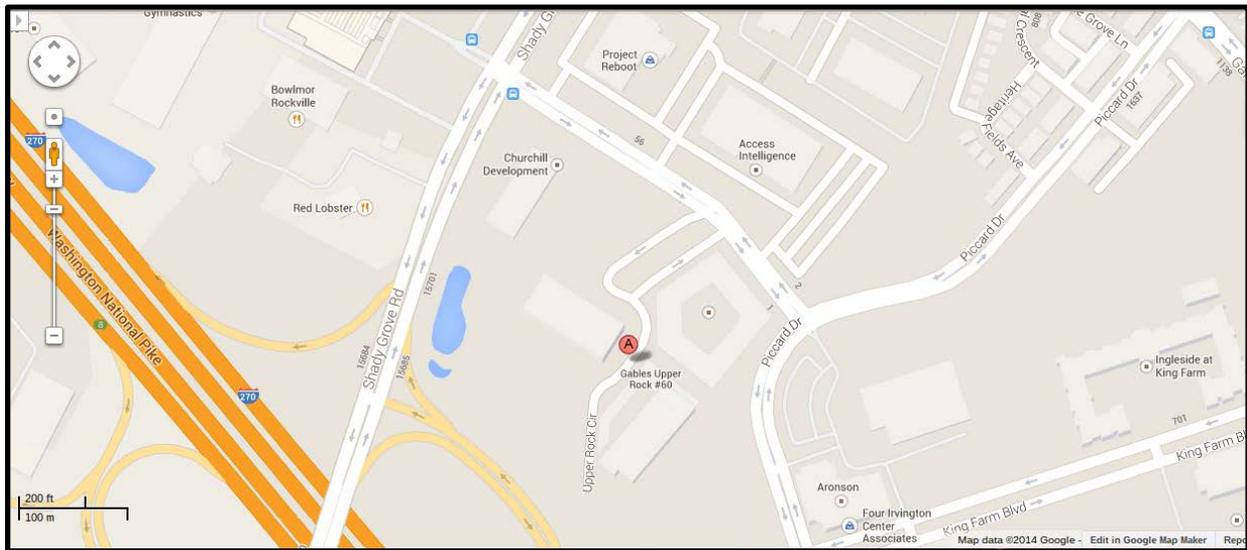
40 Upper Rock Circle was a large residential rental apartment building, essentially a seven-story structure with more than 26,000 square feet of living space per floor and a total of 150 individual luxury apartments of various sizes. It was the intent of the owners to begin occupancy in a matter of weeks and as such the interior finishes were nearly completed on the first and second floor. From the front, the building appeared to be either a large shallow “V” or “I” shaped apartment building with a common center corridor. It turns out the building was actually a “W” shaped building with multiple exposures on Side Alpha and limited access to the rear. The building was primarily wood-frame construction with a built in parking deck.

This construction style is commonly referred to as “doughnut” construction. Large, lightweight structures built with limited fire department access is a hallmark of dense urban cores and is increasingly common in the County. This construction style presents unique challenges for fire suppression and nearly all of those challenges were encountered during this particular fire.

This incident was the first significant fire incident in the County involving doughnut construction and it provided myriad lessons to be applied in future operations. If there was any good related to this event it is that the building was not occupied at the time of the fire and that Fire and Rescue was not strapped for resources which allowed the full strength of the organization to be applied to the fire suppression effort.

KEY IMAGES

Geographic Overview



Site Plan



Building "G" is the Target Structure Electronically Retrieved- 5/6/14 from [<http://bit.ly/1ot5MVZ>]

The Scene Shortly After Arrival with Aerial Tower 703 Flowing (Figure 1)



Picture electronically retrieved 5/6/14 from [<http://ireport.cnn.com/docs/DOC-1115505>]

Comparable Building Under Construction at the Same Site (Figure 2)



Electronically retrieved 5/6/14 from [<http://www.gazette.net/article/20120113/NEWS/701139754/1033/federal-realty-pays-127m-for-control-of-rockville-s-montrose&template=gazette>]

View From the Rear on the Next Morning (Figure 3)



Electronically retrieved 5/6/14 from http://www.washingtonpost.com/local/crime/more-than-200-firefighters-respond-to-big-fire-at-rockville-apartment-complex/2014/04/01/0a6bc002-b9a6-11e3-899e-bb708e3539dd_story.html

DESCRIPTION OF THE SCENE

40 Upper Rock Circle was a large, primarily wooden, building reaching nearly seven stories in height from the street. Some of that height included a complexly arranged peak roof structure, primarily ornamental and designed to hide the rooftop utility systems which included multiple heating, ventilation, and air conditioning units.

The fire began on the top floor of the structure and combustion was likely supported by multiple large propane cylinders that were being used on the top floor. At the time the fire began, the residential sprinkler system (NFPA 13R) was not yet online. It is also likely that there were a significant amount of combustible materials in the direct vicinity of the initial fire. These factors combined to provide for a relatively rapid fire growth that penetrated the ceilings of the top floor and entered the underside of the lightweight roof assembly.

Once the fire entered the open attic space, it traveled throughout at least two-thirds of the roof assembly with the last third being separated from the fire area by a firewall. The fire did not breach the masonry firewall.

On the fire department's arrival, units were faced with a well developed fire that was moving quickly and unimpeded throughout the roof assembly (Figure 1). However, many parts of the roof remained intact providing cover over the fire and preventing fire department streams from reaching interior burning surfaces. Where the fire had vented through the roof assembly, the fire department was able to direct streams onto those areas to suppress the fire.

As the fire progressed, it breached and travelled through the drywall of many of the wall assemblies. It would appear that while most of the fire on the uppermost floor was the result of the initial ignition, it also appeared as if some fire spread across the roof and dropped into the top floor. Further, throughout the initial phases of the fire, pieces of the structure fell to the ground igniting fires on the lower levels.

Access to the scene for fire department operations was hampered by three key obstacles:

1. The fire department has limited ability to access all sides of the structure because the buildings have integrated parking and are landscaped “into” the environment. These structures are certainly aesthetically pleasing and do make efficient use of scarce urban real estate and are typical of the dense urban land use in the region (Figure 3).
2. The fire building was still under construction and which meant there were various pieces of heavy equipment on the scene that prevented, until much later in the incident, fire department access to certain areas of the building.
3. In the “rear” of the structure there were high voltage power lines that prevented aerial ladder access that was already complicated by landscaping. Units were forced to set up master stream operations on an interstate off-ramp, further affecting traffic flow in the area. Once the electrical utility company was able to isolate the power in those lines, the master streams were put into service in the rear.

INCIDENT OBJECTIVES/STRATEGIES

This operation was guided by the most basic of fire department philosophies, namely that Life Safety, Incident Stabilization, and Property Conservation be addressed in that order.

Life Safety

Of primary concern was that the living spaces in the fire building appeared to be occupied because apartments on the lower levels looked finished and there were lights on inside them. Without information to the contrary, Battalion 703 rightfully assumed that the structure was occupied and made a transmission to that effect. Luckily, Engine 732 Officer had recently conducted a Safety in the Neighborhood effort in that area and knew that the building was unoccupied. The unit officer transmitted that information via radio.

Upon realizing that the building was unoccupied, Incident Stabilization became the primary objective.

Incident Stabilization

It is important to note here that a focus on Incident Stabilization does not per se rule out the possibility that a person or persons might be in a given structure. It simply says that

the likelihood of someone being inside is not sufficient to justify interior operations. The primary Life Safety issue continued to be addressed, by establishing and enforcing a collapse zone due to the likelihood of building collapse.

In this case, Incident Stabilization presented two primary concerns:

1. Ensuring that the fire did not extend beyond the building of origin.
2. Suppressing the fire in the original fire building.

From the perspective of the Incident Commander these were not sequential goals. A judgment was made that given the proximity to the exposure buildings, the fact that an overwhelming majority of the radiated heat was traveling upward into the atmosphere, and the presence of large amounts of glass on the exposure buildings, the most effective way to ensure that the fire did not extend past the original fire building was to lower the energy output of the main body of fire.

The fire was concentrated on the upper levels of the structure and as such most of the heat travelled upwards. There was, of course, a significant amount of heat being radiated in all directions but most was directed away from exposures.

The presence of large amounts of glass on the sides of the exposures facing the main body of fire was of concern simply because water, when applied to the outside of the glass, cannot absorb radiant heat energy. This means that the exposure buildings were still at risk for radiant heat energy causing pyrolysis of combustibles near the window openings. Luckily, the exposures were all protected by sprinklers, but any additional “incidents within the incident” would have placed severe stress on the Fire Rescue response system.

With those factors in mind, the best approach was to direct the main thrust of our capabilities on the body of fire in the original fire building. Even though it required a significant amount of time to put the fire out there was a significant reduction in the threat from radiant heat energy shortly after the elevated streams were put in service.

The Decision Not to Search

The decision not to commit units to the interior of the structure was not made lightly. There was at least one request made by Rescue Squad 703 to conduct a search of the structure based on visual clues noticed during a walk around by the officer or crew,

namely the lights on inside the structure and an open door on the lower level. Command denied this request.

An Incident Commander has to make a near instant judgment that weighs numerous factors when making a decision to search a structure. The first judgment is that there has to be a reasonable chance that a savable life is present inside the building. This is NOT an absolute judgment that there is no one inside a building; such a judgment would be impossible to make. While it was possible that there was someone inside this building at the time of the fire, it was not likely, especially in light of the time of day.

Further, when a Unit Officer or Incident Commander commits human resources to an interior search effort they are ipso facto saying that the likelihood of finding a savable life inside that building is so high that it is worth exposing firefighters to potential debilitating injury or death. This was simply not the case for this event.

One additional point to note is that the building was nearly seven stories, had 26,000 square feet of space per floor and contained at least 150 individual living spaces. The larger question is how would any organization conduct a reasonably effective search of that structure in a reasonable amount of time with the building essentially burning down around them? If a crew of three personnel could have searched a two bedroom apartment without forcing any doors in two minutes, it would have taken 300 minutes to search the entire building, not including common areas. And even five engines and the rescue squad were dedicated to search those apartments in two minutes each; it would still take 50 minutes to complete the search.

The math does not make a case against searching large occupied structures it makes the case against the cavalier use of the “search” as a proxy for interior operations, especially in the case where it would be nearly possible for any one unit to “search” the building. We are sometimes in the business of attempting the impossible but when we do try we must first understand that what we are trying to do is impossible.

Property Conservation

The Incident Commander regarded the fire building as a total loss from the outset. Seconds after the first apparatus arrived, pieces the sizes of small trucks were falling from the building. The fire had control of at least the top floor and roof area. Given the rate at which the fire was expanding it was unlikely that enough water could be applied quickly enough to the right places to stop the roof and top floor from being a total loss.

Additionally it was clear to anyone present that not all the water applied to that structure was consumed in the fire plume. Of the thousands of gallons applied to that fire only a small portion was used to suppress combustion. The remainder ran off, was absorbed by interior materials, or lay on the interior floors, creating an un-designed load on a structure already weakened by fire.

Command was never under the illusion that there was anything to be “saved” in the fire building.

It is important to note that Property Conservation is not limited to the material inside a structure. It is critical that MCFRS also consider the broader social impact of its operations. In this case, two key traffic arteries were shut down or had limited access for many hours, including the height of rush hour. This not only affected local commerce in the Shady Grove Road corridor, “hard costs,” but also affected the flow of commerce along the I-270 corridor, blocked residents inside an exposure building, and shut down a federal office building for two work days. These “soft costs” are much harder to calculate but no less important for those affected.

It may well be that the greatest act of conservation was restoring the area to “normal” as quickly as possible post-incident.

Tactical Application of Objectives

There were two primary and self-reinforcing tactical imperatives for this fire: apply large volumes of water to the structure via elevated streams and; quickly develop a large and resilient water supply capable of continuous support of the elevated streams. The [water supply operation](#) is detailed later in this report.

Within a few moments after arrival, the Incident Commander made it clear that the operation was to involve elevated streams almost exclusively and he also provided direction to incoming units as to where they should position to affect this application.

Both of the aerials due on the initial alarm were aerial towers with pre-piped waterways supplied through manifolds with Storz connections. Paramedic Tower 708 arrived first, moved towards the Bravo side and set up for operations. As fire encompassed nearly the entirety of the front of the building and as there was no ready access to the rear, both of the initial aerial companies were forced to set up on the same side of the structure. Paramedic Engine 708 arrived with the tower, “took their own hydrant” in

close proximity to Paramedic Tower 708 and supplied them with water.

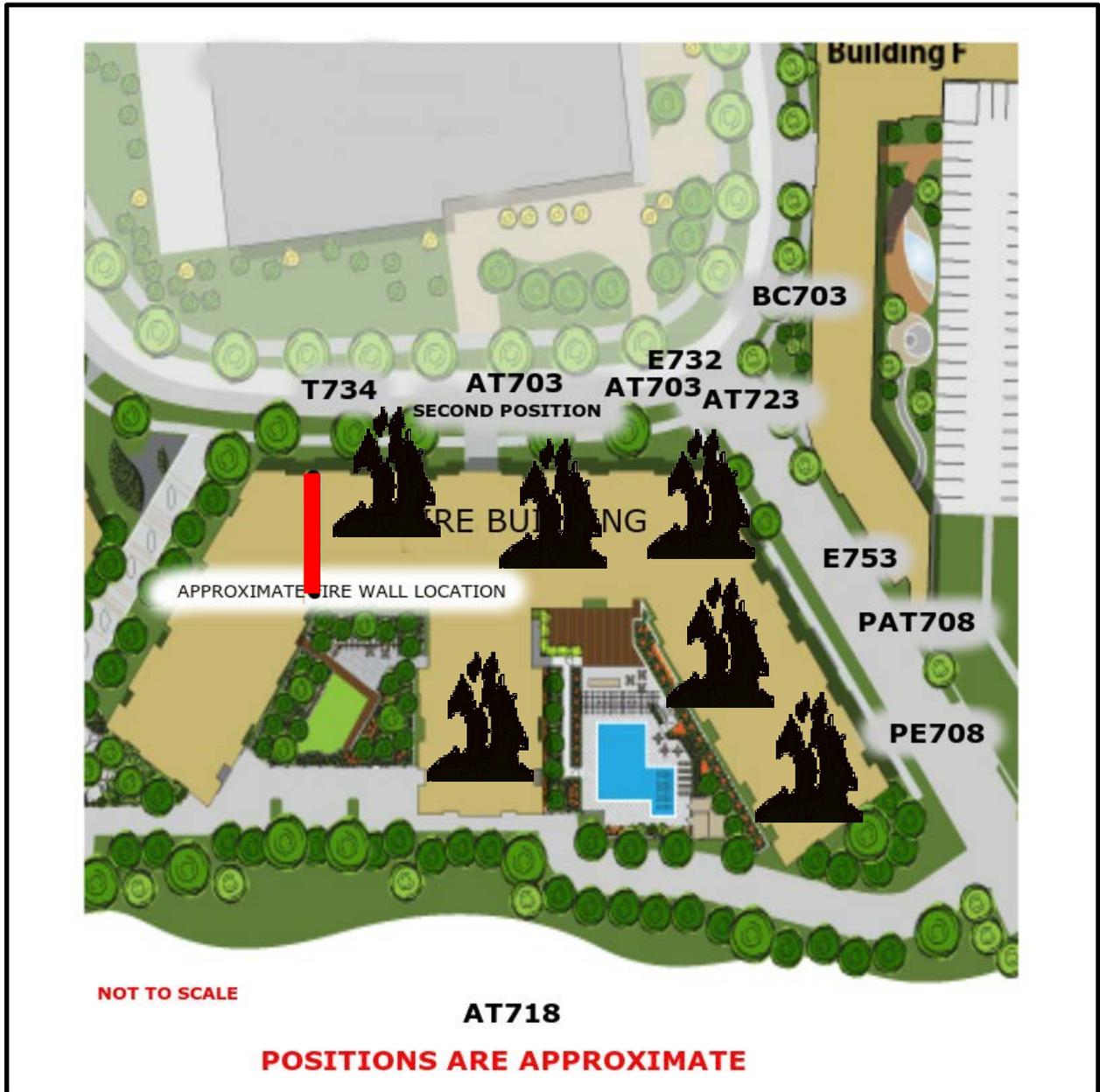
Paramedic Engine 732 had arrived first and laid two four inch supply lines into the scene and those lines were then supplied by Paramedic Engine 728. Tower 703 arrived second and simply took the side of the building opposite Paramedic Aerial Tower 708. They were supplied by Paramedic Engine 732.

Both aerial towers went into service flowing water within a few minutes of arriving on the scene. Before those aerial towers initiated operations, numerous engine companies deployed smaller caliber "Blitzfire" nozzles. While the Biltzfire nozzle is capable of 500 GPM flow, it is ground based and as such its effective range was quite limited. Further, any water supply to the ground-based monitors jeopardized sufficient flow to the elevated streams. At least one engine also deployed a deck gun at a 500 GPM flow. Soon after noticing that the ground based monitors were flowing Command ordered that all available water be reserved for the elevated streams.

Tower 723 arrived on the second alarm and was brought into the center of Side Alpha to provide fire suppression in that area. This aerial tower was supplied initially by a single four inch supply line that was later augmented with a second four inch supply line. Paramedic Engine 734 and Truck 734 also arrived on the second alarm, initiated a water supply from an adjacent roadway, and took up a position near the Alpha/Delta corner of the structure. They were able to direct their unmanned aerial stream from this vantage point onto the roofline immediately adjacent to and in support of the sole firewall for the structure.

As the incident continued to develop, it became increasingly clear that large caliber water application was going to be required in the rear of the structure. The fire had extended in the attic and roof and hot embers falling from the roof had also ignited lower floors in the rear. At the suggestion of units operating near the rear of the structure, an additional aerial tower was special called and Tower 718 set up operations on the Interstate 270 off-ramp. Personnel noticed quickly that there could be no operations from that vantage point because of high voltage power lines that ran through the area. That master streams were put on hold until the power company could isolate the power to those lines. Though Tower 718 was in the best possible position in the rear, its effectiveness was severely limited by the topographical arrangement of the structure and distance from the ramp to the structure.

Apparatus Placement (Figure 4)



TACTICAL INEFFICIENCIES

The layout of the building was the primary obstruction to the implementation of strategies and tactics. First, 360 degree apparatus access to the building was not

possible. A hallmark of the MCFRS Standard Operating Procedure (SOP) is the placement of units all around the building. This part of the SOP is important for two reasons: it provides a “set of eyes” to the rear allowing the Incident Commander a more clear picture of the totality of the incident and; it provides an alternate operational platform - a second vantage point - from which fire suppression can occur. When units cannot access the rear, operations are at a significant disadvantage.

Another problematic feature of the building construction was the presence of ornamental structures or “shed roofs”, which both hid the rooftop utilities and created a series of unreachable void spaces in which the fire could continue to burn unchecked.

MCFRS created some obstacles for itself that included the use of fog nozzles on the master streams. All but one of the master streams was initiated with a fog nozzle. While a fog nozzle can certainly provide the proper amount of water it cannot, even turned to a straight stream, provide the same reach and penetration ability of the smooth bore nozzle stream. Once the units were directed to switch to smooth bore streams, Command noticed that the stream quality from some of the aerial platforms was still poor. It was later discovered that at least one aerial was not equipped with a stream straightener on the master stream appliance. Given the turbulent flow of water through the waterway it is difficult, if not impossible, to maintain a quality laminar stream without a stream straightener near the discharge point.

Water supply operations were hampered by two main factors: The initial failure to complete the “heavy water hook up” and; the failure by a few companies to recognize the need for laying dual supply lines into the scene.

Paramedic Engine 708 took their own hydrant and did not complete a heavy water hook up. Engine 753, assigned to ensure and expand on their water supply was blocked in early and was not able to complete the “expansion” part of their task until well into the incident. This failure to secure all the available water from the hydrant limited the quick application of an effective fire flow.

SAFETY

One of the most critical aspects of any incident is safety. Even though this incident was an exterior-only effort from the beginning there were safety issues worthy of discussion.

On arrival the Incident Commander saw large flaming pieces of the building falling onto

the street below. It was obvious based on the amount and the ferocity of the fire that there would be no interior operations. The Incident Commander also made a radio transmission that outlined not only the tactical priorities but that this would be a “defensive operation.”

Once it was determined to be an exterior-only operation, the primary safety issue was the collapse zone. Command ordered the Incident Scene Safety Officer to determine, mark, and enforce the collapse zone. This was too large a task for a single individual, so Command split the Rapid Intervention Group (RIG) and assigned them to patrol and strictly enforce the collapse zone. With the fire suppression effort relegated to exterior operations, the danger the crews faced, excepting for building collapse, were the sort of strain/sprain or slip/fall injuries for which the RIG would have been unnecessary.

The collapse zone was not configured to account for a full collapse of the structure but rather to account for the pieces of the building that were falling to the ground. If a full building collapse was the concern, almost all of the first alarm units, and certainly all of the aerial platforms were placed inside the standard collapse zone of 1 to 1.5 the height of the structure. Given how the structure was arranged, it would have been virtually impossible to apply effective suppression streams while maintaining the standard collapse zone distances.

Had this fire included interior operations, it would have been necessary to add additional companies to the RIG. The sheer size of the structure would have demanded as much.

At least one unit was positioned close enough to the structure that it became enveloped in smoke on multiple occasions during the effort. The driver of that piece was forced to use self contained breathing apparatus while pumping the engine. This should never be considered an acceptable practice; If the smoke is that bad, the position should be abandoned.

Further, apparatus is often deployed without any consideration of how it would be moved if it becomes necessary. Perhaps on incidents of large magnitude where the possibility for apparatus evacuation is real, some energy should be expended to ensure that there are clear and established evacuation routes.

WATER SUPPLY

Battalion 705 was assigned as the Water Supply Officer by Command before Battalion

705 arrived on the scene. Command also assigned all engine drivers to operate on Talkgroup 7 Echo for water supply operations.

Battalion 705 had the benefit of having a light duty Captain in the vehicle as a second person, which proved to be of great benefit. The Captain assisted with gathering and tracking data, making phone calls to the water company (Washington Suburban Sanitary Commission (WSSC)) and using the mobile data computer (MDC) to access available maps for the area.

The Water Supply Officer also made great use of the WSSC water supply map book to access information such as main sizes and hydrant locations that was not available elsewhere.

One of the limiting factors in the water supply operation was the limited detail of the complex in any mapping including Computer Aided Dispatch (CAD) or station maps. Other factors that hampered the water supply evolution included:

1. The first engine entered via Upper Rock Boulevard and traveled toward 40 Upper Rock Circle and the Alpha / Bravo corner laying dual 4" supply lines. All other first alarm units also entered via Upper Rock Boulevard. Once those units were positioned, it was very difficult or impossible to relocate them.
2. Multiple units, including units on additional or special alarms, self-committed to positions. These units added to the inherent confusion and also complicated the effort to supply water to the main suppression effort as directed by Command.

Basic Water Supply Event Sequence

Units on the Initial Alarm

- Paramedic Engine 732 laid out two 4" lines into the scene.
 - Paramedic Engine 728 completed the water supply for Paramedic Engine 732 with a "heavy water hook up."
 - Paramedic Engine 708 proceeded to Side Bravo with their own hydrant (a private hydrant on a loop that included the hydrant Paramedic Engine 732 used) to supply Tower 708.
 - Engine 753 parked directly adjacent to Paramedic Engine 708 and was unable to move in either direction. Since Paramedic Engine 708 had their own hydrant there was no way for Engine 753 to augment their water supply.
 - Paramedic Engine 703 arrived and laid a single 4" line to supply Tower 723.
 - The Water Supply Officer role was assigned to Battalion 705.
 - Engine drivers were assigned to Talkgroup 7 Echo.
 - Battalion 705 used his vehicle to reconnoiter the general area multiple times to
-

visually confirm all hydrant locations on adjacent roadways.

Second Alarm Engines

- Paramedic Engine 731 staged at Choke Cherry Road and Upper Rock Boulevard.
- Paramedic Engine 734 used the north access road from Choke Cherry Road to follow Truck 734 to the Side Alpha/Delta corner to supply Truck 734 through 700' each of dual 4" supply lines.
- Paramedic Engine 731 was directed from staging via face to face communications to lay out from Choke Cherry Road & Upper Rock Boulevard into the scene, and they laid a single 4" line.
- Paramedic Engine 723 had proceeded directly to the fire scene via Upper Rock Boulevard.
- Battalion 705 instructed Paramedic Engine 723 to reverse lay 500' of 4" line from their location to the hydrant that Paramedic Engine 731 had laid out from. Paramedic Engine 723 then pumped the two 4" supply lines.
- Paramedic Engine 733 positioned at Choke Cherry Road and the north access road to supply the two 4" supply lines laid by Paramedic Engine 734.

Additional Engines

- Hose Tender 751 responded with 6000' of 5" hose.
- Engine 751 responded as staffing/support.
- The initial hydrant Engine 751 was assigned at Choke Cherry Road and Shady Grove Road was inoperable.
- The Water Supply Officer then decided to move additional water supply engines to the water main on Shady Grove Road. The use of both of those hydrants required laying lines across Shady Grove Road
- Engine 751 connected to the hydrant at 15800 Shady Grove Road, just east of the Home Depot.
- Hose Tender 751 then laid out 700' of 5" hose from Engine 751 to Paramedic Engine 733.
- Engine 726 connected to the hydrant at 15730 Shady Grove Road, just west of the Home Depot.
- The Water Supply Officer communicated face to face with Paramedic Engine 722 to determine how to execute the water supply to the off-ramp from Northbound I 270 to support the elevated master stream of Tower 718 on Side Charlie.
- Hose Tender 751 then laid out 1200' of 5" supply line from Engine 726 to Paramedic Engine 722.
- Paramedic Engine 734 then reported catastrophic failure of their engine but agreed that other units could pump through them.
- Paramedic Engine 733 moved to replace Paramedic Engine 734 to supply Truck

734.

- Paramedic Engine 729 was brought to the corner access road to replace Paramedic Engine 733.
- The Water Supply Officer noted that Shady Grove Road, and Choke Cherry Road both connected with 10" water mains and that Upper Rock Circle and the affected complex appeared to be a looped grid coming off of Choke Cherry Road.
- WSSC was consulted at this point in an attempt to direct more water flow to the fire scene. They advised that they could not divert any additional water into the area.
- Engine 751 and Engine 726 were pumping about 3,000 gallons per minute combined from the Shady Grove main with minimal residual pressure. Based on this information, it was determined that the water supply system was being used to its capacity.
- Engine 740 checked the hydrant at Corporate Drive and Shady Grove Road which was on a separate main and had good pressure. They then stood by for instructions.
- Command recognized that the fire was under control and that both commerce and morning traffic were severely impacted by road closure so a plan was initiated to reopen Shady Grove Road.
- Paramedic Engine 729 relocated their water supply to the hydrant on the Choke Cherry Road main and discontinued the supply operation of Engine 751.
- Crews then hand carried 900' of 5" hose across a wet field from Engine 753 through a parking garage on Side Bravo of the fire building to a hydrant at King Farm Boulevard and Piccard Drive where Engine 720 was positioned.
- Engine 753 then hand carried 400' of supply line to provide water to Paramedic Engine 722 on the NB270 off-ramp.
- The 5" supply line from Engine 726 to Paramedic Engine 722 was discontinued.

Water Supply Discussion

The water supply operation for this event was one of the largest on record for the Department. At the height of the event there were four elevated master streams and multiple ground and engine based streams, all being supplied through a complex assortment of relay operations and engines pumping directly from hydrants. Many units laid dual 4" inch supply lines into the scene and there was almost a mile of 5" hose laid. This was established and maintained by the team of a Battalion Chief and a Captain operating out of a vehicle with limited maps of the area.

While the water supply operation was successful, it was complicated by three factors:

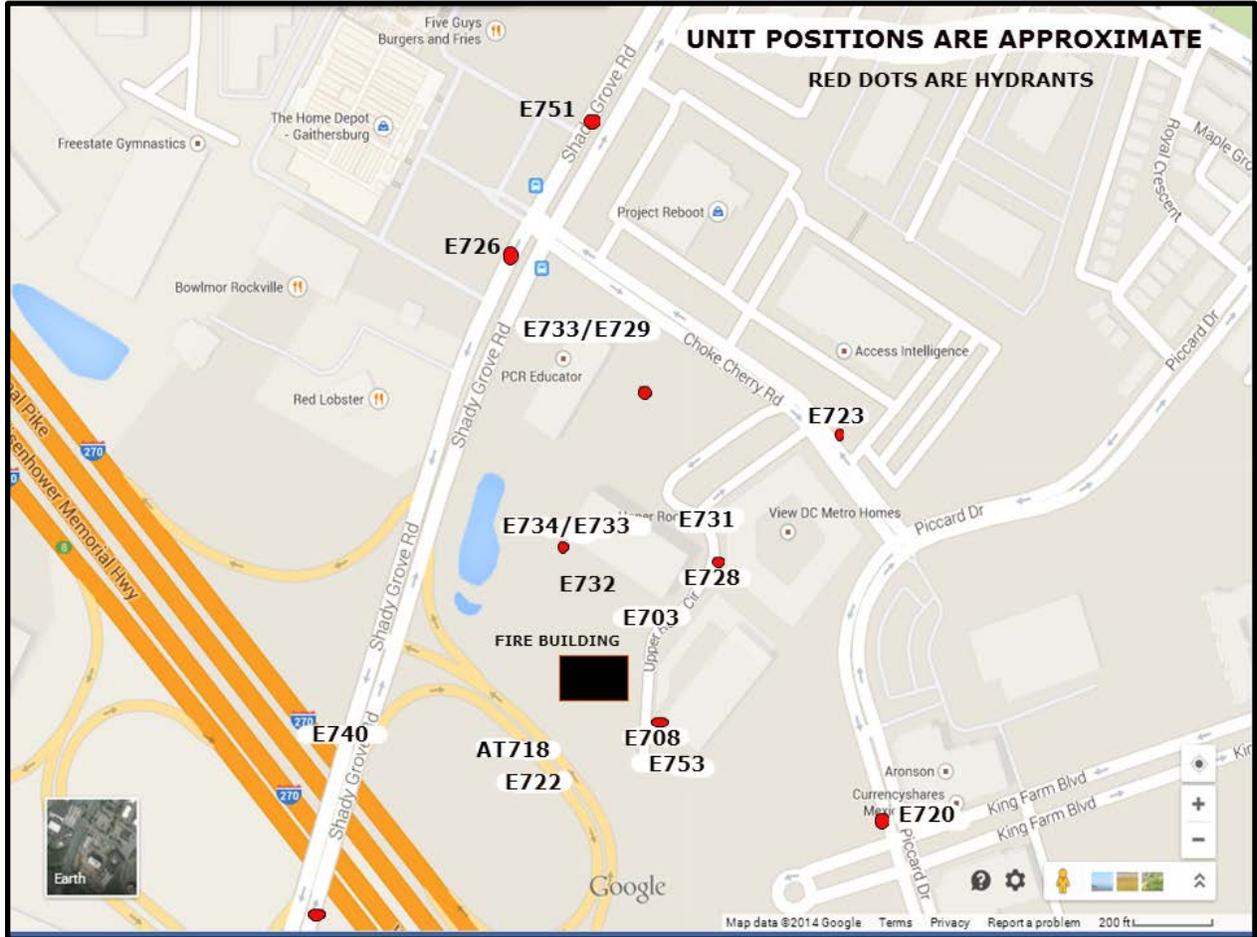
1. MCFRS does not normally develop fire flows of this magnitude.
2. Units on additional alarms self committed and once set, the Water Supply Officer had to overcome their initial decisions
3. Neither station, County Geographical Information Services (GIS), nor water utility maps were accurate for the area.

The Water Supply Officer was provided input from Command about how many master stream devices were needed and from that decided on a total flow needed. There were also phone conversations with the water utility company to request that WSSC augment flow in the area.

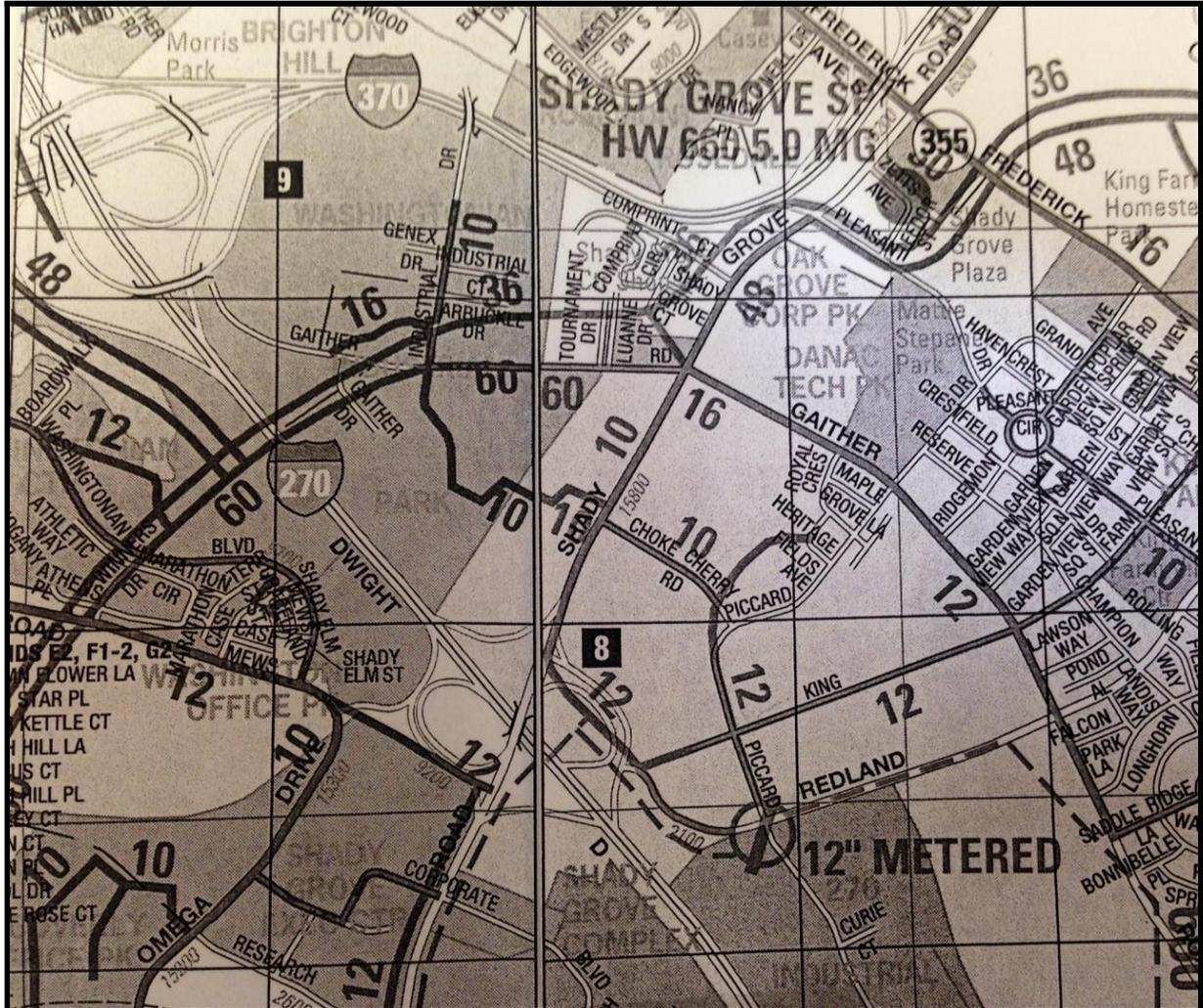
While the initial call for additional resources did not provide a staging area, all unit officers should understand that additional companies report to staging and stay there until they are provided direction by Command. This is not to say that the actions of the self deployed companies delayed or hampered suppression efforts but they were undertaken without a full understanding of the incident needs or the type and location of water supply resources. The Water Supply Officer had to do extra work to overcome the impact of decisions made by self deployed units.

Anytime that there is new construction in an area it is the responsibility of the first due company to make sure that adequate maps are available for fire service operations. It is understandable that water utility and County GIS maps are behind a few months but Fire Rescue personnel must create and update station maps as early as possible. It did not help that this complex was first in Fire Station 28's area and switched to Fire Station 32's area just two months before when Fire Station 32 opened. However, given the number and complexity of large construction projects like this, station mapping efforts must be improved.

Map of Water Supply Engine Locations



WSSC Water Supply Map



A copy of the map page used by the Water Supply Officer to determine water main size and location. This map is created by the Washington Suburban Sanitary Commission (WSSC), a non-governmental organization that manages the regional water works. These maps are carried in all of the Battalion Chief and Duty Operations Chiefs' vehicles. Please note that the main size in the immediate area of the fire is not indicated on the map and that the map does not show hydrants which forced the Water Supply Officer to drive around and verify the presence and operation of various hydrants.

INCIDENT COMMAND

Proponents of formal risk analysis tend to view affective responses to risk as irrational. Current wisdom disputes this view. The rational and the experiential systems operate in parallel and each seems to depend on the other for guidance.

Studies have demonstrated that analytic reasoning cannot be effective unless it is guided by emotion and affect. Rational decision making requires proper integration of both modes of thought. Both systems have their advantages, biases, and limitations.

[\[REFERENCE\]](#)

This incident was a large and relatively complex operation. The structure fire itself was essentially a loss on arrival and while the advanced stage of the fire presented what was on the surface a self-limiting problem, there were many additional considerations that complicated the event, increased the level of complexity, and made for a generally exhausting morning.

This fire can be broken into four distinct operational phases: initial operations, expanded operations, transitional operations, and extended operations, each of which required a different “Command mindset” and different organizational approaches.

Phase One - Initial Operations

In the words of Battalion 703:

“I responded as the first due Battalion Chief. It was obvious when the bay door was opened that this was a working event. After going en route ECC advised of numerous calls from traffic on I270. I responded that it should be the new construction on the corner of I270 and Shady Grove Road. Ambulance 732 went on scene and confirmed the fire was in the Upper Rock complex and advised fire showing. I crossed over I270, observed the volume of fire and called for a second alarm and advised to prepare for the third alarm.

I arrived on Upper Rock Court and positioned the buggy on the lawn on Side Alpha. My report was, ‘On scene with a 4 story apartment building with heavy fire on the roof. I see lights on inside, not sure if the building is occupied.’ I observed Aerial Tower 708 go by me then Engine 708 and Engine 753. I then advised the fourth and fifth engines and second truck to get to the opposite side of the first due tower and advised both engine companies that it was priority to supply ladder pipes.

The Duty Operations Chief arrived and joined Battalion 703 in the buggy. At this point the water supply officer was appointed to Battalion 705. The command bus and the Duty Operations Chief transitioned Command to the bus. I remained in the Battalion 703 car and then was assigned to Division Charlie. Once in Division Charlie, water supply was established for Aerial Tower 718 and then a blitz fire was deployed to the parking deck on the Delta side of the center wing. With both these streams in service significant progress was made in knocking down the fire.”

The operational plan was simple, “Get elevated streams and engine or ground based master streams in service as soon as possible.”

The Duty Operations Chief arrived shortly after Battalion 703 and instead of stopping to take a circumspect look at what was going on, got directly into the Battalion 703 car. In a brief conversation that lasted no more than a few seconds the Duty Operations Chief began managing voice radio traffic while Battalion 703 began capturing information on the tactical worksheet. This was perhaps the first critical error committed by the Command.

There was no announcement that command had been transferred from Battalion 703 to the Duty Operations Chief. All the operating units knew was that the voice on the radio changed. While the “voice” of Command is irrelevant, in that any transmissions from “Command” are to be heeded, it is important that all personnel are aware of who is actually in command. The second problem is because the Duty Operations Chief jumped immediately into the Command Post no one in the Command Post had a global view of the incident. There were two people “flying blind” inside the same car.

This failure, though critical, did not alter the eventual incident outcomes. However, it is important for later arriving Chief Officers to take a moment to evaluate the current status of operations before engaging. Sometimes that might mean taking the time to complete a survey of the scene before committing. In the case of the Upper Rock fire it is unlikely that anyone would have taken the time to walk around the entire structure, however, command must endeavor to leverage all available resources to get a comprehensive view of the incident. As Battalion 703 noted, as an obstacle to effective event management, “Command did not have a picture of the footprint of the building.” In reality, at this point Command not only did not understand the footprint of the building but also was unable to grasp absolute complexity of the event.

The Emergency Medical Services (EMS) Chief, who became the Planning Chief, arriving later, noted:

“Once the complexity of the incident is identified, the incident commander should concentrate on long term incident support in addition to operational effectiveness. Filling out command staff as well as general staff [*positions*] is critical for overall long term success. In the case of this incident, it was soon realized that we would need radio batteries, fuel, port-a-johns and ultimately nourishment - besides what the canteens carry.”

Though the Duty Operations Chief realized that he was behind the eight ball, that attempts to fully grasp the event were failing and that there was a need to shift operations in a different direction, it was probably an hour or more before that shift began to occur. There is quite a difference between knowing what ought to be done and creating the cognitive space necessary to get it done. This is likely due to two key factors:

1. The Duty Operations Chief allowed himself to become too intertwined in tactical operations and found it difficult to disentangle.
2. When faced with rapidly expanding complex events rife with uncertainty there is a tendency to regress to that which one knows for sure. What everyone knew is that if water could be put on the burning surfaces the problem could be brought under control. This was probably the primary focus for too long.

Phase Two- Expanded Operations

The Incident Commander realized a few things pretty early into the incident:

1. There was too much radio traffic for effective incident management.
2. The “sterility” of the incident command post was degraded by multiple high volume radios operating in a small space.
3. The incident was bigger than the operational structure established to manage it.
4. The ability to effectively dictate tactical operations was hampered by the fact that as Battalion 703 noted, “The roads in and out of the fire building were quickly cluttered with apparatus not allowing other engine companies to reverse out to supplement water supply.”

All of these factors combined to point out the single glaring need to break out of a tactical command mindset and to create a more global overhead to support incident operations. All functions remained on the main incident talkgroup except for water supply operations, Safety, and the Rapid Intervention functions. Once the decision was made to transition to a more robust command facility, Command moved from the Battalion 703 car to Command Post 727. Though the location of the command post changed, the core functionality of incident command did not change for some time.

Eventually the Duty Operations Chief handed the microphone (and with it the tactical communications and decision making) to the Training Battalion Chief, who had driven the command bus to the scene.

Discussion

The imperative, "drop your tools or you will die," is the image that I want to examine more closely. The reluctance to drop one's tools when threat intensifies is not just a problem for firefighters. Navy seamen sometimes refuse orders to remove their heavy steel-toed shoes when they are forced to abandon a sinking ship, and they drown or punch holes in life rafts as a result. Fighter pilots in a disabled aircraft sometimes refuse orders to eject, preferring instead the "cocoon of oxygen" still present in the cockpit. Karl Wallenda, the world-renowned high-wire artist, fell to his death still clutching his balance pole, when his hands could have grabbed the wire below him.

Dropping one's tools is a proxy for unlearning, for adaptation, for flexibility, in short, for many of the dramas that engage organizational scholars. It is the very unwillingness of people to drop their tools that turns some of these dramas into tragedies." [\[REFERENCE\]](#)

The Upper Rock fire was unique in two very simple yet important ways: the first incident commander was the first due Battalion Chief and the Duty Operations Chief, the second tier of day-to-day incident command, arrived only moments behind the first incident commander.

If there was a primary failure of Command it was a failure to "drop the tools" of the "normal" events managed on a daily basis in exchange for a tool set more appropriate for an incident of this size and complexity.

Our department is driven for the most part by our Standard Operational Procedures (SOP). In most cases a unit officer is the first incident commander. When the Battalion Chief arrives first it can be both a blessing and a curse. The blessing is that the incident commander has the chance to orchestrate operations from the outset with a strategy, a tempo, and a mindset of his/her choosing. The curse is that unit officers, typically making independent decisions based on SOP, have to quickly adjust to the strategy, tempo, and mindset of the incident commander. While on the surface this quandary seems to be of little import, it is actually a big deal.

Command officers arriving first at a fire may find that with this rare occasion of a blank operational canvas on which to draw they invariably get pulled ever deeper into tactical and task level decisions that they would not have engaged had they arrived after the initial plan was set. It may be more difficult for a Chief to command when he or she is first on the scene.

Unit officers in MCFRS are primarily SOP driven. When a unit officer assumes command per the policy it is difficult to deviate from the SOP for three basic reasons:

1. Officers do not regularly attend to fires that are outside the scope of the SOP.
2. In most cases units arrive in quick succession, before there has been time for circumspection, and they simply follow the SOP as they believe it to apply.
3. Unit officers tend to execute the command function concurrently with their unit officer functions and it is not reasonable expect that they can do both functions at maximum performance, so the SOP becomes the default operational modality.

The assessment here of the unit officer command functioning is not intended to be critical of unit officer command efficacy but rather to point out that even when command is established prior to the arrival of a Chief Officer, that command tends to be driven primarily by the SOP and units operate on a sort of engrained auto-pilot. This means that in those rare cases where the first arriving command officer is also the first arriving unit, the unit officer gets shaken from their normal operational mode and is forced to listen for more than just water supply instructions. They are forced to transition from one mode of operational behavior to another midstream. Such a switch increases the likelihood of complications.

The SOP

The SOP is not an optional protocol, however, the command structure provides an incident commander with the latitude to adjust the strategy, tactics, and event sequencing as he/she see fit and necessary to meet the incident objectives. At no time is an incident commander beholden to following the SOP when he/she believes either that the SOP inadequately addresses the problem at hand or that another solution may be more appropriate.

It is important to remember that the SOP is based on a series of assumptions including:

1. A residential structure fire with the possibility of someone being trapped in the fire

building.

2. An adequate compliment of resources.
3. The absence of evidence to suggest that the SOP is inappropriate.
4. A shared understanding of the operational workspace.

When any of these assumptions is not true, i.e., there is an less than typical resource allocation, it is incumbent to alter the SOP in a way that allows for a safer or more effective fire suppression effort.

The SOP could not be followed in this fire because of building access issues. However, the SOP was not designed for “outlier” events and this certainly was an outlier event. The sheer magnitude of this operation, the need to develop robust water supplies and the other complications of the event, demanded that the unit and command officers alter their “normal” approach to incidents.

PLANNING

Upon his arrival, the EMS Chief was assigned as the Planning Section Chief. After receiving a briefing from the Operations Executive Officer, he began working on Planning Section duties. Those duties included but were not limited to status check in, resource management, current situation (including an incident map) and meeting facilitation.

A relief or “Exchange Plan”, as it was later called, was being coordinated with the oncoming Duty Operations Chief and managed on scene by the Safety Chief. This exchange maintained good accountability and was later compared to the battalion rosters that were printed in the Incident Command Bus.

Resource status was confirmed by Chief 703 Charlie, who walked the scene and documented the area with a map that included hose line placement and apparatus positioning. The continuance of resource status was monitored by Command Support 700, the Resource Unit Leader. She was able to verify and maintain activity using various tools such as whiteboards, and paper accountability cards maintained by Command. Command Support 700 also dealt with logistical issues until a Logistics Section Chief was appointed.

The Planning Section continued to monitor the situation and produce an Incident Action Plan. One of the Section's primary functions was to facilitate the meetings that occurred at 0800, 1000, 1300 and 1600. These meetings included property management, a demolition company, insurance representatives, Rockville and County leaders, and managers of the adjoining buildings (a federal office building and an occupied apartment building). Public safety was represented by Operations, the Fire Chief, Fire and Explosive Investigations, County Police, Rockville Police. These meetings were critical to the perception of success by the stakeholders and to help plan future operations and demobilization.

Oncoming Battalion 703 replaced the Duty Operations Chief as the Incident Commander by 1000 hours. He did not remain stationary in the Command Post. If this is the style of the Incident Commander, a Deputy Incident Commander or Operations Section Chief should be appointed to remain at the Command Post.

The First Operational Period After Transition to the On-Coming Shift

Once the initial Incident Commander had given a situational update then the Command team began to formulate a plan to use or keep the minimum amount of units needed to ensure that there was no additional fire spread. At the time command was transferred, the incident had started to de-escalate. With so many personnel still on the scene, one goal was to begin releasing companies. The decision was to keep two tower ladders in position with engines for water supply needs and to reevaluate needs during the period. The building representatives continued to work with the Liaison Officer to get a formal demolition plan together. At the 1600 hours briefing Command was passed to another Battalion Chief for the next operational period.

FIRE/RESCUE RESOURCE MANAGEMENT

Starting at about 0600 it became clear to the oncoming Duty Operations Chief that MCFRS resources were stretched and that there were multiple out-of-county transfer companies in place. While the oncoming Duty Operations Chief was not aware that the incident would last as long as it did, he did recognize the need to augment available in county MCFRS resources. After consultation with the Operations Division Chief, he began to hire overtime personnel to staff ready-reserve engine companies throughout the County.

The Use of Second-Line Engines

MCFRS, in concert with Local Fire and Rescue Departments (LFRDs), maintains a small fleet of second-line engines. These engines are equipped and ready to go at all times. In most cases these engines are either the second engine placed in service when sufficient volunteer personnel are available or they are specialty pieces that also meet the requirements of front-line engines. These engines are separate from the “reserve engine” fleet.

Once the permission to hire back overtime personnel to staff these engines was received the on coming Duty Operations Chief ordered the MCFRS scheduling office to begin hiring personnel. Initially the plan was to staff the engines for a 12-hour period. Once these engines were staffed they were strategically relocated throughout the County and the out-of-county transfer companies were released.

Shift Change

A second major issue for the on-coming Duty Operations Chief was the need to manage shift change. With nearly one-third of the work force committed to a single event, the on coming Duty Operations Chief needed to ensure those personnel were relieved in a timely fashion without incurring additional resource deficits in the County. This mission was further complicated by the scarcity of support vehicles, passenger vans, and additional apparatus to transport relief personnel to the scene.

At the scene, the Safety Chief managed the check-in-check-out procedure for personnel. When units or crews were ready to be relieved at the fireground the Safety Chief was the single point of contact. He operated just outside the Incident Command Bus.

Some crews were not relieved right away and others had difficulty getting back to their worksites after being relieved.

Use of Command Support 700

Command Support 700, the MCFRS scheduler, reported to the scene based on the standing orders of the Duty Operations Chief. She was immediately put to work as the Resource Unit Leader and was instrumental in documenting incident operations and providing other incident support.

Unfortunately, once she was committed to the incident it was impossible to release her. This meant that the morning operation in scheduling became a one person operation instead of the normal two person operation. To make things even worse the single on coming scheduler had an unusually high workload as he sought to hire personnel to staff extra engines while still ensuring normal staffing.

LESSONS AVAILABLE FOR LEARNING

“Lessons are not learned until the behavior changes,” he said. “We may have lessons, but the question is, have soldiers learned those lessons? [Lieutenant Charles Darden, United States Army](#)

1. **Station Commanders must do a better job of keeping maps up-to-date.** The station maps for this area were woefully inadequate even though this site has been under development for a long time. Adequate response requires adequate mapping.
2. **County GIS must do a better job of keeping maps up-to date.** The mobile data computer maps did not show currently occupied buildings or existing streets. This is unacceptable.
3. **Slowing down should be a rule.** When it is obvious that a given fire does not fit neatly into the SOP the only real option is to slow down, consider what the situation is and take deliberate action from that. On this fire too many people took positions that were less than ideal and demonstrated a lack of understanding of the situation.
4. **Apparatus tool and equipment knowledge must be improved.** Any tower operator should be aware of how water moves through a pipe and should have a stream straightener on his/her master stream appliance. Further, it is important that aerial tower operators use the full range of their maneuverability to put cooling streams onto burning surfaces.
5. **Chiefs must ensure that the communications interfaces (headsets and radio) are functioning properly.** Incident communications inside the Battalion 703 car would have been improved with functioning headsets.
6. **The Duty Operations Chief should ensure a more circumspect approach to incident operations.** The tactical operations are the domain of the Battalion Chiefs and once the Duty Chief engages tactically he/she loses a great deal of perspective.

7. **Units that are assigned to subordinate talkgroups (e.g. 7 Delta or 72 Hotel) should remain there.** However, if they are not able to reach command on the assigned talkgroup they should “hail” command on the main incident talkgroup.
8. **Command should make better use of the announce talkgroups.** They were never used on this incident. The announce talkgroup would have been advantageous for making general announcements about strategy changes, collapse zones, safety hazards and other information critical to the entire fire ground.
9. **Whenever additional resources are called to the scene a staging area must be designated.** The use of Level II staging would have greatly assisted in a more orderly approach to this fire. This recommendation is not specific to fires only and would be of great utility on mass casualty, hazmat, and other large scale emergencies.
10. **The Duty Operations Chief should ensure that affected LFRD officials are notified as soon as practical.** When apparatus of concern to LFRDs is moved, they should be notified as soon as practical.
11. **The Scheduler must not be pulled into any event in a position so critical that he/she cannot break free to complete his/her scheduling work.**
12. **The Scheduler should almost always travel to the scene in his/her assigned vehicle and not with the Duty Operations Chief.** This allows him/her the ability to break free and support scheduling operations if necessary.
13. **The Scheduler should not leave the office to provide incident support after 0400 hours unless specifically requested by the Duty Operations Chief.**
14. **The Duty Operations Chief office should maintain a list of support apparatus that can be used to shuttle personnel (passenger vans, utility vehicles and the like) in situations such as this.**
15. **The Duty Operations Chief office should ensure that during similar events ALL personnel are held at the station.** This should be done until the on-

coming station officer is able to verify operational needs and manage in station relief. This was done by the on coming Battalion Chiefs and should be repeated given similar circumstances.

16. **The sanctity and efficacy of the command structure requires operational discipline.** When operating on emergency scenes where command has been established it is critical that personnel and units make requests and take their orders from their supervisor and not engage without direction.
17. **Incident commanders should use available command vests as a general rule.** When the incident is too big or too complicated to manage from the Battalion Chief car, vests are necessary.
18. **Once the complexity of the incident is identified, the Incident Commander should concentrate on long term incident support in addition to tactical effectiveness.** Filling out command and general staff is critical for overall long term success. In the case of this incident, it was soon realized that radio batteries, fuel, port-a-johns and nourishment beyond what the canteens carry would be needed.

MEDIA LINKS

LINKS TO PHOTOS, AUDIO, VIDEO AND DOCUMENTS, CAN BE FOUND [HERE](#)

The location of these files is not permanent but they should be in place for the next few years.