LINE OF DUTY DEATH INVESTIGATIVE REPORT



HOWARD COUNTY FIRE & RESCUE

EDUCATE PROTECT SERVE

Lt. Nathan Flynn

7005 Woodscape Drive
Single Family House Fire
July 23, 2018

Lieutenant Nathan Flynn



Howard County Department of Fire and Rescue Services Fire Fighter Nathan Flynn died in the line of a duty on Monday, July 23, 2018 while operating at the scene of a house fire in Clarksville, Maryland. Fire Fighter Flynn was a member of the Special Operations Team and assigned to Station 10. A thirteen-year veteran of the Department known for his attention to detail and passion for learning, Fire Fighter Flynn was posthumously promoted to the rank of Lieutenant.

A firm believer that excellent fire fighters are made, not born, Lieutenant Flynn both sought training to enhance his skills as a fire fighter as well as ways to pass his knowledge on to others effectively. This mindset motivated him to collaborate with other fire fighters to develop the real-world conditions training "Real Houses Not Doll Houses" provided at the Fire Department Instructor's Conference International (FDIC, International) in April 2018. Additionally, he volunteered with the Susquehanna Hose Company and Harford County Technical Rescue Teams, where he was always willing to take time to train and mentor younger volunteer fire fighters.

Outside of the Fire Service, Lieutenant Flynn also challenged himself to learn new skills through various home renovation projects. Although constantly driven to improve himself, Lieutenant Flynn always took the time to appreciate the present and greatly valued spending time with his family and friends. Remembered for his generosity and caring nature, friends and family recall Lieutenant Flynn as someone who placed others before himself. Lt. Flynn is survived by his wife, Celeste, and their five children.

Overview of the Internal Safety Review Board

Project Charter

On August 2, 2018 the Howard County Department of Fire and Rescue Services (HCDFRS) Fire Chief issued Special Order 2018.44 to establish the Internal Safety Review Board (ISRB). The ISRB was charged with conducting "a transparent, thorough, honest, and factual safety review of Howard County Department of Fire and Rescue Services incident F18025041, which occurred at 7005 Woodscape Drive on July 23, 2018."[1] There are twelve members of the ISRB, including the Chairperson, with five of the members joining the board from neighboring fire departments. Additionally, the Chairperson reports directly to the Fire Chief.

In addition to the Special Order organizing the ISRB, HCDFRS established a project charter for the board on August 31, 2018. The Project Charter established the general plan for the investigation, outlined roles for ISRB members, and stated the agreed upon objectives for the investigation. The scope of the ISRB investigation, as stated in the Project Charter, include "all aspects contributing to the [incident at 7005 Woodscape Drive]" and "recommendations to the Department of Fire and Rescue Services' Fire Chief." Outside of the scope of the ISRB investigation are:

- Any criminal activity
- The origin and cause of the fire
- The direct cause of Lt. Flynn's death
- The inspection of turnout gear
- Inspection of Lt. Flynn's radio

The items specified as outside of the ISRB's scope have been addressed through other investigative measures and agencies. Some of these associated reports and parallel investigations have been included in this report for reference.

Parallel Investigations into 7005 Woodscape Drive Incident

As contemplated in the Project Charter, the ISRB report is dependent on data and information collected from the following parallel investigations:

- National Institute for Occupational Safety and Health (NIOSH) Investigation and Report (including testing FF Flynn's Self-Contained Breathing Apparatus)
- Howard County Police Criminal Investigation
- Bureau of Alcohol, Tobacco, Firearms and Explosives fire modeling investigation
- Medical Examiners Cause of Death Report

The ISRB gained access to information from several of the parallel investigations in real time, such as participating in the NIOSH interview process, while other sources of information were

[1] Howard County Department of Fire and Rescue Services, Special Order 2018.44 Internal Safety Review Board for Incident F18025041 (2018).

only available after the parallel investigations were completed, such as the Howard County Police Criminal Investigation.

ISRB Investigative Process

The ISRB began its investigation by conducting a series of interviews with personnel on the scene. The ISRB interviewed 57 HCDFRS personnel with direct knowledge of the events at 7005 Woodscape Drive on July 23, 2018. These voluntary, informal interviews were conducted by members of the ISRB in coordination with NIOSH and were designed to elicit the interviewee's memory of the incident in relation to FF Flynn's actions on the fireground as well as fireground actions and observations. None of these interviews were conducted under oath and are not subject to any penalty of perjury.

In addition to personnel interviews, the ISRB obtained data relevant to the incident. This included data from:

- HCDFRS Record Management System Data for incident: 18022036[2]
- Radio transmissions
- Motorola Solutions, Inc. radio network data log
- Mine Safety Appliances (MSA) Equipment Report (Self-Contained Breathing Apparatus data)
- Bureau of Logistics, Ground Support Unit

Radio transmissions from the incident have been transcribed by ISRB staff and included in Appendix C of this report. From the interviews and data, the ISRB constructed a second by second timeline of the incident. The ISRB also obtained official photographs from the incident and subsequent investigations. Additionally, some of the HCDFRS personnel had taken photographs on their mobile devices during the fire incident and freely provided these photos to the ISRB to support their investigative efforts.

After establishing the timeline of events that occurred during the incident at 7005 Woodscape Drive from the informal interviews, radio transmissions, and photographs from the scene, the ISRB conducted a review of all applicable HCDFRS General Orders, industry standards, and best practices. Over the course of the review, ISRB members were tasked with both determining the relevant facts from this incident as it pertained to their assigned topic area as well as determining how HCDFRS practices align with industry standards.

[2] This is the RMS Incident Number for the July 23, 2018 incident at 7005 Woodscape Drive, Clarksville, Maryland.

ISRB Investigation Timeline

- **July 2018**
  - Incident at 7005 Woodscape Drive occurs
  - HCDFRS personnel are provided an opportunity to walk the scene of 7005 Woodscape Drive immediately after the incident to visualize the structure and incident scene
  - ISRB meets with Motorola Solutions, Inc. systems engineer and discovers Bravo 2 transmission made by FF Flynn
  - HCDFRS Fire Chief preliminarily nominated the ISRB chair and requested the chair to select the ISRB members
  - Obtained Self-Contained Breathing Apparatus (SCBA) fit testing and National Fire Protection Association (NFPA) 1582 physical data

- **August 2018**
  - HCDFRS Fire Chief issues Special Order 2018.44 establishing the ISRB
  - ISRB members began informal interviews with HCDFRS personnel on the scene
  - ISRB members obtain access to radio transmissions from the incident scene
  - ISRB members agreed on a report framework and ISRB members were designated to investigate specific topic areas within that framework
  - Members of the National Institute for Occupational Safety (NIOSH) visit to begin data collection and interviews
  - ISRB members, along with the HCDFRS Medical Director and NIOSH, met with the State Medical Examiner
  - Obtained training records from HCDFRS Training Academy, the Maryland Fire and Rescue Institute (MFRI), National Fire Academy (NFA), and Pro Board® Fire Service Professional Qualifications System (Pro Board®)

- **September 2018**
  - ISRB members continued informal interviews with HCDFRS personnel on the scene
  - ISRB members complete transcription of radio transmissions
  - ISRB constructs timeline of incident based on radio transmissions and informal interviews
  - ISRB members traveled to NIOSH in Morgantown, West Virginia for SCBA testing
  - ISRB members attended the ATF simulated burn of the incident in Beltsville, MD
  - ISRB members attended evaluation of FF Flynn's radio by Motorola Solutions, Inc. in Ellicott City, Maryland

- **October 2018**
    - ISRB members complete informal interviews with HCDFRS personnel present during the incident
    - ISRB provides the Fire Chief with a preliminary statement to HCDFRS membership to provide a general update on the investigation
    - ISRB members review HCDFRS General Orders and NFPA standards related to assigned investigative portions
    - ISRB members begin drafting findings for investigative portions
    - SCBA report received from NIOSH
    - NIOSH personnel made a second visit to finish conducting interviews
    - Received a third-party evaluation report of FF Flynn's turn out gear

- **November 2018**
    - ISRB members facilitate an Incident Review with crews from the Incident Scene to discuss preliminary findings
        - Members of the Prince William County Department of Fire and Rescue made a presentation regarding their Department's experience of moving forward from a Line of Duty Death
    - An ISRB member attended an evaluation of FF Flynn's radio at Motorola Solutions, Inc., forensics facility in Plantation, FL
    - ISRB members continue to draft sections of the report

- **January 2019**
    - ISRB completes first full draft of the report, bringing together independently written sections for the first time
    - ISRB members met to discuss overall findings from first draft
    - Personnel from NIOSH, ISRB, HCPD meet, tour, and interview the Howard County Communications Center

- **February 2019**
    - ISRB completes a section by section review of the report
    - Evaluation of nozzle completed and report received from Elkhart Brass

- **March 2019**
    - ISRB continues section by section review of the report, completing second full draft
    - ISRB obtains access to Howard County Police Department interviews from the incident scene, using the information from the interviews to enhance their understanding of the incident

- ISRB invites an outside, peer review panel to confidentially review the draft of the report

- **April 2019**
  - ISRB completes the third full draft of the report
  - Third draft of the report is sent to peer review

- **May 2019**
  - ISRB reviews comments from peer review
  - ISRB finalizes the report content

- **June 2019**
  - ISRB completes final technical review
  - ISRB sends final report to the Fire Chief
  - ISRB publishes final report
  - ISRB members conduct HCDFRS member informational sessions about the report findings

Executive Summary

On July 23, 2018, a lightning strike at approximately 01:20 hours ignited a fire within the residence located at 7005 Woodscape Drive, Clarksville, Maryland. Smelling smoke, the residents called 911 to report the lightning strike and visible smoke in their home at 01:52:14. The Howard County Communication Center, which serves as the Public Safety Answering Point for Howard County, then dispatched a Local Box Alarm 5-62 to the residence. The Local Box Assignment from Howard County Department of Fire and Rescue Services (HCDFRS) included Paramedic 56, Engine 101, Engine 51, Tower 10, and Battalion 1.

The residential structure at 7005 Woodscape Drive was a uniquely shaped single-family dwelling spanning approximately 8,400 square feet. There are no fire hydrants on Woodscape Drive, however the residence included a swimming pool at the rear of the property. One aspect of 7005 Woodscape Drive that contributed to this incident's complexity was the grade change along the rear of the residence (referred to as Side C throughout this report).



Figure 1 Side C of 7005 Woodscape Drive

HCDFRS established command at 02:00:29 and upgraded the dispatch assignment to a full metro-box alarm. While en route, Battalion 1 (Incident Commander) instructed Engine 51 to use the pool at the rear of the property to establish a water supply, unaware that the first two arriving engines had not initiated a water supply plan. At 02:07:51, Engine 51 entered the structure on the upper level of Side C (laundry room door) but did not advise command of either their level of entry or the conditions they encountered. Repositioning to the lower level of Side C, Engine 51 re-entered the structure but did not make the Incident Commander aware of

the grade change along Side C. At 02:12:41, the Incident Commander advised all units that residents had evacuated the structure.

At 02:15:48, Engine 101A advised the Incident Commander of visible fire on the upper level of Side C and that they needed to redeploy back up to their initial entrance (upper level of Side C) to reach the fire. Advancing a pre-connected hose line from Engine 51, Engine 101 entered the structure through the laundry room door located at the upper level of Side C. At approximately 02:20:11, FF Flynn had fallen through the first floor into a basement level crawlspace containing active fire and high heat conditions.

Engine 101A, recognizing that FF Flynn had fallen through the floor, declared a MAYDAY emergency on Bravo 1, the radio talk group used for operations during this incident. While clarifying the MAYDAY emergency with Incident Command on Bravo 1, FF Flynn transmitted his own MAYDAY statement including a clear "Who, What, Where" on Bravo 2—an unmonitored radio Talk Group. The Incident Commander quickly deployed the Rapid Intervention Crew (RIC), which entered the basement at approximately 02:27:17 in search of FF Flynn. Overcoming numerous obstacles, including multiple crew members becoming entangled in wiring, the RIC located and extricated FF Flynn by 02:43:39—fifteen minutes and five seconds after their initial entry.

After FF Flynn was removed from the dwelling, those on scene followed and exceeded all BLS, ALS, and ACLS protocols as FF Flynn was transported to Howard County General Hospital. Tragically, FF Flynn did not survive.

On August 2, 2018, Howard County Department of Fire and Rescue Services Fire Chief established an Internal Safety Review Board (ISRB) to review the fire incident at 7005 Woodscape Drive and examine HCDFRS's response and actions to determine the underlying causes for factors that contributed to FF Flynn's death. Tasked to "look beyond the immediate causes to discover all factors that impacted the event⋯[including]: equipment, policies, procedures, training, available resources, or other safety and health program deficiencies,"[3] the ISRB conducted a thorough review of all available data from the incident as well as analyses of HCDFRS policies, procedures, and cultural norms.

The subsequent report examines fourteen broad topics related to HCDFRS's response to the 7005 Woodscape Drive incident, with each detailed in subsequent chapters of this report. While all areas merit attention by the department, the ISRB determined the most critical issues for HCDFRS leadership to address are:

1. Establishing a clear and consistent Philosophy of Command throughout the department;

[3] Howard County Department of Fire and Rescue Services, Special Order 2018.44 Internal Safety Review Board for Incident F18025041 (2018).

2. Creating a competency-based training program, in which all HCDFRS personnel complete hands-on training in realistic conditions with an emphasis on practical error prevention and error trapping;
3. Enhancing fireground communication, with an emphasis on establishing closed-loop radio communications;
4. Enhancing crew accountability on the fireground; and
5. Cultivating the ability of HCDFRS officers to clearly establish incident strategy and the global ability of all department members to carry out effective tactics.

First—as detailed in Sections III.B Strategy and Tactics and III.L Training—HCDFRS must establish a clear command philosophy throughout the department. Drawing from military terminology, there are two philosophies of Incident Command: Befehlstaktik (order-based) and Auftragstatik (mission-based). Befehlstaktik (pronounced bĕ-feel-stack-tic) is a centralized command and control structure in which the command chain prescribes why, when, and how operations will be conducted. For example, some HCDFRS officers are trained in the "Blue Card" method which employs order-based tactical philosophy. Auftragstaktik (pronounced aʊf –tra-stack-tic) is less regimented, with the Incident Commander providing instruction on the why and when of operations (commander's intent) but delegates how operations are executed to lower level leaders. This command philosophy is often employed by the United States Marine Corps, however HCDFRS officers do not receive explicit training in this command philosophy. Both command philosophies are woven throughout HCDFRS General Orders and neither are explicitly stated in department training. This results in confusion among HCDFRS personnel, hindering task accomplishment and team cohesion.

Second, HCDFRS must restructure its current training program to shift its focus away from prioritizing classroom or online course completion to hands-on training in realistic conditions. As detailed in Section III.L Training, while the material covered in the current training program is undisputedly valuable, the department does not verify that personnel can apply the material learned in courses to their position in realistic conditions (with the exception of the paramedic specialization). This was most clearly demonstrated during this incident by veteran personnel entering a structure above a fire, despite acknowledging situational cues and patterns that indicated a basement fire.

Third, HCDFRS must train all fireground personnel to use closed-loop communication methods to ensure that communications are received accurately and to address current shortcomings of radio equipment programming. Each of these issues is detailed in Section III.C Communications.

Fourth, there was a consistent lack of crew accountability on the fireground during the 7005 Woodscape Drive incident. The specific issues related to this incident are explained in Section III.G Accountability, but, in general, the entire department needs to improve accountability of personnel to ensure that all crews on the fireground are operating within the command structure.

Fifth, as detailed in Section III.B Strategy and Tactics, HCDFRS must rethink its current use of Command Modes, command philosophy, and process for implementing strategy and tactics on the fireground. During this incident, the Incident Commander established an Offensive Strategy at the outset, in accordance with current HCDFRS General Orders. A complete 360-degree survey and situational assessment should be completed before declaring a strategy.

The ISRB identified many systemic issues within HCDFRS during the investigation. Current HCDFRS General Orders are often contradictory, unclear, or too cumbersome for personnel to glean operational value. To address this issue, HCDFRS must review all current and applicable General Orders, revise them for consistency across the department, and conduct comprehensive training of HCDFRS personnel on the updated orders.

Lastly, through the informal interviews conducted by the ISRB for this investigation as well as discussions among HCDFRS personnel, the ISRB identified a widespread belief that department leaders are not promoted or assigned based on merit or experience. Whether this belief is true or not, it has a negative effect on unit cohesion and trust in leadership. This lack of trust with department leadership has been exacerbated by previous decisions to not widely publish previous safety reports, which has led to rampant conjecture and rumors. During this incident, this belief and lack of trust between officers and firefighters likely had a deleterious effect on tactical decision making, impacting overall safety on the fireground. Moving forward, HCDFRS must take steps to regain trust between firefighters and leadership.

As a foundation for rebuilding this trust, the ISRB strongly recommends that Howard County have an independent organizational review of the HCDFRS to make recommendations on improving overall department structure, policies, and procedures. Ideally, the team conducting the department review will have no personal or professional connections to HCDFRS personnel and will include a trained Organizational/Industrial Psychologist to make specific recommendations for improving trust between firefighters and leadership.

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Acknowledgements

The Howard County Department of Fire and Rescue Services thanks the following individuals for their effort, dedication, and professionalism through the difficult process of examining the circumstances involved in Fire Fighter Nathan Flynn's line of duty death. Fire Fighter Flynn was the first career line of duty death in the history of Howard County Department of Fire and Rescue Services. By sharing this report, the Department aims to educate all first responders and recommend changes in order to prevent any future line of duty deaths.

Internal Safety Review Board Members

Joseph R. Ross, Battalion Chief, Chairperson
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- Howard County Police Department
- Howard County Communications Center
- Office of the State Fire Marshal
- National Institute for Occupational Safety and Health (NIOSH)
- Bureau of Alcohol, Tobacco, Firearms, and Explosives
- Prince William County (VA) Department of Fire and Rescue
- Motorola Solutions, Inc.
- Elkhart Brass
- International Personnel Protection, Inc.
- Howard County Radio Shop
- West Friendship Volunteer Fire Department

Fire and Rescue Services Overview

Howard County, Maryland



Located southwest of Baltimore, Maryland and northeast of Washington, D.C., Howard County, Maryland is a rapidly developing jurisdiction. With urban, suburban, and rural areas, the 253 square-mile jurisdiction includes densely populated areas such as Columbia, Ellicott City, and Laurel in the southeast part of the county, as well as more rural areas such as Clarksville to the West and North. The current population of Howard County is 321,113 residents.

Howard County is a Charter government with its own legislative and executive branch. With no incorporated towns or cities within Howard County, the County government provides all local government services to its residents. This includes public safety protections by police and fire departments.

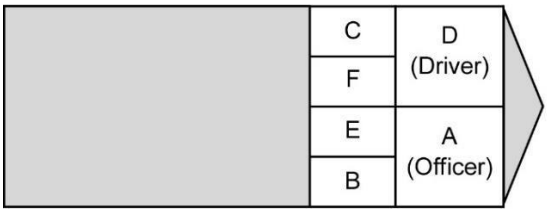
Howard County Department of Fire and Rescue Services

The Howard County Department of Fire and Rescue Services (HCDFRS) is a combination system (volunteer and career departments) with nearly 900 personnel. Operating from twelve (12) stations across the County, HCDFRS is statutorily responsible for fire suppression and prevention, fire training, arson investigation, rescue services, and emergency medical services.

Every station has at least one engine and one paramedic unit assigned. Many stations also house apparatus such as ladder trucks, heavy duty rescue squads, brush trucks, foam and dry chemical units, and water tankers. Career personnel work on a rotating shift schedule working twenty-four (24) hours on duty followed by forty-eight (48) hours off duty.

Personnel responding to an emergency are assigned a riding position on their apparatus. This riding position correlates with their radio and SCBA equipment. Apparatus riding positions with corresponding radio designations used by HCDFRS are as illustrated in Figure 2.

Engines / Trucks / Towers / Squads



Ambulances / Tankers / Brush Units

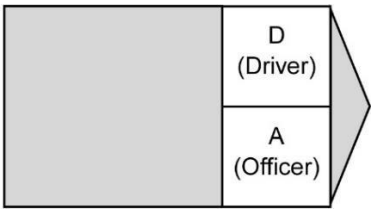


Figure 2 HCDFRS Radio and Seating Matrix

I. Incident Information

Pre-Incident Weather Conditions

The Clarksville area experienced rainstorms with thunder and lightning the night of July 22, 2018. These weather conditions were reported in interviews with responding personnel and supported by the weather history data obtained through Weather Underground, as reported at Montgomery Air Park (KGAI), which is located 13.39 miles west of the incident location.

Building Construction



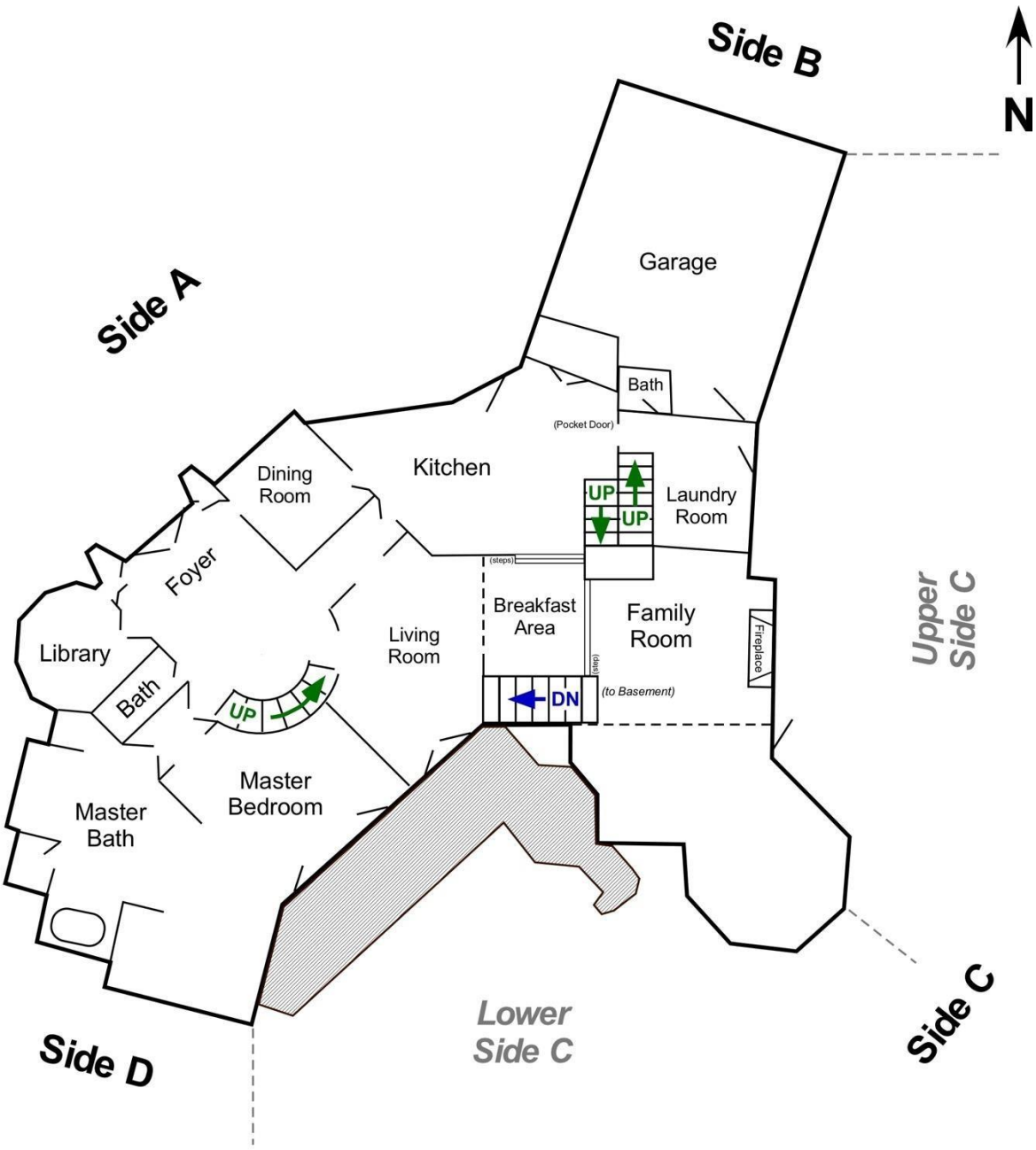
Figure 3: Side A view of 7005 Woodscape Drive

The structure addressed as 7005 Woodscape Drive, Clarksville, Maryland is located on a three (3) acre lot in a suburban neighborhood. This structure is a large, uniquely shaped, mansion-type, single-family dwelling. Maryland State Department of Assessment and Taxation (SDAT) lists the structure size as having 7,313 square feet of above grade living area and 1,100 square feet of finished basement.



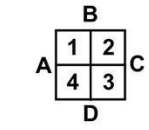
Figure 4: Aerial view of 7005 Woodscape Drive

For the purposes of this report, the addressed (western) side of the structure at 7005 Woodscape Drive is the front, or Side A. The left (northern) side of the structure is Side B; the rear (eastern/southeastern) side of the structure is Side C; and the right (southern) side of the structure is Side D. To identify the interior, the structure is divided into four quadrants. The left front quadrant is Quadrant 1, the left rear Quadrant 2, the right rear Quadrant 3, and the right front Quadrant 4. This same side and quadrant identification system also applies when identifying areas and objects within a specific room. Interior side and quadrant identification is assigned in relation to the structure, regardless of the location of the entrance to a room.



Floor 1

rev 4/11/19



Side/Quadrant Key

(drawing not to scale)

Figure 5 – Sketch of Floor 1 for 7005 Woodscape Drive

The general shape is two rectangles with an offset of approximately thirty (30) degrees at the approximate center of the structure. There is a bump-out portion at the approximate center of Side C, terminating with an octagonal turret-type feature. The overall centerline length of the structure (Side B to Side D) is approximately 145 feet, accounting for the thirty (30) degree offset. The depth of the structure varies. The northern (toward Side B) rectangular portion is approximately forty (40) feet deep (Side A to Side C). The southern rectangular portion is approximately fifty (50) feet deep. The depth of the structure at the location of the bump-out portion increases to approximately eighty-five (85) feet, from the nearest Side A wall.

The structure is of wood frame construction with a brick veneer exterior finish. The roof has multiple pitches and consists of wood sheathing covered with asphalt shingles. The structural components are a combination of dimensional lumber, web trusses, and engineered wooden I-beams. Side A of the structure has two exterior entrances. An arched main entranceway, approximately at the center of the structure, opens into the first-floor main foyer area. A doorway to the left (toward Side B) of the main entranceway, accessed by a walkway from the driveway, opens into the first-floor kitchen area. The northern rectangular portion of the structure has two floors above grade and no basement. This portion contains a multi-bay garage on Floor 1 and residential area on Floor 2.



Figure 6 - View of 7005 Woodscape Drive from Side C

A Floor 1 exterior door on Side C, to the left of the garage, leads into a laundry room. At Side A of the laundry room is a doorway with a pocket door, which connects to an open area

containing a two-section return-style stairway to Floor 2. Turning to the left upon reaching this stairway leads to a common open family room area. There is a step-down in floor level from where the stairway is located to the floor level of the family room. The Side C terrain declines on the southern portion (toward Side D) of the structure, providing walkout exterior access to a finished basement. There is an open-air deck on Side C of Floor 1 of the southern portion, above the basement access doors.

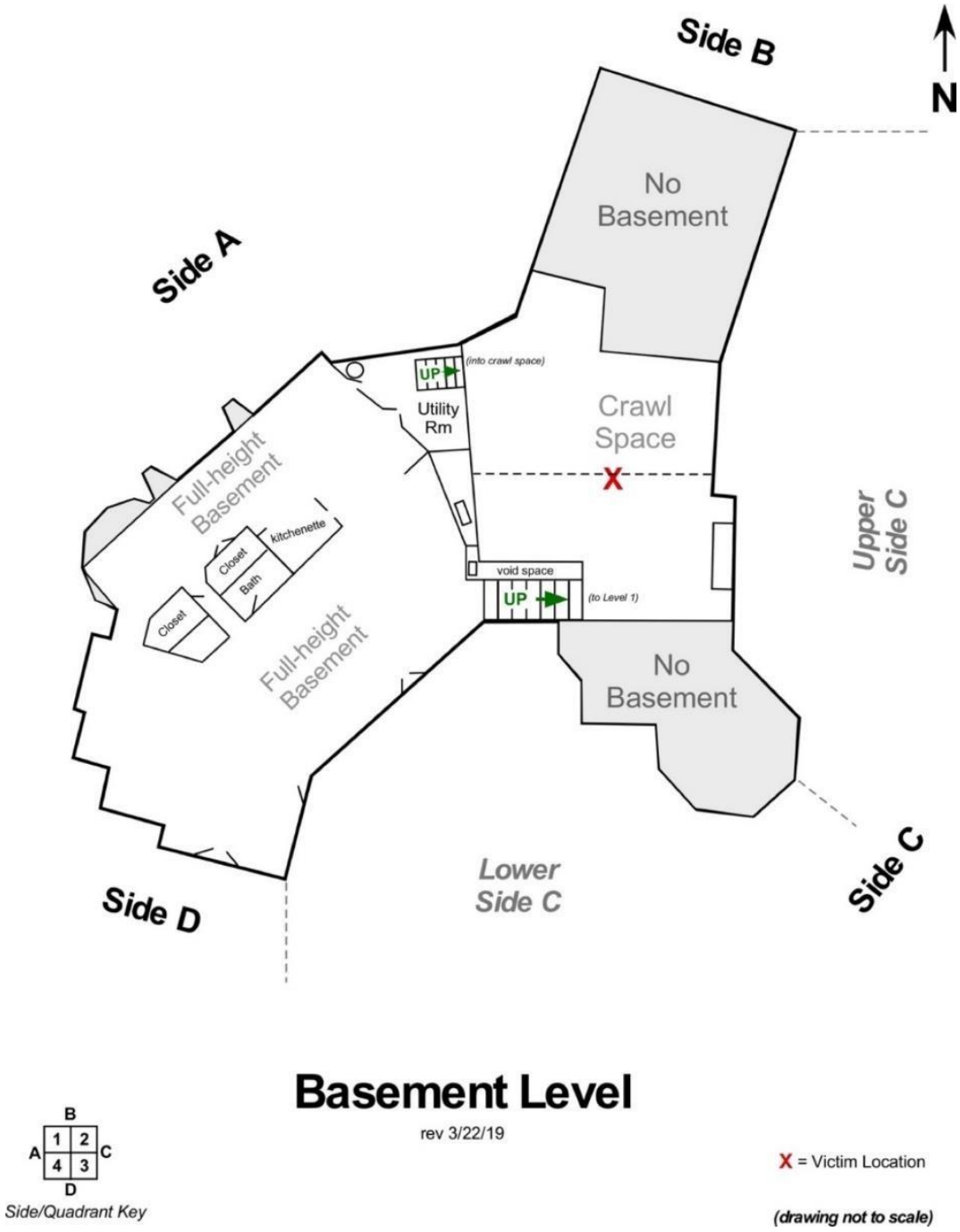


Figure 7 - Sketch of Basement for 7005 Woodscape Drive with approximate location of FF Flynn

There is a full-story basement beneath approximately half of the structure from Side D to approximately the center, ending at a crawlspace. The crawlspace is a unique feature located beneath Floor 1 in the center portion of the structure, accessible only from the basement via a set of stairs at the A/B corner of the crawlspace beneath the area of the Side A first floor kitchen entrance. See Figure 23 Steps leading from basement to crawl space where FF. Flynn was located for a post-incident photograph of the area. The crawlspace and access to the crawlspace is hidden from general view with no indication of its existence, even under normal occupant activity. Marble tile covers the floor of the Floor 1 family room approximately above Quadrant 3 of the crawlspace. Tongue-and-groove hardwood covers the Floor 1 floor approximately above Quadrant 4 of the crawlspace. The underside of the floor system for Floor 1, which is the crawlspace ceiling, consists of unprotected dimensional lumber supported by unprotected dimensional lumber components. Height of the crawlspace varies due to differing floor levels of the areas above, with an estimated average height of approximately four (4) to five (5) feet. Concrete masonry unit (CMU) block walls bound the crawlspace on all sides. The northern half, approximately Quadrants 1 and 2, of the crawlspace have a platform-type floor assembly of plywood and linoleum on top of moisture barrier. The floor of the southern portion, approximately Quadrants 3 and 4, is earth covered by moisture barrier and plywood panels. The crawlspace contained various household storage items.

Incident Narrative

On July 23, 2018 at 01:51:03 a 911 call was received from a resident of 7005 Woodscape Drive reporting a fire. The caller stated that "we're not sure [what's on fire], we just smelled smoke, and we are out of the house."[4] The 911 operator verified that the resident did not see flames in the structure, only smoke. The caller also indicated that there was a recent lightning strike in the area.

Howard County Communications Center (Communications Center) dispatched Local Box 5-62 at 01:52:14 on Radio Talk Group Alpha 1. When dispatching the Local Box 5-62 assignment, the Communications Center dispatcher stated that there was "visible smoke from a lightning strike" at the structure and that crews should operate on Radio Talk Group Bravo 1. The Local Box 5-62 assignment consisted of Engine 51 (5 personnel), Engine 101 (3 personnel), Tower 10 (4 personnel), Paramedic 56 (2 personnel), and Battalion Chief 1 (2 personnel).

While units were en route, a second 911 call was received at 01:57:21 to report a fire at 7005 Woodscape Drive from another resident. This second caller also indicated that they did not, "see a flame, but [the] whole house [was] filled with smoke." Reassuring the caller that Howard County Department of Fire and Rescue Services were on their way, the dispatcher told the resident that responders were, "coming as fast as they can."

As Engine 51 approached the intersection of Woodscape Drive and Guilford Road, crewmembers smelled smoke. On arrival at 7005 Woodscape Drive, crewmembers saw low-laying smoke, like a fog across the lawn, with smoke coming from multiple levels of the residential structure. The first arriving engine, Engine 51, did not make provisions for water supply. As the first arriving officer, Engine 51A transmitted the Initial Radio Report at 02:00:29 hours, stating, "51 to Howard single family two-story, smoke showing, go ahead and start a box." Engine 51 crew began to deploy a 200-foot-long, 1 ¾ inch pre-connected hose on Side A.

While traveling to the incident scene, Battalion Chief 1 consulted a newer Mobile Data Terminal (MDT) map than available in Engine 51 and identified a pool at the rear of the property. Determining that there were no hydrants on Woodscape Drive, Battalion Chief 1 directed Engine 51 at 02:01:23 to reposition to the rear of the property to see if they were able to use the swimming pool as water supply for the incident.

[4] Unless otherwise stated, all quotes included in this document come from radio transmissions from the incident, transcribed by the ISRB.



Figure 8 MDT Map (BC1)

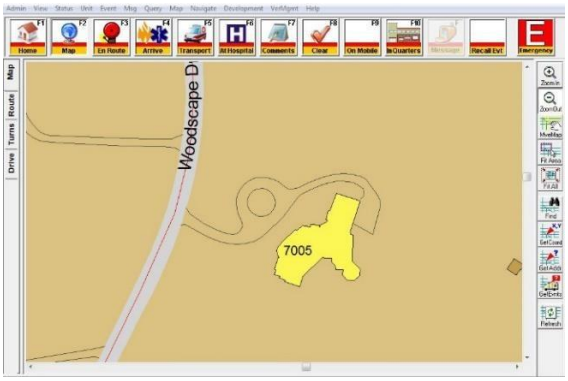


Figure 9 MDT Map (other units)

Upgrading to a Full Box Alarm assignment, the Communications Center dispatched Engine 71 (4 personnel), Engine 111 (3 personnel), Truck 7 (4 personnel), Tower 3 (5 personnel), Paramedic 105 (2 personnel), EMS 1 (1 personnel) and Safety 1 (1 personnel) at 02:01:56 hours. Additionally, Battalion 2 (2 personnel) self-dispatched, as is standard practice for HCDFRS.

At 02:02:14 hours, Tower 10 arrived on scene and positioned behind Engine 51 on Side A. Then Engine 101, as the second arriving engine, backed into the driveway in preparation to reverse lay from Engine 51 to Guilford Road. However, Engine 51 repositioned to Side C of the structure before Engine 101 began the reverse lay operation from Engine 51. Pulling out of the driveway, Engine 101 then repositioned and laid a supply line from the driveway entrance toward Side A of the structure. After repositioning to Side C, Engine 51A spoke to the owner of 7005 Woodscape Drive and determined that, "most of the heavy smoke [was] in the basement."

Engine 51A relayed this information to Battalion Chief 1 at 02:03:32. Battalion Chief 1 arrived on scene, committed to an offensive strategy, and established Command at 02:03:55. The Incident Commander assigned Engine 51 and Tower 10 to the Fire Attack Group, with Engine 51A as the Fire Attack Group Supervisor, at 02:04:31. The Battalion Chief Aide began a 360-degree assessment at 02:05:22.

The crews of Engine 51 and Tower 10 entered the structure on the first floor from the upper level of Side C at approximately 02:07:51 with a charged hose line, noting smoke conditions but

no visible flames on that floor. Using thermal imaging cameras Tower 10A, Engine 51B and Engine 51E observed indications of fire below them and all crews exited the structure. This initial floor of entry on Side C (the laundry room) and conditions observed in the structure were not reported to Incident Command.

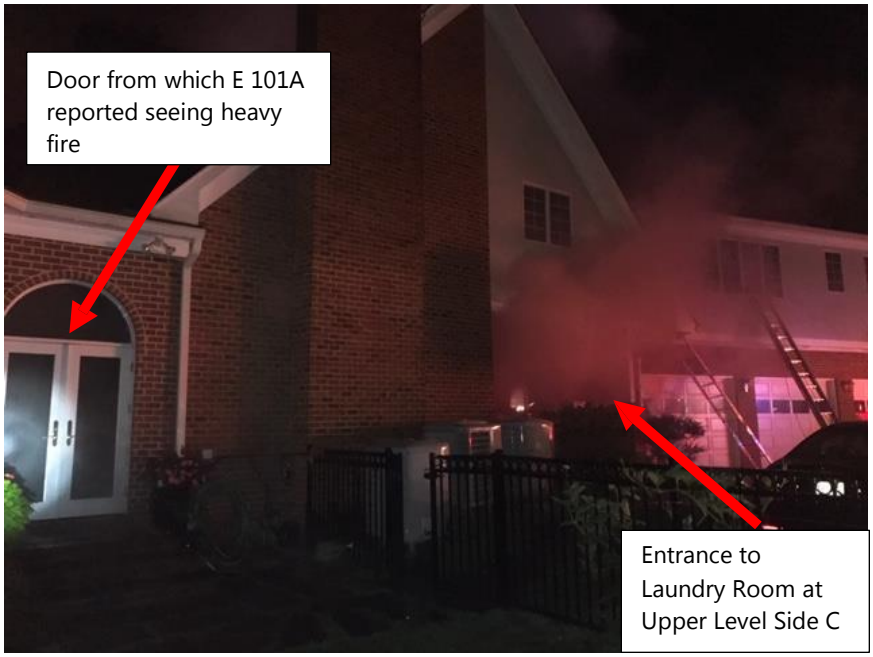


Figure 10: Photograph of Side C with smoke emanating from laundry room door

As this was occurring, Engine 101 pulled a second 1 ¾ inch pre-connected hose line as a back-up line on the exterior without making entry on the first floor. Redeploying to the lower level of Side C, Engine 101 advanced a 300-foot hose line and Engine 51 moved their 200-foot hose line. However, Engine 51's 200-foot hose line did not reach the basement entrance of the structure. Engine 101B (FF Flynn) entered the basement on the lower level of Side C with the 300-foot charged hoseline.

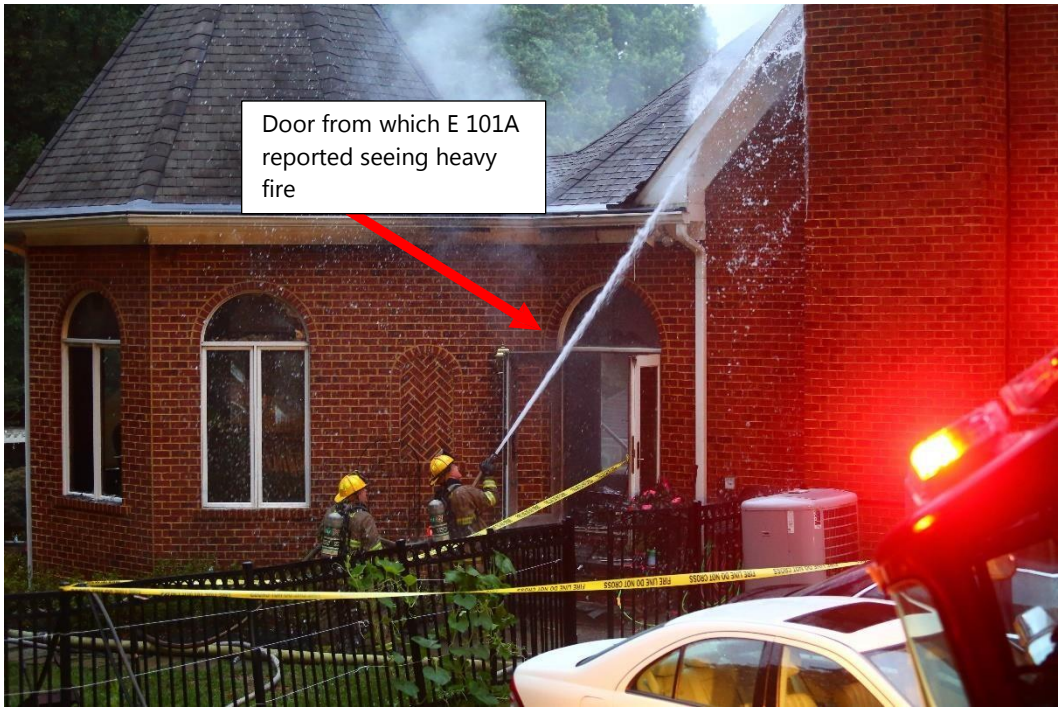


Figure 11: Fire visualized by Tower 10D and E101A behind the open doors in above photo.

Seeing fire on the first floor of Side C, Engine 101A, advised the Incident Commander by radio, "…heavy fire on floor number one Side Charlie…We need to redeploy our line back up to the initial entrance." Engine 101B withdrew from the lower level Side C (basement entrance), abandoning the 300-foot hose line, and went back up the hill toward Engine 51's apparatus. Deploying a second 200-foot hose line from Engine 51, Engine 101's crew made entry into the first-floor laundry room on upper level Side C with FF Flynn on the nozzle of a charged hose line and Engine 101A an unknown distance behind him. Engine 51's crew redeployed their charged hose line from lower level Side C to upper level Side C and made entrance on the first floor behind Engine 101 at approximately 02:17:43.[5]

[5] This time is estimated based on a radio transmission from Tower 10A

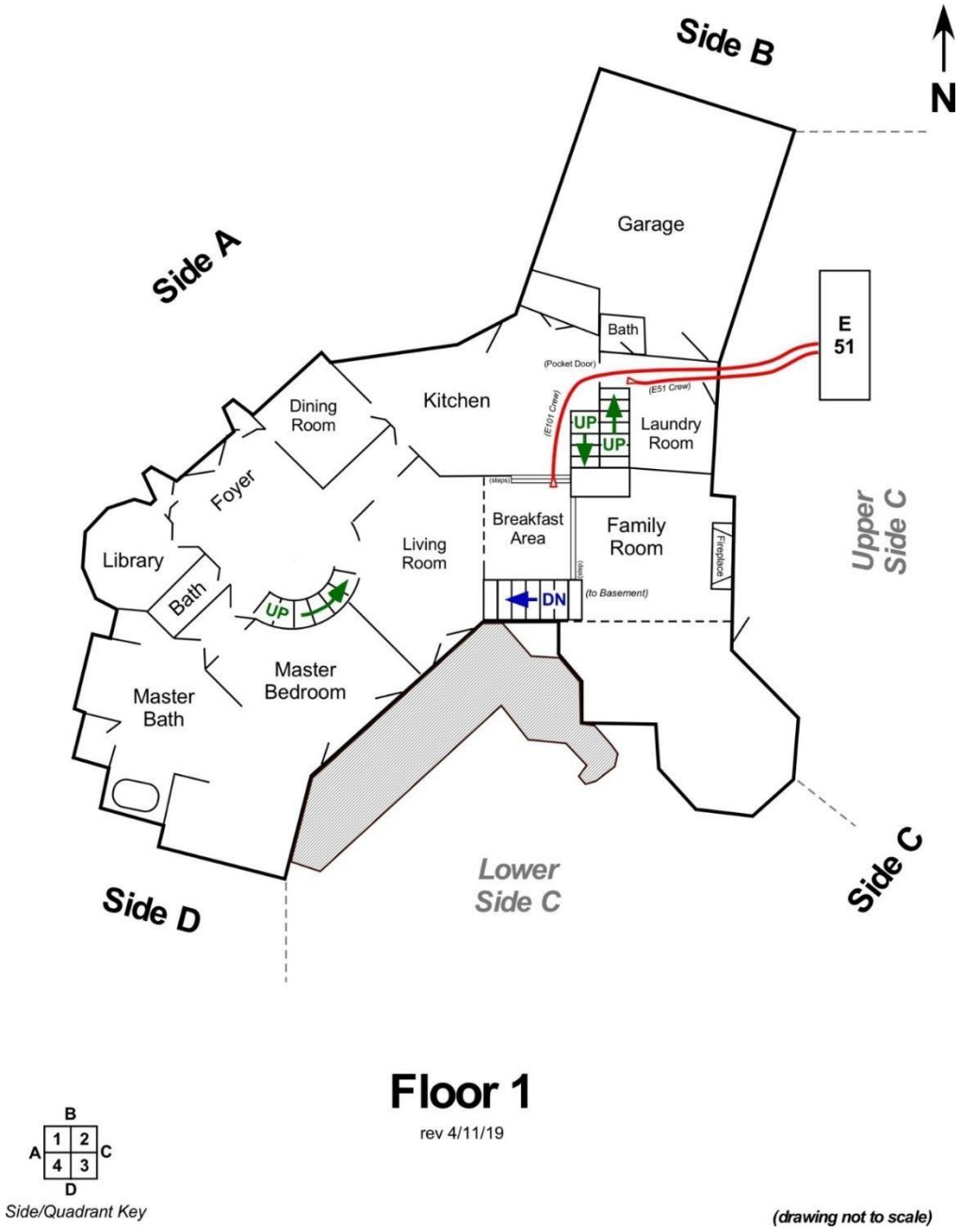


Figure 12: Sketch of Floor 1 showing attack lines

While Engine 51 and Engine 101 were operating on Side C, the residents of 7005 Woodscape Drive reported to Incident Command that all occupants of the residence had evacuated the structure. At 02:12:41 Command transmitted, "⋯to all units, we do have an ALL CLEAR from the occupants, occupied times three, ALL CLEAR of the house. We do have an ALL CLEAR." Shortly after that, Battalion Chief 2 arrived at the incident scene and was assigned as Charlie Division Supervisor at 02:13:01.

Additionally, Engine 71 radioed Command at 02:09:34 inquiring whether they needed to secure secondary water for the incident. Incident Command confirmed that Engine 71 would need to

secure water, instructing Engine 71 to "get that hydrant on Guilford at the next street up" to connect to the hose Engine 101 laid at the entrance to the driveway to 7005 Woodscape Drive.

At 02:18:29 hours Incident Command assigned Truck 7 as the Rapid Intervention Crew (RIC) and Engine 71 was on-deck, positioned on Side A. Prior to that time, the Incident Commander was communicating with Engine 101A and Tower 10A to ascertain the locations of the crews operating on Side C. Throughout the incident, the Incident Commander was unaware of the grade change along Side C of the structure. The Communications Center transmitted the fifteen-minute mark to Incident Command at 02:19:09 and the Incident Commander requested a Task Force at 02:19:10.

Having entered the first-floor laundry room from the upper level Side C at approximately 02:17:43, FF Flynn fell through the first floor into a crawlspace at approximately 02:19:45. The hose line FF Flynn was advancing also fell into the crawlspace with him, however FF Flynn's proximity to the nozzle after the fall is unknown. From the investigation, it was determined that water did not flow through this hose line until it was burnt through at approximately 02:26, implying that FF Flynn was not able to use the hose to extinguish the fire.

The crawlspace had been used as a storage area by the residents and contained active fire and high heat conditions. At 02:20:11, Engine 101A transmitted, "MAYDAY, MAYDAY, MAYDAY, Flynn's in the basement to the left" on Bravo 1. Engine 101A's MAYDAY transmission was immediately acknowledged by the Incident Commander, however the Incident Commander was unclear who was experiencing the MAYDAY due to the transmission's clarity.

The Communications Center advised Command that the transmission was from 101A. The Incident Commander, on Bravo 1, instructed "all units hold the air" and for Engine 101 to provide more information regarding the MAYDAY incident. At 02:21:05 Engine 101A transmitted on Bravo 1 "he's in the basement, hose line trying to pull him up, go through the basement." Simultaneously, FF Flynn transmitted a clear Who-What-Where statement on Bravo 2. Because Bravo 2 was unmonitored by the Communications Center, and the fireground was operating on Bravo 1, FF Flynn's transmission was not heard by either the Incident Commander or the Communications Center.

The Incident Commander reassigned Engine 71 to RIC with Truck 7. Once RIC was directed to Side C, the Incident Commander immediately attempted to obtain the Who-What-Where of the

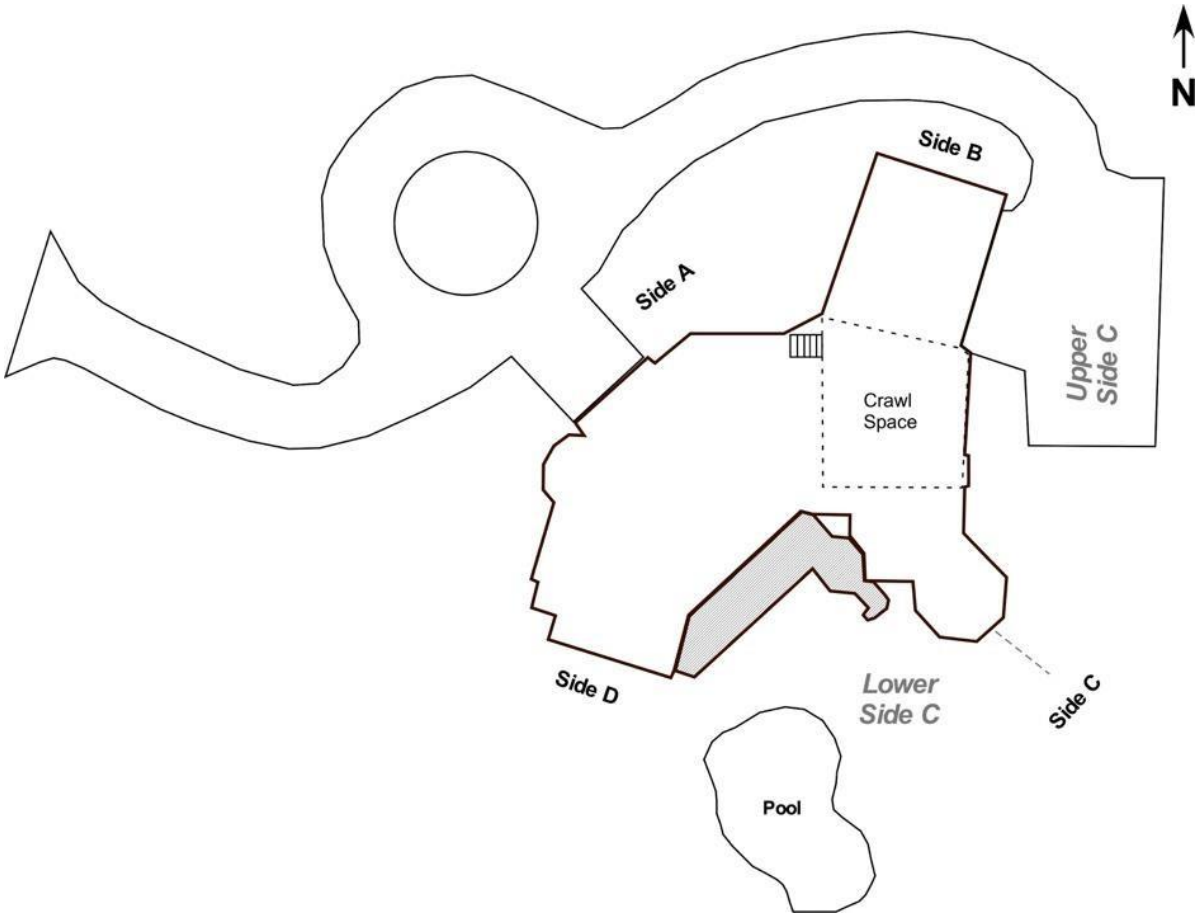


Figure 13: Sketch of structure at 7005 Woodscape Drive, not drawn to scale.

MAYDAY emergency from Tower 10A and Engine 51A. Engine 51A and Tower 10A simultaneously attempted to notify the Incident Commander that they were trying to find Engine 101A. The Incident Commander initially believed Engine 101A had fallen through the floor. It was not until 02:24:05 hours that the Incident Commander ascertained FF Flynn (Engine 101B) as the person in distress.

Truck 7A began a 360-degree survey starting on Side A and continuing around Side B until reaching the lower level of Side C. Engine 71A started his 360-degree survey by continuing around Side D to Side C lower level. During this time the crew from Engine 71 was tasked with moving the charged 300 foot 1 ¾ inch hose line from Engine 101 from Side A to Side C lower level. Crews from Truck 7 were continuing to gather tools and supplies for the RIC operation. Truck 7A and Engine 71A discussed their plan for rescuing FF Flynn.

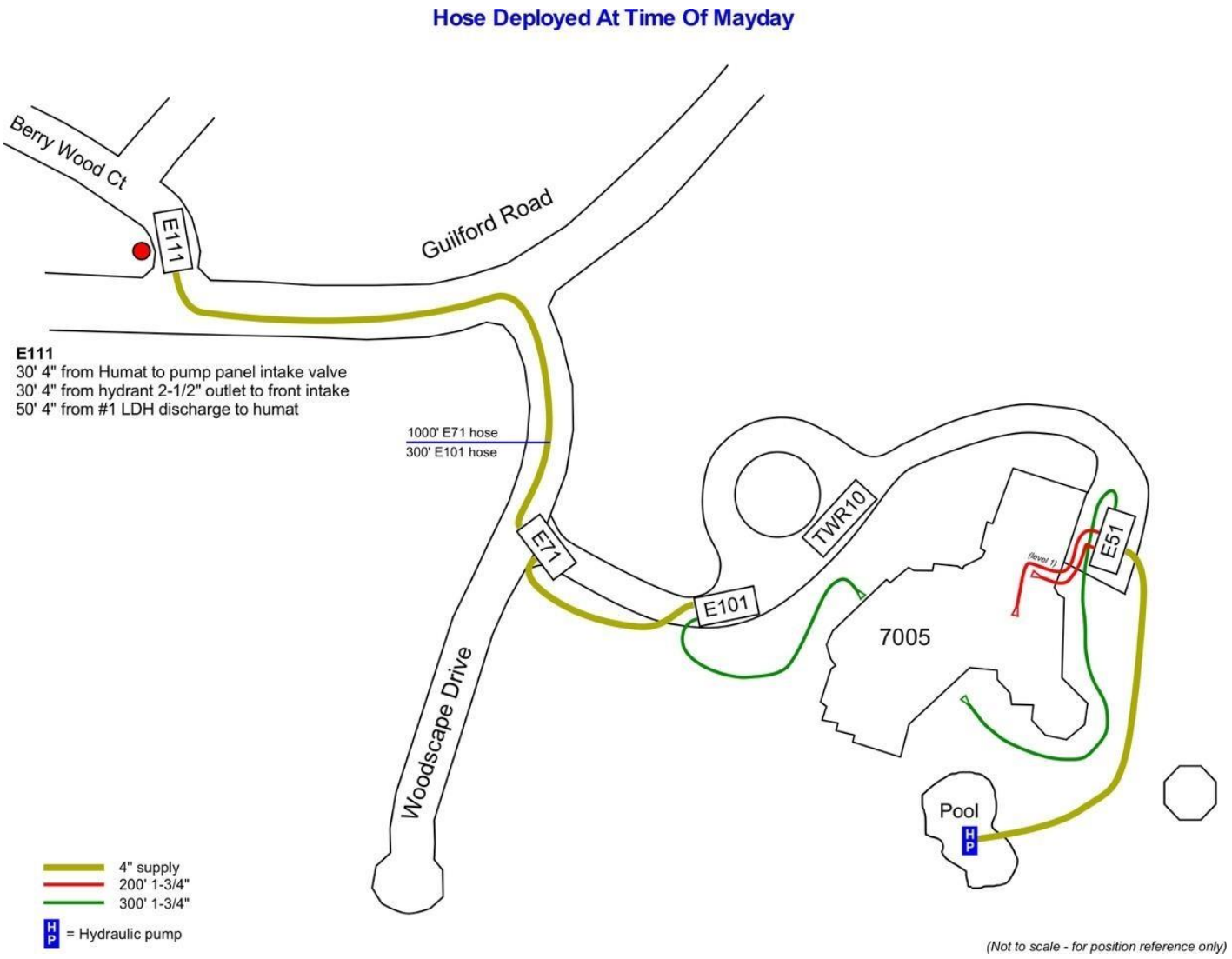


Figure 14: Water supply plan that was put in place during the MAYDAY operations

Engine 71A and Truck 7A were the first members of the RIC to enter the basement. They reported "cold smoke" conditions creating poor visibility for the members entering. Engine 71A took a few seconds to map the layout of the basement with the use of their Thermal Imaging Camera (TIC). Truck 7B first came across a set of steps that led to the first floor, Truck 7B observed heavy smoke conditions on the first floor but no fire. Truck 7B then descended the steps. Crews searching the basement encountered furniture in their path, what was described as a black-oily residue in the smoke and a slippery floor. Truck 7C and Paramedic 56D located the second set of steps and could hear the fire in that direction. They notified Engine 71B of the fire's direction and continued toward the crawlspace where FF Flynn was located.

Members of the RIC stated that as they got to the top of the steps to the crawlspace, visibility was low, the heat had increased, and they were able to hear FF Flynn's personal alert safety system ("PASS") alarm. Fire was observed on both sides of the RIC. Encountering wires from the ceiling, several members of the RIC became entangled and needed to be cut free to proceed.

Free of the entanglements, crews were able to extinguish the visible fire in the space and move toward the sound of FF Flynn's PASS Alarm.

The RIC team found FF Flynn lying face-down and slightly on his left side in what appeared to be a four-foot by four-foot space at the end of the storage area. The gauge on FF Flynn's Self-contained breathing apparatus ("SCBA") showed that he still had a cylinder pressure above the red zone. Engine 71C removed his buddy-breathing line from the pouch on his SCBA but decided not to remove FF Flynn's line and make the connection with air still remaining in FF Flynn's cylinder. Crews moved FF Flynn toward the crawlspace entrance through smoldering debris, with some crewmembers losing their footing and falling backwards toward the top of the steps.

At this point in the operation, members from Tower 10, Tower 3, and Engine 22 were inside the basement completing searches and standing by to provide additional assistance. As FF Flynn was removed from the basement, crews had to move the furniture to make a straight path to the exterior. Other members in the basement assisted by removing FF Flynn the rest of the way to the exterior. FF Flynn was transferred to EMS personnel outside the basement level entrance for patient care and packaging.

During transport, Advanced Life Support (ALS) and Basic Life Support (BLS) care was continued until arrival at Howard County General Hospital, where FF Flynn's care was transferred to the Emergency Room physician. HCDFRS personnel continued assisting in FF Flynn's care under the direction of hospital staff. Treatment of FF Flynn continued at Howard County General Hospital until the physician determined that all efforts of resuscitation had been exhausted. HCFDRS Chaplain Stone offered prayer and FF Flynn's body was draped with the American Flag. The State Medical Examiner determined the cause of death to be an accident due to "prolong[ed] exposure to high temperature and thermal injuries."

Origin and Cause

The Origin and Cause Investigation of the fire at 7005 Woodscape Drive incident, conducted by the HCDFRS Office of the Fire Marshal, determined the area of origin to be the unfinished basement crawlspace below the first-floor family room and breakfast area. Investigators identified the ignition sequence of the fire to be a lightning strike which induced the failure of the residential corrugated stainless-steel tubing (CSST) system. This caused the ignition of fugitive gas escaping from the hole formed by the arcing process which then ignited combustible material in the area of origin. The classification of the fire cause was determined to be Natural. Natural fire causes involve fires caused without direct human intervention or action, such as fires resulting from lightning, earthquake, wind, and flood.[6]

HCDFRS Office of the Fire Marshal investigators and personnel were assisted in many aspects of the origin and cause investigation, scene processing, and documentation by the following organizations:

- Howard County Police Department
- Bureau of Alcohol, Tobacco, Firearms, and Explosives Task Force
- Office of the Maryland State Fire Marshal
- Prince George's County Police Department Crime Scene Investigation Division

[6] National Fire Protection Association, Guide for Fire and Explosive Investigations 921 (2017)



Figure 15 - Path of lightning travel, photo courtesy of ATFE


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II. Fireground Operations Sequence

The Internal Safety Review Board (ISRB) compiled a timeline of events related to this incident based on radio transmissions, witness interviews, photographs of the scene, and other available information. In some cases, the times listed in the operations sequence may be rounded to the nearest minute and some events may not have been included. This timeline is not intended as a formal record of events, nor should it be used as such. Rather, it is to provide the reader the ISRB's understanding of the sequence of events during this incident.

First, there is a high-level overview of the incident's critical moments (below). Second, there is an annotated timeline that includes most radio transmissions in context of critical events and general comments from the ISRB analysis of the incident.

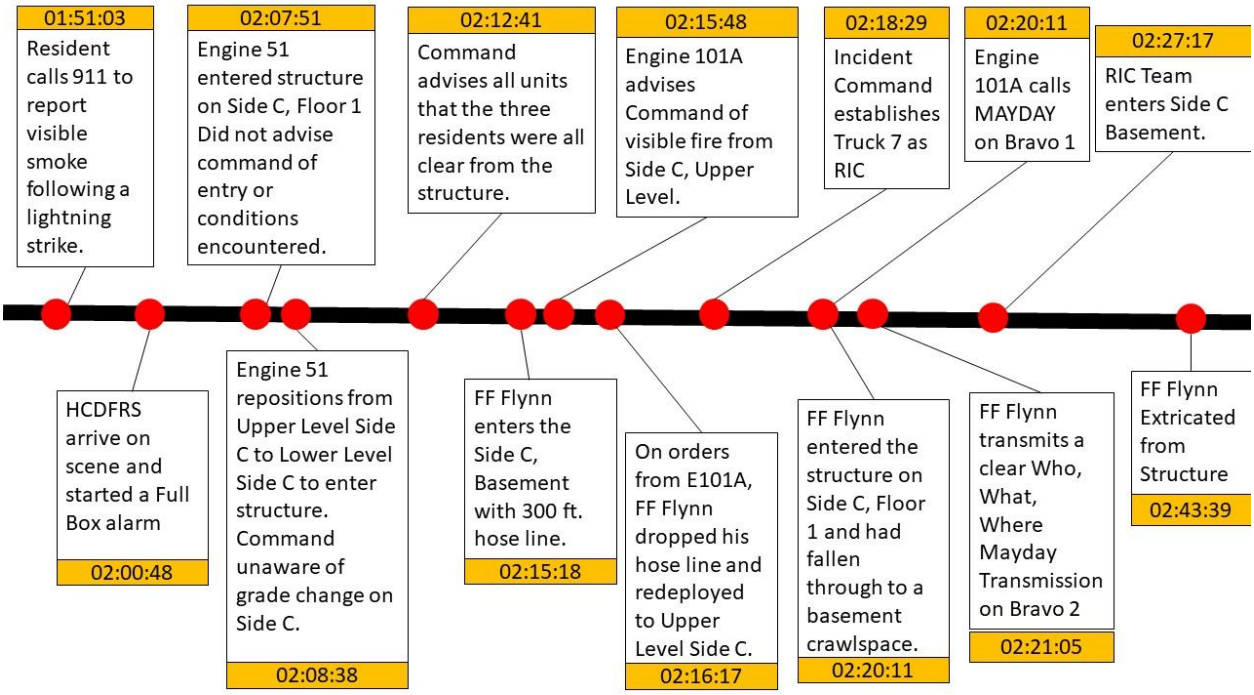


Figure 16 - High Level Overview of Fireground Operations

Annotated Fireground Operations Timeline

Fireground Sequence Key	
	Radio Transmission—Bravo 1 Talk Group
	Radio Transmission—Bravo 2 Talk Group
	Critical Event or Finding (e.g. safety red flags)
	Comments

Key Events	Time	Incident Radio Communications
	July 23, 2018	
	1:52:14	Howard Dispatched Local Box 5-62: "Paramedic 56, Paramedic Engine 101, Engine 51, Paramedic Tower 10, Battalion 1 respond 7005 Woodscape Drive visible smoke from a lightning strike."
	1:54:16	"Tower 10 with 4." Howard acknowledges: "Tower 10 at 1:54."
	1:54:19	"Engine 51 with 5."
No staffing level transmission given from Engine 101, Paramedic 56, and Battalion 1.		
	1:54:23	Howard: "Engine 51, Tower 10, Engine 101, Paramedic 56, Battalion Chief 1, your responding 7005 Woodscape Drive off Guilford Road, lightning struck the house."
	2:00:29	"[Engine] 51 to Howard, single-family, two-story, smoke showing, go ahead and start a box."
	2:00:43	Howard acknowledges Engine 51A on-scene report: **"**51, single-family, two-story.**"**
	2:00:44	Engine 51 to Tower 10: "Tower 10 take the front of the building."

Key Events	Time	Incident Radio Communications
		full box."
Side A of the structure.		back, if you can, position such to use your hydraulic pump for a non-hydranted street."
		Woodscape Drive, Tower 7, Paramedic Engine 71, Paramedic Tower 3, Engine 111, Paramedic 105, EMS 1, Safety 1 upgrade to a building fire operate on Bravo 1."
		Alpha." Howard acknowledges: Tower 10, 2:02."
		Howard acknowledges: "101, 2:02."
	2:03:07	"Paramedic 105 en route."
		"105, 71, 2:03."
	2:03:21	"51 to Battalion 1."
		ahead."
Engine 51 repositioned their apparatus to the upper level of Side C and firefighters walked Engine 51's hose line with the movement of the engine. Safety Red Flag: heavy smoke in the basement as reported by Engine 51	**2:03:32**	Engine 51A to Battalion 1: "we pulled around back to use the pool and we're going to make entry from the back. The owner talked, talked to the owner most of the heavy smoke is in the basement."
		"Battalion 1 direct. Battalion 1 to Howard, on location confirming a large-two-story single-family we do have visible smoke showing, going to be committing to an

Key Events	Time	Incident Radio Communications
		offensive strategy, Battalion 1 with the Command." Howard acknowledges: "OK, Battalion Chief 1 on location with Command, at 2:04."
		attack, you're going to have yourself and Tower 10." Command questions: "and you're advising your operator is going to access the swimming pool for water supply?"
Engine 51 did not make Command aware of which level of the structure they were	**2:04:54**	Engine 51A acknowledges Command: "that's correct, we are on Side Charlie, suggest other units come in from Alpha."
		visible report on Side Charlie from the basement as soon as you can."
		Command." Command Acknowledges: "go ahead Aide."
		from outside and see nothing from the outside, going to make entry, uh?".
Safety Red Flag: Battalion Aide's 360 survey confirmed smoke in the basement. Throughout the incident the Incident Commander was unaware of the grade change on Side C.	**2:05:22**	Battalion 1 Aide to Command: "Glass slider access across Side Charlie as well as Side Delta, we have smoke in the basement. It's pretty hazy, going to assume it's finished but, again, I have smoke in the basement."
		to Aide, all I got was finished and you have a haze, but you and 51 were both talking. Give me a complete 360 again."
		Command, I've got two-story Side Charlie, smoke in the basement, glass slider access on Side Delta and Charlie, finished basement, and I do have smoke conditions."

Key Events	Time	Incident Radio Communications
Safety Red Flag: Command acknowledges smoke in the basement.	**2:06:32**	Command to Battalion 1 Aide: "very good, finished basement, smoke conditions with a slider on Charlie and Delta."
		Command acknowledges: "go ahead."
Safety Red Flag: Indications of a below	**2:07:06**	Tower 10D to Command: "Chief, right to stacked, I got moderate smoke coming from the ground level."
Safety Red Flag: Command acknowledges	**2:07:20**	Command acknowledges Tower 10D: "You from the window, at the front door."
		have two-out duties?"
		out, Side Charlie."
Engine 51 entered into the Floor 1 laundry room with a 200 ft hose line. Incident Commander was unaware of entry, assumed Engine 51 was operating at the Basement level outside the structure.	**2:07:51**	Command: "Last unit on Side Charlie, repeat?" Engine 101A acknowledges: "101."
		advising that you're on Side Charlie and you, you're with 51? Is that correct? "
FF Flynn pulled the 300 ft hose line from Engine 51.	**2:08:12**	Engine 101A to Command: "we are outside but we are, second line pulled, two-out."
		second line pulled and you're on Charlie."
No response from Fire Attack.	**2:08:28**	"Tower 10[A] to Fire Attack."
Engine 51 exited the Floor 1 laundry room and redeployed their 200 ft hose line to Basement level entrance. Command still	**2:08:38**	"[Engine] 51[A] to Command." Command acknowledges: "51, go ahead."

Key Events	Time	Incident Radio Communications
	2:08:46	Engine 51A to Command: "We are going to reexamine if we have access to the basement, we're going to come in through the basement slider."
		advising you have access to basement via the slider on Side Charlie?"
		going to do this right, this." [unrecognizable audio]
First two arriving engines did not initiate a water supply plan. Incident Commander is drawn into addressing incident water supply.	**2:09:27**	"Engine 71 to Command." Command acknowledges: "71, go ahead."
		on Great Star now. Do you need me to come into the scene or grab secondary water?"
Incident Commander instructed Engine 71 on water supply assuming that Engine 101 had laid supply line from the intersection of Guilford Road and Woodscape Drive to the dwelling. Engine 51 and Engine 101 failed to establish water supply from an available municipal water source (hydrant) as the first two arriving engines.	**2:09:42**	Command to Engine 71A: "no, you are going to have to bring second water. I believe if, uh, 101 has laid in off of Woodscape, if you can, lay from Guilford into Woodscape and, uh, I'm not even sure what we've got on the remainder of the assignment, but somebody got to get that hydrant on Guilford at the next street up."
		hydrant on Berrywood Court. Confirming you want me to forward lay into the scene or you need me to reverse lay from the scene to Woodberry?"
	2:10:19	Command to Engine 71A: "go ahead and forward lay from Woodberry {Berrywood} in."
		Tower 10A acknowledges: "Tower 10."

Key Events	Time	Incident Radio Communications
	2:10:47	Command to Tower 10A: "I had heard you call Fire Attack but didn't hear them answer you. Do you have a message?"
Engine 51, with their 200 ft hose line and FF Flynn with the 300 ft hose line, redeployed to Side C Lower Level. Engine 51's 200 ft hose line came up short of the Basement entrance.	**2:10:55**	Tower 10A to Command: "Yeah, I was just telling the Lieutenant on 51 to redeploy their line to the basement. We're currently exterior right now, Side Charlie, getting ready to make entry."
		confirming that you are making entry with 51, from that same location, on Charlie Side." Tower 10A acknowledges: "That's correct."
		garage is secured." Command acknowledges: "Tower 10B, you're advising electric is secured?"
		secured in the garage." Command acknowledges: "Electric is secured in the garage."
Incident Command confirmed IRIC was established. Paramedic 56 had separated, with Paramedic 56D alone as IRIC on Side A. Incident Command was not aware the crew separated.	**2:12:01**	Command to Paramedic 56A: "Ambulance 56, Medic 56, confirming your location." Paramedic 56D acknowledges: "56 IRIC, Side Alpha."
		Side Alpha."
		aerial."
Key benchmark: Occupants reported to personnel that everyone was out of the house.	**2:12:41**	"Command to all units, we do have an ALL CLEAR from the occupants, occupied times three, ALL CLEAR of the house. We do have an ALL CLEAR."
		Howard acknowledges: "Truck 7 and Battalion 2, 2:13."

Key Events	Time	Incident Radio Communications
Incident Command assigned Battalion 2 as the Charlie Division Supervisor. However, the Incident Commander did not assign specific units to the Charlie Division.	**2:13:01**	Command to Battalion 2: "Battalion 2, I am going to have you assume Charlie Division when you can get here and get around there."
Charlie Division Supervisor did not confirm what units were assigned to his division.	**2:13:10**	Battalion 2 to Command: "Copy, Battalion 2 taking Charlie Division."
		Howard acknowledges: "105, 02:13."
		squeeze by you we're picking up your plug."
		got 7's line, we've got their hydrant."
Engine 111 did not establish RIC as the	**2:14:12**	Command to Engine 111A: "Commands made it all the way into the fireground?"
		driver, he stopped at Guilford and Woodscape, so we don't have the street blocked off just yet. We have about 600 feet on Guilford right now, if you want me to continue in?"
Engine 51 and Engine 101 did not lay	**2:14:30**	Command to Engine 71A: "Yeah, you're connect to 101's line. 101 laid in off of Woodscape."
		Fire Attack, Engine 51, CAN Report."
FF Flynn enters the Basement level entrance, with the 300 ft hose line from Engine 51.	**2:15:09**	Engine 51B to Engine 51D: "Engine 51 charge the 300 foot line."
	2:15:18	"101 to Command."

Key Events	Time	Incident Radio Communications
		Command acknowledges: "51 go ahead."
Safety Red Flags: 1. Unable to find the fire, smoke in the basement. 2. 25 minutes have elapsed since the 911 call. **Report via StrikeNet determined that the lightning strike occurred at 01:20.**	**2:15:30**	"Fire Attack to Command, go ahead and have somebody positive pressure the front door. We have smoke in the basement and can't find the fire at this time."
	2:15:48	"[Engine] 101 to Command, we have heavy fire on floor number one, on the Charlie Side."
		advising you've got visible fire on floor number one, Charlie Side?"
		Command acknowledges: "can you hit the fire from the exterior?"
FF Flynn was ordered to back out of the Basement by Engine 101A. FF Flynn and Engine 101A abandoned their attack line and pulled a line from E51 to Floor 1 laundry room.	**2:16:17**	Engine 101A to Command: "We need to redeploy our line back up to the initial entrance."
		the initial entrance you're talking the Alpha Side, is that correct?"
Miscommunication between Engine 101A	**2:16:33**	Engine 101A to Command: "Yes, Side Command acknowledges: "No, you mean the initial entrance on Side Charlie?"
		which quadrant you have fire showing from?"
Communication loop between 101A and Command left open.	**2:17:33**	"Tower 10[A] to Command."
Safety Red Flag: Command did not	**2:17:43**	"Tower 10, go ahead."

Key Events	Time	Incident Radio Communications
by Tower 10A is Floor 1. Command was unaware that Engine 51 and Engine 101 were entering above a working basement fire.		Tower 10A acknowledges: "It's going to be quadrant two, 101 and 51, are making entry right now. We have made access to the basement, still have smoke from floor to ceiling, I closed the door back up. Only crews you should have in are on the 1st level entering Side Charlie."
Incident Command instructs Engine 71 and Truck 7 to halt, which prevents them from entering first floor above working basement fire.	**2:18:07**	Command acknowledges Tower 10A: "Very well. Command to 71 and Truck 7, hold do not make that attack."
		"Engine 71's direct as well."
		to assume RIT, Truck 7, I want you to assume RIT. From that position where you're located. You've got 51 and 101, Tower 10, they've entered from the Charlie Side." Truck 7 acknowledges: "Truck 7's ok."
		On-Deck, right there, you're On Deck." Engine 71 acknowledges: "71 copy's On-Deck."
		minute mark."
		"Command's direct, you're at the 15-minute mark, go ahead and give me the Task Force." Howard acknowledges: "direct."
Engine 101B is operating on Bravo 2, an unmonitored talk group, key up not heard on fireground or Howard Communications.	**2:19:45**	Engine 101B (FF Flynn): Open Mic
FF Flynn had fallen through the first floor into a crawlspace, which was used as a storage area, containing active fire	**2:20:11**	Engine 101A: "MAYDAY, MAYDAY, MAYDAY, Flynn's in the basement to the left."

Key Events	Time	Incident Radio Communications
Due to clarity of Engine 101A's MAYDAY transmission, the Incident Commander was unable to ascertain emergency.	**2:20:27**	Command to MAYDAY: "Unit calling the MAYDAY, unit calling the MAYDAY, go ahead."
	2:20:31	Engine 101A to Command: "101 is in the basement now, I believe he's in the basement now."
	2:20:44	"Howard to Command its 101 portable A."
	2:20:47	Command to Engine 101A: "101-A, I've got you on the MAYDAY, Tower 7 RIT, deploy from the Charlie Side, you've got a MAYDAY from 101, all units hold the air, 101 go ahead with your MAYDAY."
Engine 101B was operating on Bravo 2, simultaneous transmission on Bravo 1 prevented radios operating in scan mode from hearing any transmissions outside of Bravo 1 talk group. Communications Center did not hear transmission on Bravo 2.	**2:21:05**	Engine 101A to Command (Bravo 1): "he's in the basement, hose line trying to pull him up, go through the basement." Engine 101B to Command (Bravo 2): Transmits a clear Who, What, Where consistent with MAYDAY training.
Engine 51B reached into the hole and attempted to contact FF Flynn by calling his name.	**2:21:19**	Command to Engine 51 and Tower 10: "Tower 10 and 51, can you advise on 101's MAYDAY, all I hear is the basement."
		fell through the basement."
		"10, Tower 10 to Command, we are trying to find her now."
Incident Commander understands there's a MAYDAY emergency, the nature and extent of the MAYDAY	**2:21:44**	Command to Engine 51A: "very well, 51 you're trying to find her." Command to Engine 101A: "[Engine 101A], basement?"
		alarm and keep them on Bravo 6."

Key Events	Time	Incident Radio Communications
		Howard acknowledges: "Howard's direct."
FF Flynn's SCBA temperature alarm activated.	**2:22:15**	
		you're on RIT with Tower 7."
		redeploying the line around Side Delta, to Side Charlie. I'll team up with Truck 7."
Engine 51A makes physical contact	**2:22:41**	Engine 101A to Command: "Chief, I need with background voice]."
		advise on 51 and 101." Tower 10A acknowledges: "Negative Chief, I'm checking now, give me a minute"
		officer." Command acknowledges: "Tower 10 you've got 101's officer, are you out of the structure?"
		Engine 51's officer."
		message, [Engine 101A] is out." Command acknowledges: "Go ahead Charlie?"
First reference that FF Flynn is the	**2:24:00**	Command to Charlie Division: "Go ahead Charlie Division acknowledges: "We've got 101 Officer is out, we are still looking for Flynn, Firefighter Flynn."
		got 101's officer out, still looking for Flynn, that would be 101 Bravo portable, advise on 51's crew,"

Key Events	Time	Incident Radio Communications
		Command acknowledges: "RIT? RIT, go ahead."
		went through the floor as well or if he is on the first level?"
		the, uh, lost firefighter." Command acknowledges: "Go ahead Charlie."
		through the floor, he is on the hose line, he's down the hose line and could not get pulled back-up. Units are inside, right now, uh, searching for him."
First confirmation by Incident Command that FF Flynn is experiencing the MAYDAY. Incident Commander still believes that initial crews were operating	**2:25:30**	Charlie to Command: "Confirmed he did go down one level and he fell through a fire hole in the floor." Command acknowledges: "So from the a sub-basement level? Is that correct?"
		below the grade level at the front door. The only area, that has exposed at the grade level, is the Delta side, as well as the lower part of the Charlie side."
		you confirm a PAR on 51's crew and Tower 10's crew?" Charlie acknowledges: "[Engine 101A] is, uh? The only person right now that is unaccounted for is Firefighter Flynn off 51."
		and you have 101 Officer, you have her out and we have, we still have contact with 51, [Engine 51 A] and Tower 10, [Tower 10A]?"
FF Flynn SCBA data indicates decrease	**2:26:45**	

Key Events	Time	Incident Radio Communications
	2:26:58	Charlie to Command: "I am talking with Tower 10 right now, we're redeploying them to the lower section and he is PAR."
RIC Team entered basement level	**2:27:17**	Command to Charlie: "OK, when you can, 51A]." Charlie acknowledges: "OK, I have not seen [Engine 51A]."
		located in front of 51, as is [Engine 51B] and [Engine 101A]."
		am direct on that. So, what about the third member of 51's crew?" Engine 51D acknowledges: "We are continuing Chief, [Engine 51C] has not been located, as of yet."
FF Flynn's manual PASS activated.	**2:28:00**	
		have [Engine 51C] right here, at the entrance to the basement. He is with the RIT crew."
		identified [Engine 51C], repeat your unit." Truck 7D acknowledges: "Truck 7 Operator."
Based on the data retrieved from FF Flynn's SCBA, motion stopped on the	**2:28:29**	Command to Truck 7D: "Alright Truck 7 Operator, you've got [Engine 51C], return Truck 7D acknowledges: "Truck 7 Operator to Command, [Engine 51C] been removed from the structure under his own power and is sitting out here on the back deck."
		has came out under his own power and he is sitting on the back deck. Command to [Engine 51C], I want you to return to Engine 51, to your crew."

Key Events	Time	Incident Radio Communications
		direct on that, one priority addition, we have a [Engine 51E] who is unaccounted for. So, we have Flynn and [Engine 51E] still unaccounted for, [Engine 51C] is safe outside."
		[Engine 51B] is with me, [Engine 51C] is unknown at this time. Correction he is now with me, also, be advised, the doorway that we initially went in is about to flash."
		Tower 3's crew, so you should have 71, Truck 7, and Tower 3 back there as resources." Charlie acknowledges: "Charlie to Command, I'm not honestly sure who I got back here. I know I got Tower 10, that's really about it."
		initial was 51, 101, and Tower 10. Then RIT came around, it was Truck 7, 71 and now I'm sending you Tower 3." Charlie acknowledges: "OK."
Engine 51D reports tank water is out which was supporting Flynn's hose line. Water supply from the pool has not been established.	**2:31:33**	Engine 51D to Command: "51 to Command, 51 to Command, be advised, we are at less than a ¼ tank of water- we are out of water."
		water is on the way, 71 Operator?"
	2:31:59	"Command to Charlie Division?" Charlie acknowledges: "Go ahead Command."
		confirm, for me, we have a PAR on 51. Do we have a PAR on Tower 10 and we are still

Key Events	Time	Incident Radio Communications
		missing one firefighter and you've got 71 and Truck 7 deployed?"
		have 71 and Tower 7 deployed, Tower 3 is about to deploy, Tower 10 is out of air and switching out."
		Division, how many lines do you have deployed?"
		Command." Command acknowledges: "Go ahead if urgent."
The Emergency Identifier on Bravo 2 was likely activated by the man down feature. Howard did not report the channel the identifier activated on to Incident Command.	**2:33:12**	Howard to Command: "Getting the emergency identifier 101B portable, should be Flynn."
First attempt at verbal contact by the Incident Commander to FF Flynn. Incident Command is operating on Bravo 1 while FF Flynn is operating on Bravo 2.	**2:33:17**	"Command to Firefighter Flynn, Command to Firefighter Flynn."
realize the emergency identifier was on Talk Group Bravo 2.		to Engine 101B portable Flynn?"
		Charlie acknowledges: "Go ahead."
		PAR on Tower 10 and do you have any status updates?" Charlie acknowledges: "Charlie Division can confirm Tower 10 is PAR."
		direct, Tower 10, 51 are PAR. We still got 71 and Truck 7 deployed and Tower 3 deployed in an effort to find Firefighter Flynn. You are direct we had an emergency identifier on Flynn?"

Key Events	Time	Incident Radio Communications
		also recommend getting a transport unit cot around back, uh, for when we are able to get him out. He's going to probably need medical attention." Command acknowledges: "I'm direct. EMS 1 should have that."
		on the lower side and not up by 51. Come around the Delta side." Command acknowledges: "I've got 105's crew and EMS 1 coming down the Delta side now."
		Operator, charge the hydraulic pump." Engine 51D acknowledges: "We're direct."
		currently getting the Air Unit and the MAB and headed that way. Also, can you confirm that [Engine 51E] was located?"
		[Engine 51E] was accounted for by Engine 51." Howard acknowledges: "I'm direct."
		Command acknowledges: "51 go ahead."
Engine 51D establishes a water source	**2:37:35**	Engine 51D to Command: "Hydraulic pump source." Command acknowledges: "51 has water."
		reentering. So, I've got Tower 10 and Tower 3 inside working on in the basement." Command acknowledges: "You've got Tower 10 and Tower 3 in the basement; do they have a line with them?"

Key Events	Time	Incident Radio Communications
	2:38:17	Charlie to Command: "That is correct." Command acknowledges: "and what is the status of Truck 7 and 71, original RIT?"
		you were still looking for?" Command acknowledges: "The original RIT was Truck 7 and Engine 71."
		from 7, both Truck and Engine, are on the handline. Tower 10 is in the area as well as, uh, Tower 3 is in the area, in the search process."
		"Squad 6, is that you I see on the scene?" Engine 61 acknowledges: "61, three of us down here. One's getting dressed coming down to meet us. We are on the Alpha side, on deck."
Estimated time RIC located and began extricating FF Flynn based on data retrieved from FF Flynn's SCBA motion	**2:39:39**	Command to Engine 61: "Alright Squad 6. Form up with 91, and 22 and you're going to go to the rear. Squad 6, you're going to Squad 6, you are now assuming RIT number two." Engine 61 acknowledges: "ok, that's 61, 91, and 22. We are going to be the second RIT."
		22 have just gone down Delta side, in front of you. Those three companies you're going to have as RIT number two. 22 and 91 are you direct on that?"
	2:40:33	Engine 91A to Command: "91 is direct."
		Command acknowledges: "Go ahead RIT. Go ahead RIT, [Truck 7A], go ahead for Command?"
		Command, I've got 22 entering now."

Key Events	Time	Incident Radio Communications
	2:41:39	Command acknowledges: "Charlie Division, Engine 22, Engine 91, and 61 were coming to you all as part of RIT number two, RIT number two, those three units. Command to RIT, [Truck 7A]?"
		Command acknowledges: "Go ahead RIT."
		Flynn. Need EMS to the Charlie side basement door." Command acknowledges: "Alright RIT, you have Firefighter Flynn and you're on the Charlie side basement door. EMS 1 are you direct? Division Charlie are you direct?"
		me the evacuation tone. Charlie Division, I want all units pulled out, with Flynn found, all units pulled out and give me a PAR as soon as you can."
		"Howard to all units, evacuate the scene. Authority of Command 02:43."
		PAR." Command acknowledges: "Tower 10 out and PAR."
twenty-two minutes and eleven seconds (22:11) after MAYDAY initially declared. RIC located and extricated FF Flynn fifteen-minutes and five seconds (15:05) after entry.		building." Command acknowledges: "Charlie I'm direct, Flynn is out of the building, and we are evacuating, and I need PAR's on everything that went in."
		"All units on the fireground, units are PAR, we are going to commit to a Defensive Strategy, Defensive Strategy."

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III. Findings, Discussions, and Recommendations

The Internal Safety Review Board (ISRB) was established on July 23, 2018 following the fire incident at 7005 Woodscape Drive, Clarksville, Maryland, which resulted in the death of Fire Fighter Nathan Flynn (FF Flynn). The ISRB was tasked with gathering all relevant facts and identifying factors that contributed to FF Flynn's death, and recommending changes to the Fire Chief that the Howard County Department of Fire and Rescue Services (HCDFRS) can make to help prevent another tragedy of this type.

The following findings and recommendations are organized into fourteen (14) broad areas. These range from unique factors of the structure at 7005 Woodscape Drive to Incident Command to training. Each of the sections that follow detail one of the 14 areas of findings and recommendations. Most of these sections adhere to the following format: first, information about the area in general; second, HCDFRS-specific information about the area; third, incident-specific information (related to incident at 7005 Woodscape Drive) about the area; finally, the ISRB's findings and recommendations for that area.

Over the course of the investigation, the ISRB discovered widespread inconsistencies among current HCDFRS General Orders. **ISRB recommends HCDFRS review and revise all General Orders for consistency.**

The ISRB, through the informal interviews conducted by the ISRB for this investigation as well as discussions among HCDFRS personnel, also identified a widespread belief that department leaders are not promoted or assigned based on merit or experience. Whether this belief is true or not, it has a negative effect on unit cohesion and trust in leadership. This lack of trust with department leadership has been exacerbated by previous decisions to not widely publish previous safety reports, which has led to rampant conjecture and rumors. During this incident, this belief and lack of trust between officers and firefighters likely had a deleterious effect on tactical decision making, impacting overall safety on the fireground. Moving forward, HCDFRS must take steps to regain trust between firefighters and leadership.

As a foundation for rebuilding this trust, the ISRB strongly recommends that Howard County have an independent organizational review of the HCDFRS to make recommendations on improving overall department structure, policies, and procedures. Ideally, the team conducting the department review will have no personal or professional connections to HCDFRS personnel and will include a trained Organizational/Industrial Psychologist to make specific recommendations for improving trust between firefighters and leadership.

A. Incident Command

General Background: Incident Command

Incident Command System (ICS), "is a management system designed to enable effective and efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, designed to enable effective and efficient domestic incident management."[7] The ICS structure facilitates incident response through five major functional areas: command, operations, planning, logistics, and finance and administration.

Command, under ICS, is established clearly at the beginning of an incident with the ability to transfer command throughout the course of an incident. The Incident Commander determines response strategy and establishes a clear chain of command, or orderly line of authority within the incident management organization. Operations includes the specific tactics used to carry out the Incident Commander's declared strategy. Planning includes the forward-thinking efforts needed to manage an incident, such as developing Incident Action Plans for the upcoming operational period and situation reports of what occurred through the previous period. Logistics pertains to the process of moving resources from one area to where they are needed, such as identifying food and water vendors or resources and establishing a rehabilitation area with food and water. Lastly, the finance and administration section covers items such as procurement and oversight of employee time and incident cost.

ICS has been used, to varying degrees, by first responders since the 1970s. Developed largely by California firefighters after the 1970 fire season, which severely taxed response agencies in Southern California, ICS was intended as a, "system which would provide uniform terminology, procedures, and incident organization structure required to ensure effective coordinated action when two or more agencies are involved in a combined effort."[8]

Over subsequent decades, fire departments and other response agencies implemented ICS into their day to day practices. In 2004, the United States Department of Homeland Security established the National Incident Management System (NIMS), which incorporated ICS and officially made it the national standard for organizing incident response.[9]

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[7] Incident Command System, U.S. FIRE ADMIN., https://apps.usfa.fema.gov/thesaurus/main/termDetail?id=1304&letter=I (last visited Nov. 12, 2018).
[8] History of ICS, EMERGENCY MGMT. SERV. INT'L (EMSI), http://www.emsics.com/history-of-ics/ (last visited Nov. 12, 2018).
[9] Jessica Jensen & Steven Thompson, The Incident Command System: A Literature Review, 40 DISASTERS 158-182 (2016).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Incident Command

The Howard County Department of Fire and Rescue Services officially adopted the Incident Command System in 2005 through General Order 300.07: Incident Command System.[10] This order defines a number of critical terms, such as Personnel Accountability Report (PAR), the Hazard Zone, Follow-Up (Basement) report, and MAYDAY. Additionally, it establishes three distinct Modes of Command: Investigation, Tactical, and Strategic.

Investigation Command Mode occurs on initial arrival at an incident, when Command is on scene and determining the exact nature of the incident and level of response required. The Incident Commander operating in this mode conducts a "Size-Up" report to others arriving on scene. Tactical Command Mode is an early command posture that precedes the Strategic Command Mode if there is no chief or command level officer on scene. In Tactical Command Mode, the Incident Commander is "typically a company officer that is performing all the responsibilities of Command while on-foot and from within the tactical environment."[11] While Tactical Command Mode operates near the Hazard Zone, they are not committed within an IDLH or area with conditions that could rapidly deteriorate. Strategic Command Mode occurs when there is a chief or command level officer established as Incident Commander outside of the tactical environment and within an atmosphere conducive to managing the functions of Command.

Beyond General Order 300.07: Incident Command System that provides a broad overview of ICS within HCDFRS, HCDFRS General Order 310.01: Single Family and Townhome Structure Fire Operational Guidelines provides more specific ICS guidance for residential fire incidents. Under General Order 310.01: Single Family and Townhome Structure Fire Operational Guidelines the first arriving officer on scene will operate in Investigation Command Mode. In this posture, the first officer on scene will assess the situation and transmit an Initial Radio Report. The Initial Radio Report communicates the IC's assessment of the scene, determination of overall strategy, and clearly establishes Command. General Order 300.07: Incident Command System details specific items that must be included in the Initial Radio Report are:

- Unit identification and arrival to the scene
- A description of the structure and area
- A description of the problem, including location, conditions, apparent life-safety concerns, and special circumstances
- Initial incident action plan taken by the first arriving unit
- Declaration of strategy for the incident (i.e. units operating in offensive strategy)
- Clearly naming the command and command mode
- Determination of resource need, considering escalation of alarms

[10] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.07 INCIDENT COMMAND SYSTEM (2013).
[11] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.07 INCIDENT COMMAND SYSTEM (2013).

- Continuation with Incident Action Plan work assignments for arriving units
- At the point of assuming command, the first arriving officer becomes the Incident Commander in Tactical Command Mode and remains Incident Commander until the arrival of Command rank officers, such as Battalion Chief 1. When a Command officer arrives, the initial Incident Commander will typically transition Command to the Command officer. With a Command officer in charge the Incident Commander Command Mode shifts to Strategic Command Mode.

Woodscape Drive Incident Overview: Incident Command

The first unit on the scene of 7005 Woodscape Drive was Engine 51, with Engine 51A assuming the role of Incident Commander as the first arriving officer. Engine 51A assessed the situation and transmitted the Initial Radio Report at 02:00:29 stating, "51 to Howard single family two story, smoke showing, go ahead and start a box." As the Incident Commander, Engine 51A then directed Tower 10 to the front of the structure and started a full box alarm.

While in transit to the incident scene, Battalion Chief 1 directed Engine 51 to reposition to the rear of the property to see if they were able to use the swimming pool as a water supply. Engine 51 repositioned to the upper level of Side C, deploying a 200-foot line. Engine 51 advised Command of their position on Side C and that the homeowner advised of heavy smoke in the basement. At that time, Engine 51 entered the structure on Side C on the upper level, but did not relay their location, actions, observed conditions, and subsequent withdrawal to Battalion Chief 1.

Battalion Chief 1 arrived on the fireground and radioed that he was assuming Command and committing to an offensive strategy at 02:03:55. The Incident Commander then directed Engine 51 and Tower 10 to commit to Fire Attack and advised Engine 51A on the status of the water supply. The Incident Commander also requested a visible report from Side C from the basement as soon as possible. At that point, the Battalion Aide began a 360-degree assessment of the incident scene in order to report to the Incident Commander.

Reporting back to the Incident Commander, the Battalion Aide stated that the structure had two stories on Side C with a glass slider for access to the finished basement. The Battalion Aide also stated that there was smoke visible in the basement. At 02:07:06, Tower 10D advised the Incident Commander that there was smoke at the ground level at Side A. At approximately the same time, Engine 51's crew were a few feet inside the laundry room door when Engine 51E and Engine 51B saw indications of a basement fire on their thermal imaging cameras. After that observation, Engine 51 withdrew from the upper level of Side C to redeploy to the lower level of Side C. Although the information from the TICs was relayed to the Fire Attack Group Supervisor, it was not relayed to the Incident Commander. Rather, the Fire Attack Group Supervisor radioed Command stating that they needed to re-examine access through the basement slider. Engine 51B then redeployed the 200-foot line to the lower level of Side C, quickly finding that it was not long enough. At that point, Engine 101 was also on scene and assisting Engine 51. FF Flynn helped deploy a 300-foot line to the lower level of Side C.

At 02:09:27 Engine 71A radioed Command of their impending arrival to see if they were needed on scene or to acquire a secondary water supply. Command instructed Engine 71A to bring secondary water from a neighboring street. At 02:12:41 hours Command notified all units that all three occupants of the home had evacuated the structure, there was no change in operational posture from Command at that time. At 02:15:30 hours Engine 51 and Tower 10 advise that they are unable to find the fire. Shortly thereafter, Engine 101A relayed to Command that they saw fire on the first level of Side C. In response to Engine 101A, the Incident Commander asked

whether it was possible to "hit the fire from the exterior." Engine 101A replied that they needed to redeploy their line back to the initial entrance, referring to the upper level of Side C although that was not clear to the IC.

During the communication between Engine 101A and Command there was uncertainty as to Engine 101's position, with the Incident Commander asking for Engine 101A to confirm their location at 2:17:16. Tower 10 responded to Command's clarification request, stating that Engine 101 and Engine 51 were making entry in Quadrant 2 with crews having made access to the basement, experiencing smoke conditions, and closing the basement door to restrict airflow. Tower 10 advised that the only crews present should have been on the first level of Side C. At 2:18:24 hours the Incident Commander directed Truck 7 to assume RIC duty and that they have Engine 51, 101 and Tower 10 making entrance on Side C.

At 2:20:47 Engine 101A declared MAYDAY, although it was unclear to Command whether it was Engine 101A or Engine 101B in MAYDAY. After clarifying with the Communications Center and Engine 51A, the Incident Commander determined that FF Flynn was in MAYDAY and was deploying the RIC.

Findings and Recommendations: Incident Command

After holistically assessing Incident Command during this incident, the ISRB determined that the Incident Commander acted in a reasonable and prudent fashion. However, the ISRB did identify several systemic failings of HCDFRS's implementation of ICS that contributed to, but did not cause, FF Flynn's Line of Duty Death.

First, HCDFRS does not have a clear and consistent command philosophy. General Order 300.07 Incident Command describes three modes of command (Investigation, Tactical, and Strategic) without establishing a clear command philosophy. Investigation Command, functionally describes sensemaking of a potential incident scene with a notional decision maker on site. It does not provide any clear philosophy of either order-based or mission-based tactics, presumably allowing the Investigation Incident Commander to use their personal command philosophy. Tactical Command Mode and Strategic Command Mode both require the Incident Commander to establish the overall incident strategy, establish objectives, evaluate the need for additional resources, as well as direct and assign responding resources upon arrival. These requirements blend both command philosophies, having the Incident Commander establish the strategy and objectives (mission-based) as well as directly manage assets and resources (order-based). The notable difference between Tactical Command and Strategic Command is the location of the commander (within the Hazard Zone or outside the Hazard Zone), which changes the environment of the Incident Commander but provides no guidance on command philosophy for the department.

Second, under General Order 300.07 Incident Command System the first arriving officer is the Incident Commander, however that officer may elect to pass command to a command officer or chief if that command officer is arriving nearly simultaneously. The ISRB finds this practice flawed because it requires the arriving officer to be aware of not only their crew, their actions, and the scenario they face, but to also be aware of other units. During this incident, there was approximately a 3.5-minute delay between Engine 51A and Battalion Chief 1 arriving on the scene. Despite the delay, Engine 51A neither formally established command nor affirmatively passed command. Although Engine 51A's failure to establish command likely did not impact this incident, the ISRB recommends that General Order 300.07 Incident Command System be revised to state clearly that the first arriving officer on the scene is the Incident Commander until they are relieved by a Command Officer.

Third, the current practice of officers operating without direct knowledge of the hazard zone is insufficient. As demonstrated by this incident, the current application of ICS by HCDFRS places structures around Command that separate the Incident Commander from the hazard zone. For example, Battalion Chief 1 arrived on scene and assumed command in accordance with General Order 300.07 Incident Command System without completing a 360-degree survey of the incident or having a transition briefing from the first arriving officer. In this instance, the Incident Commander relied on an aide to take pictures and relay information back personally without completing a 360-degree survey of the incident scene. Had the Incident Commander completed their own 360-degree survey of the incident scene, they may have created a stronger mental

model to understand the location of the crews within the structure, particularly in regards to the different points of entry on Side C.

Fourth, the current practice of announcing the incident strategy during the Initial Radio Report is flawed. By declaring an offensive strategy on immediate arrival, before the commander can make sense of the situation, makes it more difficult for the Incident Commander or other firefighters to assess what strategy best fits any particular incident.

Fifth, there are multiple areas where General Order 300.07 Incident Command System and the General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, when read together, do not run parallel and could confuse the reader. There are multiple areas where a lack of clarity will hamper accountability and the presence of confusion is detrimental to operational consistency.

Sixth, General Order 300.07 Incident Command System does not align with the NFPA 1561 Standard on Emergency Services Incident Management System and Command Safety guidelines for effective command. Under NFPA 1561 guidance, "[s]upervisory personnel shall work toward assigned objectives, within the overall strategy defined by the incident commander." (NFPA 1561 5.8.3.1). Additionally, "[t]he incident commander shall develop the incident objectives from the situational assessment and form applicable strategy and tactics..." (NFPA 1561 8.9.1.3). Under General Order 300.07 Incident Command System, however, the Incident Commander establishes and communicates a general strategy (offensive/defensive) instead of stating the objectives for the incident. For example, when Battalion Chief 1 established command he announced an offensive strategy and in so doing decided, with very little information, on how close personnel were going to get to the structure. However, based on what appears to be common practice, there was a disconnect between what he intended by that statement and what was in writing in the General Order.

Based on a totality of available evidence, it is reasonable to assume that Battalion Chief 1 meant that operations were going to be centered around making an interior attack on the fire. This can be supported by General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, which defines offensive and defensive differently in the Risk Management Plan,

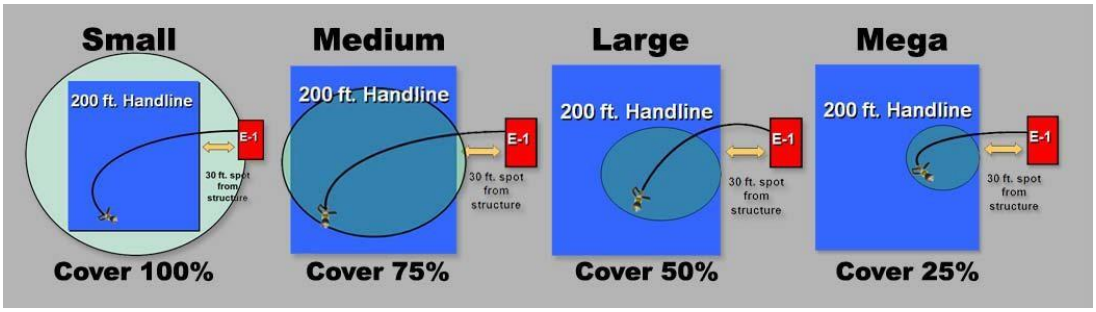
> "If there is a possibility that there are savable lives inside a structure, and it is reasonably safe to conduct offensive interior firefighting, the offensive strategy is appropriate. If fire conditions indicate that the interior of the structure is not survivable or that interior firefighting would not be reasonably safe, interior firefighting is not an option, and the defensive strategy is required."

This is a very different thought process than the one embedded in the same General Order. In this case the implication is that offensive operations are synonymous with interior firefighting. However, the definition found in the risk management section ties savable lives AND reasonable safety together such that both are required to support interior firefighting.

While the intent of the policy and the delineation of the strategies can be inferred by a reasonable person, the lack of clarity hampers accountability. Relying on a binary approach to strategy (inside/outside the hazard zone) denies the inherent complexity and variability on the fireground. The fireground is not static. Strategy is the general approach taken to meet objectives and as such complex operations are almost always in a state of transition. Reducing strategy to two choices and tying those choices to proximity unnecessarily restricts the tactical options available to the Incident Commander.

Seventh, the Battalion Aide performed tasks outside of the Command Post which may have impacted Command's understanding of the incident. According General Order 300.07 Incident Command System the command aide should not be assigned to task level assignments during emergency incidents. The paramount goal of this resource is to increase the effectiveness of Command. At this fire, however, the Battalion Chief 1 aide performed multiple tasks outside the command post, including a size-up, looking for the homeowner to get keys for the basement door, and assisting with the deployment of the hydraulic line from Engine 51. According to the definition, he operated outside of his designed role.

Eighth, although the intent of General Order 300.07 Incident Command Systems description of structure sizes is "to minimize ambiguity" it is not effective in practice. General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines advises to describe the size of structures using relative sizes of Small, Medium, Large, and Mega, based on the ability of a 200-foot hose line being able to reach 100%, 75%, 50%, and 25% of a structure, respectively, if the engine is parked thirty (30) feet from the structure. This sizing convention is depicted below:



Establishing the size of a structure under HCDFRS General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines is based on a square structure. This process does not provide any information to the incoming units as to the length or width of the structure that would allow the officer to plan for which hose line would need to be pulled to access various areas of the structure. Nor does the process provide information that would allow the officer to plan for optimum positioning of their apparatus in order to reach their intended or designated target with their provided hose lines. For example, if the assignment is to pull a hose to enter through Side C of the structure, there is no reference to the distance around the structure to get to the Side C entrance. However, if the structure description included the

approximate size (i.e. 70-feet x 40-feet), the incoming officer would be able to estimate which hoses would be necessary to reach the rear of the structure based on their parked position on the scene.

To illustrate, with the above-mentioned dimensions, if the engine parks on the street 50-feet out from the A/B corner and needs to enter the center Side C door with enough hose to access either end of the basement, the officer can quickly determine that this can be accomplished with a 200-foot line. Conversely, if they were parked at the A/D corner and the entrance is on the B/C corner of Side C, they would need a 300-foot line. These factors are important, as they affect positioning to assure the available hoses can reach the intended target or task without excess hose being deployed which can lead to kinks that reduce flow, or a hose that is too short to reach the fire.

Ninth, the Incident Commander did not have a full orientation to the incident. This is demonstrated in his Command Chart, a shorthand visualization of the incident, which did not clearly indicate the elevation change. He was not aware of the front to back elevation change on Side C, which was not articulated clearly from units on the scene. While the intent of vehicle-based command is understood, there are times when it is more important for the Incident Commander to have a good orientation to the scene than for the Incident Commander to remain stationary. In this case, where it was clear that the Incident Commander had on-going uncertainty about the size and scope of the incident, it is likely that had he conducted a 360-degree check of his own that check would have resolved outstanding questions.

The ISRB understands that a consensus exists that would discourage Incident Commanders from leaving the command post. However, effective orientation is more critical to incident outcomes than maintaining a stationary command post. When the Incident Commander leaves the Command Post they must understand that they are operating at a deficit and that making such a move increases the risk of missing critical transmissions. Whenever an Incident Commander chooses to leave the command post they should announce that fact to the fireground and should whenever possible leave someone stationary at the Command Post to monitor radio traffic.

Tenth, the use of the term Fire Attack implies that the supervisor of that group is responsible for all Fire Attack regardless of where it is occurring. Given the size and complexity of the structure at 7005 Woodscape Drive, the Fire Attack group made a single person responsible for three levels and more than 8,000 square feet—at least 2.5 times the size of a typical single-family homes as defined by NFPA. Practically, Incident Command dividing the structure into divisions and assigning leaders to each division would have made the Fire Attack function more manageable, as appropriate resources arrived. This would also have enhanced crew accountability.

Eleventh, the Incident Commander's attention was diverted from providing tactical RIC orders to companies in close proximity to the MAYDAY by conducting a PAR check. While the PAR is important, it was more important to ensure that rescue operations were underway. Once the

MAYDAY was sounded the RIC was dispatched to assist and knowing how many people were trapped would not have altered their approach and given that there were no other resources immediately available on the fireground to assist, Command could not have augmented the staffing of the RIC even if he wanted to, because there was no one else to send.

Lastly, but critically, the Incident Commander maintained a calm demeanor during the RIC operation, which likely contributed to the overall success of the RIC operation. A major and repeated issue in other fire department line of duty deaths is the failure of the Incident Commander to maintain a calm demeanor. The Incident Commander in this instance did an exceptional job in maintaining composure throughout the MAYDAY.

Findings	**Recommendations**
A.1 The current HCDFRS policy permitting the first arriving unit officer to forgo establishing command when, "A chief, command officer, or other company officer is arriving nearly simultaneously and takes Command" is flawed. The first arriving unit must assume command regardless of circumstance, so that there is always clear command and control of the scene. The formal announcement of command does not add anything to the exercise of the command.	A.1.1 HCDFRS General Order 300.07: Incident Command System and General Order 310.01: *Single Family and Townhouse Structure Fire Operational Guidelines* should be amended to clearly establish the first arriving unit officer as the Incident Commander, eliminating the circumstances when Command may be passed. Instead, the unit officer as Incident Commander may transition to a Command level staff once the Command officer reaches the incident scene
A.2 Declaring an offensive or defensive strategy during the initial radio report is insufficient since it does not allow the Incident Commander to gain a firm sense of the incident before declaring a strategy.	A.2.1 The Initial Radio Report protocol should be amended, removing the requirement that the Incident Commander declare an offensive or defensive strategy. Instead the strategy should be announced after the Incident Commander gains sufficient information from the scene (e.g. the 360-degree assessment completed) to establish a strategy.
A.3 The Incident Commander did not have a strong mental model of the incident, likely because of current HCDFRS practice of Incident Commanders relying on aides to complete a 360-degree assessment of	A.3.1 The Incident Commander should complete their own 360-degree assessment of the incident to establish their mental model.

Findings	Recommendations
the incident instead of conducting it themselves.	
A.4 The Incident Commander maintained a calm demeanor during the MAYDAY.	No Recommendation

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B. Strategy and Tactics

General Background: Strategy and Tactics

Managing an emergency incident effectively requires an Incident Commander to have a sense of the size and scope of an incident, the capabilities of personnel on scene, and resources available. Additionally, the Incident Commander must determine an overall strategy for addressing the incident and communicate the strategy to other crews on the scene. An incident strategy includes a goal, or set of goals, for managing the incident hazard.[12] Often, these goals are articulated in an Incident Action Plan (IAP) and used to frame operational tactics. While strategy outlines the broad goals for managing an incident, tactics refer to how resources are used to accomplish those goals. In the context of firefighting, tactics are actions such as managing ventilation within a structure with active fire.

Borrowing from military doctrine, there are two philosophies for Incident Command to convey strategy and tactics. These philosophies can be expressed by the German terms Befehlstaktik (command-driven tactics) and Auftragstaktik (mission-based tactics).[13] Befehlstaktik is a centralized command and control structure in which the command chain prescribes why, when, and how operations will be conducted. For example, the Blue Card Hazard Zone Management System employs a command and control structure. Under this system, tactical and operational decisions flow through the Incident Commander down to personnel on the fireground.

Auftragstaktik is less regimented, with the Incident Commander providing instruction on the "why" and "when" of operations but delegates "how" operations are executed to lower level leaders. This command philosophy is often employed by the United States Marine Corps, with commanders providing their crew a mission but trusting those crews to determine the best tactics to complete their assigned mission. In the fire service, an example of Auftragstaktik philosophy would be an Incident Commander assigning a crew to "Fire Attack," with the "why" being an assignment to extinguish the fire and the "when" being the time of assignment. The supervisor for Fire Attack would then have the authority to determine the best operation and tactics to extinguish the fire with the crews they have. This philosophy of command is supported by organizational Standard Operating Procedures or General Orders.

Response organizations must establish a clear and consistent command philosophy so that personnel know what to expect during response operations. This philosophy should be present throughout organizational planning, training and operations. Consistent organizational command philosophy supplies lower level personnel a commander's intent when given orders, enabling them to effectively follow command without foreknowledge of an individual commander.

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[12] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY 1561 (2014).

[13] Geoffrey Sloan, Military Doctrine, Command Philosophy and the Generation of Fighting Power: Genesis and Theory, 88 INT'L AFF. 243-263 (2012).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Strategy and Tactics

HCDFRS General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines outlines the responsibilities an Incident Commander and company officers have during fire incidents involving Single Family and Townhouse structures. Portions of this order relevant to this incident include, the two strategies HCDFRS uses in approaching a residential structure fire: offensive and defensive. Additionally, this order assigns the first arriving engine company the responsibility to establish a water supply plan. Under this order, the first arriving engine company is to, "[m]ake provisions for water supply by laying supply line and communicating the address of the layout, or split lay…." The second arriving engine is, "to ensure the water supply for the first arriving engine company," unless ordered otherwise.

Another order pertinent to this incident is HCDFRS General Order 300.07 Incident Command System, which outlines HCDFRS' adoption of the National Incident Management System (NIMS) as outlined by the United States Fire Administration/National Fire Academy Field Operations Guide. This General Order describes three Command Modes in HCDFRS: Investigation, Tactical, and Strategic. Investigation Command may be established when the first arriving officer cannot identify a Hazard Zone and has the Incident Commander on-foot to investigate the potential hazard. It is in this mode that the Incident Commander is to transmit a Size-Up Report. Tactical Command Mode requires the Incident Commander to establish the overall incident strategy, establish objectives, evaluate the need for additional resources, as well as direct and assign responding resources upon arrival while the Incident Commander is operating on-foot and from within the tactical environment. Strategic Command Mode requires the Incident Commander to establish the overall incident strategy, establish objectives, evaluate the need for additional resources, as well as direct and assign responding resources upon arrival while the Incident Commander is operating from a command post outside of the tactical environment.

Woodscape Drive Incident Overview: Strategy and Tactics

The first unit on the scene of 7005 Woodscape Drive was Engine 51, with Engine 51A assuming the role of Incident Commander as the first arriving officer. Engine 51 did not make provisions for water supply or communicate a water supply plan en route or on arrival. Engine 51A assessed the situation and transmitted the Initial Radio Report at 02:00:29 hours, stating, "51 to Howard single family two story, smoke showing, go ahead and start a box." As the Incident Commander, Engine 51A then directed Tower 10 to the front of the structure and started a full box alarm.

Battalion Chief 1, piloting a newer version of the map on his MDT than was on Engine 51's MDT, identified a pool at the rear of the property. While in transit, Battalion Chief 1 directed Engine 51 to reposition to the rear of the property to see if they were able to use the swimming pool as a water supply because there were no hydrants on Woodscape Drive. The second arriving engine, Engine 101, did not ensure the water supply of Engine 51. Engine 101D, understanding there was a hydrant on Guilford Road, repositioned Engine 101 with the intention to reverse lay from Engine 51 toward the hydrant.

Engine 51 repositioned to the upper level of Side C, deploying a $1^{3/4}$ -inch diameter, 200-foot line. Engine 51 advised Command of their position on Side C and that the homeowner advised of heavy smoke in the basement. At that time, Engine 51 entered the structure on Side C on the upper level but did not relay the conditions to Battalion Chief 1.

Battalion Chief 1 arrived on the fireground and radioed that he was assuming Command and committing to an offensive strategy at 02:03:55. The Incident Commander then assigned Engine 51 and Tower 10 to the Fire Attack Group with Engine 51A as the Fire Attack Group Supervisor. The Incident Commander then inquired about the status of the water supply from the pool. The Incident Commander also requested a "visible report" from Side C from the basement as soon as possible. At that point, the Battalion Aide began a 360-degree assessment of the incident scene in order to report to the Incident Commander. Reporting back to the Incident Commander, the Battalion Aide stated that the structure had two stories



Figure 17: Photograph or Floor 1 entrance 21 minutes after MAYDAY

on Side C with a glass slider for access to the finished basement. The Battalion Aide also stated that there was smoke visible. At 02:07:06, Tower 10D advised the Incident Commander that there was smoke at the ground level at Side A. At approximately the same time, Engine 51B was inside the structure and saw indications of a basement fire on his thermal imaging camera, although they did not relay their findings to the Incident Commander. After that observation, Engine 51 and Tower 10's crews exited the upper level of Side C to redeploy to the lower level of Side C. In doing so, Engine 51A radioed Command stating that they needed to re-examine access through the basement slider. Engine 51B then redeployed the 200-foot line to the lower level of Side C, quickly finding that it was not long enough. At the same time FF Flynn (Engine 101B) deployed a $1^{3/4}$ -inch 300-foot line to the lower level of Side C, making entry with Tower 10A and Tower 10B approximately four (4) feet into the basement.

At 02:09:27 Engine 71A radioed Command of their impending arrival to see if they were needed on scene or to acquire a secondary water supply. Command instructed Engine 71A to bring secondary water from a neighboring street. At 02:12:41 hours Command notified all units that all three occupants had exited the structure, there was no change in operational posture from Command at that time.

At 02:15:30 Engine 51 and Tower 10 advised that they were unable to find the fire. Engine 101A relayed to Command "we have heavy fire on floor number one, Side Charlie" at 02:15:48 hours. In response to Engine 101A, the Incident Commander asked whether it was possible to "hit the fire from the exterior." Engine 101A replied "we need to redeploy our lines back up to the initial entrance," referring to the upper level of Side C although that was not clear to the Incident Commander.



Figure 18: Photograph of hydraulic pump supplying Engine 51

During the communication between Engine 101A and Command there was uncertainty as to Engine 101's position, with the Incident Commander asking for Engine 101A to confirm their location at 02:17:16. Tower 10A responded to Command's clarification request, stating that Engine 101 and Engine 51 were making entry in Quadrant 2 with crews having made access to the basement, experiencing smoke conditions, and closing the basement door to restrict airflow. Tower 10A advised that the, "only crews you should have in are on first level, entering Side Charlie." At 02:18:29 the Incident Commander directed Truck 7 to assume RIC duty and that they have Engine 51, Engine 101 and Tower 10 entered on Side C.

At 02:20:11 Engine 101A declared MAYDAY, although it was unclear to Command whether it was Engine 101A or Engine 101B experiencing a MAYDAY emergency. After clarifying with the Communications Center and Engine 51A, the Incident Commander determined that FF Flynn was experiencing a MAYDAY emergency at 02:24:16.



Figure 19 Aerial view of 7005 Woodscape Drive with the location of apparatus

Findings and Recommendations: Strategy and Tactics

The most critical decision during the 7005 Woodscape Drive incident that contributed to FF Flynn's death was the tactical choice for crews to enter a structure above a fire. A confluence of factors lead to this tactical error, which are explored in this section. While the ISRB analyzes the shortcomings of the strategies and tactics employed during this incident, the goal of this assessment is to improve future HCDFRS operations and not to assign blame or responsibility.

First, it is difficult for an Incident Commander to convey strategies and tactics of an incident clearly without a clear philosophy of command. The standards required for establishing strategy and tactics under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines blend command philosophies, possibly contributing to the confusion between Incident Command and crews operating within the Hazard Zone. For example, the Incident Commander (Battalion Chief 1) employed a Befehlstaktik (command-driven tactics) philosophy while establishing water supply because he provided explicit tactical direction in using the residential pool as a water source and ordering Engine 71 to not commence in Fire Attack on Side A. However, the Incident Commander employed the Auftragstatik philosophy (mission-based tactics) when he assigned Engine 51 and Tower 10 to the Fire Attack group with Engine 51A as the Fire Attack Group Supervisor. In this instance, the Fire Attack Group was given a broad mission (find and extinguish the fire) without explicit tactical instruction from the Incident Commander on how to do so. This blending of command philosophies leads to uncertainty among crews, making it unclear what tactical choices are to be made by the Incident Commander and which choices crews are empowered to make themselves. Additionally, this blended philosophy makes it more difficult for all personnel to understand the implications of the tactical choices they do make. Clearly choosing a command philosophy and integrating that philosophy into HCDFRS General Orders and training will enhance HCDFRS' ability to develop effective strategies and tactics to manage an incident.

In considering which philosophy HCDFRS should employ, the ISRB noted that the command-based philosophy creates an information bottleneck and delays tactical decision making during operations. This is because the Incident Commander only has the bandwidth to communicate one decision at a time, meaning that all operational decisions must be made sequentially rather than allowing for multiple decisions and tactics to be deployed at the same time. This was shown during this incident where the Incident Commander's decision making was diverted to establishing water supply, delaying his ability to provide tactical direction to the Fire Attack Group Supervisor.

The ISRB recommends that HCDFRS adopt a mission-based philosophy throughout the department. By adopting a mission-based philosophy, HCDFRS officers should ground their directions to their crews on the Incident Commander's intent, clearly communicate that intent when needed, all while empowering unit officers to make prudent, tactical decisions to accomplish their assigned missions. To be effective, HCDFRS must improve the trust between crews, their officers, and Incident Commander. HCDFRS must also facilitate the creation of cohesive teams that are able to work together with a shared understanding of the parameters of

their given mission and exercise disciplined initiative. In adopting this philosophy, HCDFRS training should prepare personnel for a process for identifying risk on the fireground and accepting prudent risks in order to accomplish their mission.

Second, group supervisors and unit officers failed to give proper direction and orders on the fireground. This was true regardless of the command philosophy employed during the incident. For example, Engine 101A transmitted to Incident Command that "we are two-out, Side Charlie" and functioned as a back up to Engine 51. Notably, the Incident Commander never explicitly assigned Engine 101 to the Fire Attack Group but provided commands to Engine 101 as if they were part of the Fire Attack Group. As part of the Fire Attack Group, the Fire Attack Group Supervisor (Engine 51A) did not provide clear direction to the group and Engine 101A did not request redeployment of the line through the Fire Attack Group Supervisor. Rather Engine 101A announced the redeployment of the line directly to the Incident Commander.

Additionally, when Engine 111A ordered Engine 111B to "find something to do" on the fireground while Engine 111A remained at the hydrant with Engine 111D (an action detailed further in Section H. Crew Integrity of this report) the order lacked either a mission under the Aftragstatik philosophy or a clear order under Befehlstaktik (command-driven) philosophy.

Third, although the Incident Commander established a strategy for the incident according to HCDFRS policy, the strategy for the incident was announced before the Incident Commander established a clear mental model of the incident. The declared strategy set the tone for the overall incident, before they were able to absorb and orient themselves to the unique factors of the structure at 7005 Woodscape Drive. The declared strategy of this incident was an offensive posture (entering the building). The ISRB believes that it was in the Incident Commander's mental model that this strategy was established to extinguish a basement fire. However, the Incident Commander did not expressly communicate this understanding to crews on the fireground. Additionally, the Incident Commander's strategic command was not sufficiently tailored to the unique circumstances of this incident. For example, despite the massive size of the structure the Incident Commander made a general assignment of Fire Attack, which covered the entire 8,400 square foot structure, rather than providing a clear geographic boundary for Fire Attack. Rather than assigning groups, the Incident Commander should have assigned crews to geographic locations, such as a Basement Division, would have focused crews on the Basement Level.

Fourth, the strategies and tactics deployed during this incident were hindered by a lack of cohesiveness among the crews. There is evidence, almost from the beginning, that Engine 51 was not a cohesive team. The team made their initial entry without Engine 51A. While it is true that Engine 51A was bound by HCDFRS General Orders to remain on the exterior there is no evidence that he provided the team with any direction upon their entry and there is no evidence that he provided any sort of overwatch function, either as Incident Commander or in his later role as Fire Attack Group Supervisor. Additionally, the crews failed to communicate the conditions, actions, and needs (CAN) they encountered on the first floor to the Incident

Commander. Current CAN reports do not necessarily provide the Incident Commander information regarding a firefighter's location. In this incident, the location of a firefighter along with the grade of Side C may have aided the Incident Commander in understanding where all crews were operating during the incident. Based on interviews with those crews, smoke conditions and observations on TICs indicated a basement fire. Despite indications of a basement fire, those crews did not reposition until Tower 10A ordered them to exit the structure and redeploy to the basement.

Another example of this hindrance is the failure for the first two arriving engines to establish water supply, which had an outsized effect on subsequent incident strategy and tactics. Under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines the first arriving engine is to lay supply lines and communicate the address of the layout to other responding units. The second arriving engine is to then, "ensure the water supply of the first arriving engine company." Neither action occurred at the outset of this incident. Engine 51, as the first arriving engine, did not make provisions for water supply or communicate a water supply plan en route or on arrival. Additionally, although Engine 101 repositioned with the intention to reverse lay from Engine 51 to a hydrant on Guilford Road, Engine 101 did not ensure water supply as the second arriving engine. This failure limited tactical options on the fireground not only due to the delay in establishing a water supply but because it pulled the fourth due engine (Engine 111) away from RIC duties to establish water supply. Beyond that, addressing the critical need to establish a water supply plan diverted the Incident Commander's attention.

Fifth, based on the situational cues crews should have known that the fire was in the basement. In establishing situational awareness, crews must first perceive the situational cues, ascribe the correct meaning to those situational cues, and predict future outcomes based on those cues. The process of perceiving situational cues and ascribing them the correct meaning is sensemaking. During this incident, there were clear situational cues that there was a basement fire: the resident caller indicated smoke in the basement, smoke conditions on the first floor of Side A with moderate smoke on the ground level, and Engine 51 and Tower 10's observations from their TICs that indicated fire in the basement. The ISRB believes that some crews operating on the fireground appropriately ascribed the meaning of these cues—such as Tower 10A when he ordered crews to reposition from the first floor to the basement—however, it is not clear that all crews appropriately identified these factors as indications of a basement fire.

Sixth, the crew's tactical decision-making ability was hampered by the stress and frustration caused by their difficulty in locating the fire. At the fifteen (15) minute mark of the incident, the crews still had not confirmed where the fire was located. Despite the situational cues of the fire being in the basement, the prior tactical decision by Tower 10A to search for fire in the basement, and Engine 51A's request for a PPV fan to locate the fire; at the observation of fire on the first floor the crews rapidly and illogically redeployed to the first floor. This tactical error, to the best of the ISRB's assessment, was likely due to the crew's singular focus on finding the fire. Tower 10D seeing fire on the first floor and communicating the location to Engine 101A over-

rode their sensemaking of the situational cues that there was a basement fire in favor of moving to the area where fire was visualized. Engine 101A's transmission of "we need to redeploy our line back up to the initial entrance" altered the crews course of action to extinguish the fire. This choice to enter at the upper level of Side C rather than continuing entry into the basement resulted in crews entering above a fire that likely burned for close to an hour, with the unfortunate outcome being FF Flynn falling from the upper level of Side C into the crawlspace that contained the fire.

Seventh, crews' failure to report critical information to the Incident Commander and other crews hindered the overall strategy and tactics employed during the incident. For example, crews of Engine 51 and Tower 10 entered the first floor of the structure at approximately 02:07:51 and, using Thermal Imaging Cameras, saw indications of fire beneath them. With that information, they altered tactics to enter the structure at the lower level of Side C, presumably because they thought the fire was in the basement. This highly pertinent information—initial entry to the structure, conditions within the structure, and subsequent exit and repositioning to a lower grade entrance to the building—was never relayed to the Incident Commander or communicated to all crews operating along Side C. At that point, the officers of those companies (Engine 51A, Engine 101A, and Tower 10A) had clear indications that the fire was beneath them.

Eighth, Engine 101 made entry into the first level into the Hazard Zone without expressed authorization from Command, in contradiction to General Order 300.07 Incident Command. General Order 300.07 Incident Command states that, "[c]rews must be well disciplined and not make entry into an interior Hazard Zone until assigned to do so by Command, understanding that operating in offensive overall incident Strategy may not mean that Command is employing interior attack tactics at the moment," the crews made entry without express authorization from Command. Based on the radio transcripts, the Incident Commander was still trying to establish the exact location and nature of crews along Side C before Engine 101 made entry. Following Engine 101A's transmission that they had, "heavy fire on floor number one, on the Charlie Side," the Incident Commander inquired whether they could, "hit the fire from the exterior?" In response, Engine 101A informed the Incident Commander that they needed to redeploy, "back up to the initial entrance" without clarifying whether Engine 101 would be entering the building.

Ninth, this incident was dispatched as a Metro Box, although 7005 Woodscape Drive is along a street without fire hydrants. Current HCDFRS dispatch policy does not have a clear definition of whether an alarm is dispatched as a hydrant box (metro) or non-hydrant box (rural), making the development of a water supply plan more difficult for responding personnel. Moving forward, HCDFRS needs to modify this policy of what qualifies as a metro box or rural box based on clear distance from a water source to the incident site.

Last, during and after the MAYDAY emergency, crews not involved in the RIC efforts did not continue activities to locate, confine, and extinguish the fire. There were immediate efforts to rescue FF Flynn after the MAYDAY emergency, however there were no tactical orders targeted at

locating and extinguishing the fire until after RIC operations were completed. As further explained in Section F. Rapid Intervention Crew, there was no attempt to extinguish the fire in the crawlspace from above. Although there were crews and a charged hose line available to continue locating and extinguishing the fire had they been assigned, there was no such command given.

Findings	**Recommendations**
B.1 HCDFRS does not have a clear philosophy of command, which limits an Incident Commander's effectiveness in executing strategies and tactics.	B.1.1. HCDFRS must clarify its philosophy of Incident Command, with a recommendation for adopting a mission-based expression of strategy where lower level officers (unit officers) are empowered to make tactical decisions to carry out the overall incident strategy. This philosophy of Command should then be reflected in all General Orders and supported by training. B.1.2. General Order 310.01:*Single Family Townhome and Structure Fire Operational Guidelines* must be revised to more clearly articulate strategy employed on the fireground, modernizing the current binary "offensive"/"defensive" strategy to more dynamic strategy declarations.
B.2 Group supervisors and unit officers failed to give proper direction and orders on the fireground.	See Recommendations B.1.1 and B.1.2.
B.3 The Incident Commander established a strategy for the incident according to HCDFRS policy, but that strategy was announced before the Incident Commander established a clear mental model of the incident.	B.3.1. The Incident Commander should complete a 360-degree survey and situational assessment of the fireground before declaring a strategy.

Findings	Recommendations
B.4 Strategies and tactics deployed during this incident were hindered by a lack of cohesiveness among the crews.	B.4.1. HCDFRS must implement hands-on, competency-based training in realistic conditions that reinforces fundamental skills and teamwork necessary for success on the fireground.
B.5 Based on the situational cues crews should have known that the fire was in the basement.	See Recommendation B.4.1.
B.6 Tactical decision making by crews on the fireground was compromised by their frustration to locate the fire.	See Recommendation B.4.1.
B.7 Crews failed to report critical information to the Incident Commander and other crews on the fireground, hindering overall strategy and tactics used during the incident.	B.7.1. HCDFRS leadership must hold crews accountable for failing to execute actions dictated by the General Order without informing the Incident Commander. B.7.2. HCDFRS must integrate reporting of location into existing CAN reports (LCAN).
B.8 Engine 101 made entry into the first level into the Hazard Zone without express authorization from Command	See Recommendations B.7.1 and B.7.2.
B.9 This incident was dispatched as a Metro Box, although 7005 Woodscape Drive is along a street without fire hydrants.	B.9.1. HCDFRS must modify this policy of what qualifies as a metro box or rural box based on clear distance from a water source to the incident site.
B.10 During and after the MAYDAY emergency, crews not involved in the RIC efforts did not continue activities to locate, confine, and extinguish the fire.	B.10.1. HCDFRS personnel must be trained to: • Complete a rescue attempt from an upper level floor. • Continue suppression efforts while RIC operations are underway. B.10.2. Incident Commanders must be trained on managing RIC operations. B.10.3. Crews should continue to use restraint in ventilating structures.

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C. Communications

General Background: Communications

Across every level of emergency response, communication is critical to effective incident management. Some researchers have noted that in the context of responding to active fire incidents, "decisions are not explicit, but intertwined in the conversations and the situated actions."[14] Many times fire crews respond to unclear or ambiguous situations, necessitating them to use situational cues to, "actively interact to create meaning by the enlargement of small cues and forming a structure to provide meaning."[15] In other words, to respond to a fire incident effectively the fire crews on the scene and the personnel in public safety dispatch must communicate clearly and effectively to support fire crew sensemaking of the incident scene.

Communicating real-time information during fire emergency response involves two essential communication modalities: face-to-face communication and radio communication.[16] Face-to-face communication is ideal because it enables both the receiver of the communication and the sender of the communication to gain additional context and understanding through, "nonverbal gestures such as a head nod."[17] Discerning whether a communication is understood may be difficult without these gestures, requiring certain practices to assure understanding of a message delivered by other modalities like a radio.

Recognizing that fire rescue crews often must communicate using radio communication rather than face-to-face communication, there are a number of best practices and standards adopted by fire departments to best facilitate communication via radios. Generally, radio communications should follow a standard format to ensure that there is a closed communication loop. Researchers studying firefighting team effectiveness have hypothesized that effective teamwork include mutual trust, a shared mental framework, and closed loop communication.[18] Closed loop communication, which has also been linked to the establishment of team's shared mental framework, has three characteristics:

1. A message being initiated by the sender
2. That message being received, interpreted, and acknowledged by the intended receiver

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[14] Jonas Landgren, Making Action Visible in Time-Critical Work, CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 201-210 (2006).

[15] Jonas Landgren, Making Action Visible in Time-Critical Work, CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 201-210 (2006).

[16] Zachary O. Toups & Andruid Kerne, Implicit Coordination in Firefighting Practice: Design Implications for Teaching Fire Emergency Responders, CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 707-716 (2007).

[17] Shannon L. Marlow, Christina N. Lacerenza, Jensine Paoletti, Eduardo Salas, & C. Shawn Burke, Does Team Communication Represent a One-Size-Fits-All Approach? A Meta-Analysis of Team Communication and Performance, 144 ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES 145-170 (2017).

[18] Elise Jouanne, Camilo Charron, Christine Chauvin, & Gael Morel, Correlates of Team Effectiveness: An Exploratory Study of Firefighter's Operations During Emergency Situations, 61 APPLIED ERGONOMICS 69-77 (2017).

3. A follow-up by the sender ensuring that the message was received and appropriately interpreted

In the context of fireground radio operations, closed loop communication is integrated into the Blue Card Command Program training for radio communications. The Blue Card system uses the Standard Order Model to structure communications, which involves the following steps for radio communication:

1. When the sender is ready to transmit a message, they call the receiver to determine if they are ready to receive the message;
2. The receiver then acknowledges the sender;
3. When the sender receives the readiness reply, they can transmit the message;
4. The receiver then gives a brief restatement of the message to acknowledge the receipt of the message; and
5. The sender restates the message if misunderstood.

This standard protocol for radio communications lessens the risk of misunderstanding among incident responders and dispatchers. Additionally, it mitigates the loss of nonverbal cues in communicating to others.

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Communications

The Maryland Fire Service Health and Safety Consensus Standard[19] requires each Authority Having Jurisdiction (AHJ) adhere to the following communications practices:

- Include guidelines and/or procedures for radio communications that provide standard protocols and plain language terminology for all types of incidents
- Maintain standard operating guidelines and/or procedures to support all types of incidents, from routine to unusual, without difficulty
- Establish standard terminology to transmit emergency and non-emergency information
- Establish a standard method for prioritizing emergency and non-emergency messages to all levels of command within a given emergency incident; and
- Use established Incident Management System as standard operating guidelines and or procedures to support emergency operations

As the Authority Having Jurisdiction, the Howard County Department of Fire and Rescue Services adopted several General Orders to meet the MOSH consensus standard. First, embedded in General Order 300.07 Incident Command System, which establishes the Howard County Department of Fire and Rescue Incident Command System, are instructions of how units should report information on the radio. In the order, units are to "report the conditions they have, the actions they have taken, and their needs for additional resources or actions of others, and end the report with their PAR (Personnel Accountability Report) status."[20]

Second, General Order 410.01 Communications applies to the Howard County Department of Fire and Rescue Services as well as the Howard County Department of Police, Information Technology Bureau, Communications Division (Communications Center) that administers all 911 call-taking and fire dispatch services in Howard County. The Communications Center coordinates all Howard County Government radio communications—including facilitation of Police, Fire, and Emergency Medical calls—24 hours a day, 7 days a week. It is fully operated by the Howard County Department of Police, with a uniformed Fire Captain and Fire Lieutenant serving as liaisons from Fire and Rescue Services to support Fire Operations. The Fire Captain is on an administrative work schedule and does not have any official management function in the Command Center. There is no official oversight of Fire and Rescue incidents, only unofficial oversight when the Fire Liaison is on duty.

While General Order 410.01 Communications provides a comprehensive overview of communication procedures for the Howard County Department of Fire and Rescue Services, the

[19] MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).
[20] Howard County Dept. of Fire and Rescue Services, General Order 300.07 Incident Command System (2016).

portion of this order pertinent to the Internal Safety Review Board is Section 11 (Incident Communications Practices and Procedures). Within General Order 410.01 Communications, Section 9.3, the Order Method for communication is described as the radio communication method for Howard County Department of Fire and Rescue Services.

Third, Howard County Department of Fire and Rescue Services General Order 300.04 MAYDAY Situations provides the policies and procedures for MAYDAY situations, defined as when "an imminent life-threating situation exists."[21]

[21] Howard County Dept. of Fire and Rescue Services, General Order 300.04 MAYDAY Situations (2013)

Woodscape Drive Incident Overview: Communications

The Howard County Department of Fire and Rescue Services radio communication system has standard Zones and Talk Groups as established in General Order 410.01 Communications. Under the order, Alpha 1 is used to alert and dispatch units and is the typical channel used to alert stations of an incident. The talk group Bravo 1 is the initial operational channel for an incident. Should an incident expand, Bravo 1 is maintained as the Incident Command channel while other talk groups in the Bravo Zone are used if necessary. During the Fire Incident at 7005 Woodscape Drive on July 23, 2018, radio transmissions occurred on the following Talk Groups: Alpha 1, Bravo 1, Bravo 2, Bravo 3, Bravo 4, and Bravo 6.

Communication during the Fire Incident at 7005 Woodscape Drive primarily occurred in two distinct, but connected, locations: the Fireground and the Communications Center. For clarity within this report, each location is addressed separately.

Communications Center

On the evening of July 22 – 23, 2018 the Communications Center had three civilian fire and rescue dispatchers working. Each dispatcher was assigned to a primary radio talk group (Alpha 1, Alpha 2, and Bravo 1). At 01:51 on July 23, 2018 a resident of 7005 Woodscape Drive called 911 advising the dispatcher that there was a strong smell of smoke from the residence and that they had evacuated the building. Although this information was verbally communicated to the 911 call-taker, it was not transcribed into the Computer Aided Dispatch (CAD) notes for the responding units. The Communications Center, following General Order 410.01 Communications, alerted Paramedic 56, Engine 51, Engine 101, Tower 10, and Battalion Chief 1 of a local alarm for a single-family home with visible smoke from a lightning strike on talk group Alpha 1. Operations were then switched to the Bravo 1 channel. After Engine 51 arrived on-scene and confirmed that the single-family dwelling had visible smoke, Engine 51 directed the Communications Center to dispatch a full box alarm, which it did following the protocols in General Order 410.01 Communications.

Recognizing that there was a working fire incident, the Communications Center supervisor moved a fourth dispatcher from training in police operations to fire operations to staff an additional tactical channel as is standard practice. Following General Order 410.01 Communications, the Incident Commander provided the Communications Center a fifteen (15) minute progress report, in which they requested additional assistance from a task force. The Communications Center dispatched the task force that included Squad 1, Engine 61, Engine 91, On-Call Public Information Officer, On-Call Safety Officer, and On-Call Fire Investigator.

At that point in the incident a MAYDAY call was transmitted over Bravo 1. Realizing that Incident Command was unsure of the location of the MAYDAY call, the Communications Center informed Command of which radio transmitted the MAYDAY call over Bravo 1. Following protocol from General Order 300.04 MAYDAY Situations, the Communications Center placed a channel marker on Bravo 1 as the channel that transmitted a MAYDAY call.

Then, following the instructions of the Incident Commander, the Communications Center initiated a second alarm that was maintained on Bravo 6. At 02:33 hours Communications notified Command of an emergency identifier from FF Flynn's radio, which was set to Bravo 2, then attempted to contact FF Flynn over that channel. The Communications Center did not advise the Incident Commander that the transmission occurred on Bravo 2.

At 02:49 Incident Command advised the Communication Center to call a third alarm to the scene, which the Communications Center completed at 02:50. At 03:04 the Communications Center advised all units that Bravo 6 would no longer be monitored and to switch to Alpha 2 if anything was needed. Bravo 6 was unmonitored due to the dispatch of another box alarm overwhelming the staffing in Communications Center.

Fireground

Howard County Department of Fire and Rescue Services arrived on the scene of 7005 Woodscape Drive by 02:00 on July 23, 2018. The units from the initial alarm verified that there was an active fire incident, notified the Communications Center to upgrade the assignment to a Box Alarm, and continued operating on operations talk group Bravo 1. Units on scene primarily operated on Bravo 1, as dictated by General Order 410.01 Communications.

At 02:20 a MAYDAY sounded on Bravo 1, clearly transmitting the MAYDAY signal but with unrecognizable words afterward. Immediately seeking to identify the person who placed the MAYDAY call, the Incident Commander worked with the Communications Center to identify the radio calling MAYDAY as portable Engine 101A. There was brief confusion among the responders, with Command and the Communications Center initially believing that Engine 101A had fallen into the basement rather than Engine 101A calling MAYDAY on behalf of FF Flynn. During these communications on Bravo 1, FF Flynn transmitted a MAYDAY call on Bravo 2. Unfortunately, that transmission occurred simultaneously to a transmission on Bravo 1, which was the priority operations channel, and was heard neither by the Incident Commander nor by the Communications Center.

Findings and Recommendations: Communications

The Internal Safety Review Board (ISRB), after an extensive review of available information regarding the 7005 Woodscape Drive Fire Incident, identified the following communication issues. These findings and associated recommendations are divided into three areas: communications center related, fireground related, and equipment related.

Communications Center Related

Although the Communications Center personnel overcame inefficiencies in the process of scaling up to support a large incident, there were communication gaps between the 911 call taker and the fireground personnel. First, although the residents of 7005 Woodscape Drive clearly stated that all residents had evacuated from the structure, that information was not transcribed into the CAD notes for the responding personnel. Without information in the CAD notes, the Incident Commander and other crews on the fireground did not know that the life-safety risk of the residents was avoided until conferring with the residents and transmitting the "all clear" at 02:12:41.

The County's 911 call takers are not utilizing the Fire Priority Dispatch System, Emergency Fire Dispatch Protocol (EFD), which has become a standard in many surrounding jurisdictions and the Region. This system guides the call taker in collecting all necessary incident information and automatically relays this information through the CAD system. If the County had adopted the EFD, important information would not have been left out of the CAD notes. ISRB recommends adopting the EFD.

Second, the Communication Center is understaffed for responding to HCDFRS incidents. The Fire Operations section in the Communications Center has three dispatchers, each assigned a radio talk group. These dispatchers consistently monitor talk group Alpha 1, Alpha 2, and Bravo 1, however the dispatcher on Bravo 1 often fulfills other responsibilities when there is no active incident requiring the operations channel. In the event of high incident volume or complexity an additional dispatcher may be reassigned from call taking operations to Fire Operations as staffing permits.

When a call taker is reassigned to assist Fire Operations, there is significant time delays in the transition. The three regular Fire Operations dispatchers were heavily engaged in critical tasks, with one dispatcher monitoring multiple channels at the same time, during the incident. The Communications Center was in the process of transitioning a call taker to be an additional dispatcher at the time of the MAYDAY. As reported by the dispatch staff, it takes three to five (3-5) minutes due to login procedures with the dispatch console.

Although Communication Center staff are well trained to support Fire Operations, many critical tasks are performed by memory and are not supported by a job aid, such as a checklist. Additionally, there is no procedure to provide just-in-time training, which is a way to provide employees necessary information at the moment they need it to complete a critical job function. This includes procedures for handling a MAYDAY call. While staff are able to access HCDFRS General Orders through a network drive, the process is impractical during an active incident.

When the Fire Liaison is present, they provide fire operations expertise to the Communications Center Staff. At times, such as when the MAYDAY call happened during this incident, when the Fire Liaison is not on-duty such expertise is missing. A just-in-time training or job aid would help ensure a minimum level of fire operation expertise among call center staff when there is not a Fire Liaison available to advise. Additionally, the General Orders—including General Order 300.04 MAYDAY Situations—are lengthy and difficult to glean operational value from during a critical event.

During this particular incident, neither Fire Liaison was present in the center to assist dispatchers. This lack of in-person Fire Operations guidance, just-in-time training, or job aids made it difficult for dispatchers to contact other jurisdictions for mutual aid support efficiently. Fire Operations leadership within the Communications Center during the incident could have also aided the influx of radio traffic and the process for escalating alarms.

Findings	**Recommendations**
C.1. Communications Center Fire Operations staffing levels limit the ability to expand operations for multiple incidents while maintaining focus on critical tasks and transmissions. This includes the absence of a 24/7 Fire Operations supervision from a HCDFRS officer.	C.1.1. The Communications Center should adopt and implement the EFD protocol. C.1.2. The Communications Center should increase staffing levels to support critical Fire Operations and develop a written staffing plan that adequately fulfills Fire Operations staffing needs. C.1.3. HCDFRS should increase its leadership presence at the Communications Center by establishing a Fire Liaison position 24/7 to support Fire Operations dispatchers. C.1.4. HCDFRS should have full operations and management oversight of Fire Operations dispatchers.
C.2. General Order 410.01, Communications, does not reflect current operational practices for HCDFRS or industry consensus standards.	C.2.1. HCDFRS should review and revise General Order 410.01 Communications to reflect the consensus standard for communications, the operational reality of the Communication Center staff, and current field practices and technology.

Findings	Recommendations
	C.2.2. Establish a Communication Center workgroup among the Baltimore/Washington metropolitan region to identify gaps among Howard County Communication Center operations and develop an improvement plan.
C.3. Dispatchers lack readily accessible job aids to assist during critical events. This led to inefficiencies in accessing mutual aid as well as deviations from protocols established in General Orders.	C.3.1. The Communications Center, in coordination with HCDFRS, should develop just-in-time and job aids training for call takers and dispatchers. C.3.2. Communications Center staff, in coordination with HCDFRS, should engage in a training program that aligns with the duties and capabilities required by Fire Operations dispatchers. Scenario-based training and integration with live company and battalion evolutions, similar to spring 2018 MAYDAY trainings at the American City Building, would be particularly beneficial.

Fireground Related

In reviewing communications and actions on the Fireground, the ISRB identified several critical instances where actions were taken but not communicated with Command or among other crew members. First, many responding apparatus failed to announce their response or staffing levels as ordered in General Order 410.01 Communications. This may contribute to Command Officer confusion since they may not be aware of what units are responding with what staffing level.

Second, many units on the fireground did not follow the procedure for reporting their status while in the Hazard Zone, as established under General Order 300.07 Incident Command System. Under the established department procedure to report their status, units should report the conditions they have, the actions they have taken, their needs for additional resources or actions of others, and end the report with their PAR status. This did not occur at several critical moments during the incident, including a lack of announced initial entry into the structure, units not notifying command of withdraw from the structure, and units not reporting deployed tactics to attack the fire. Crew members recognized deteriorating conditions but did not advise their company officers of their observations. Critically, information about conditions, obstacles encountered, and change in crew location were not communicated to the Incident Commander clearly either in-person or via radio communications. These critical gaps in communication between crew members and Incident Command likely contributed to the circumstance where by crews entered the structure through Side C on the first floor despite early identification of a basement level fire.

Third, while there was an attempt to maintain closed-loop communications on the fireground there were a number of communications loops either left open or disrupted by other communication traffic. For example, shortly after Incident Command was established the BC Aide signaled a communication to command and was provided a go-ahead to speak. When the BC Aide attempted to provide a situation update a simultaneous communication from E51 interrupted the BC Aide's report with non-critical information, forcing the Incident Commander to request that the BC Aide re-transmit the status report. While this example was relatively minor, it is illustrative of the communication confusion during the fireground operations.

Findings	**Recommendations**
C.4. Fireground Communications were ineffective at relaying critical information among fire crews and to Command.	C.4.1. All crew members would greatly benefit from additional training on appropriate and effective fireground communications. This includes: ○ (C.5.1) Effectively communicating reports to crew leaders and group/division supervisors by providing clear and concise status reports.
C.5. Responding crews failed to follow protocol in communicating which units are responding and with what staffing level is included in the response.	

Findings	Recommendations
C.6. Responding crews failed to verify that all crewmembers were operating on the same Talk Group before engaging the fire and a critical communication was transmitted over Bravo 2, an unmonitored channel.	○ (C.5.2) HCDFRS should incorporate standard naming convention for structure floors and train all personnel to use common terminology on the fireground. ○ (C.6.1) Properly announcing responding apparatus with staffing level as ordered in General Order 410.01 Communications. ○ (C.7.1) Tactical radio communications when entering and exiting an incident hot zone. ○ (C.7.2) Crew selecting and verifying the appropriate tactical channel for fireground operations. ○ (C.7.3) HCDFRS should train all personnel to follow closed-loop communication best practices during fireground operations. This process has been effectively executed among other fire departments to enhance crew and command understanding during active incidents. HCDFRS should develop protocols for verifying that all personnel responding to and operating on an incident scene have their mobile and portable radios selected to the correct tactical radio channel. This could be actualized by requiring crew
C.7. Responding crews left communication loops open, failing to use the Order Method. This led to responding crews interrupting and cross-talking on the operational radio channel.	

Findings	Recommendations
	officers to announce when their crew is entering a hot zone which will ensure that the officer is on the correct tactical radio channel, accounts for the crew's entry time, and provides accountability of the unit for the Incident Commander. ○ (C.8.1) For example, implementing the recommended complete loop communication recommended by FEMA in 1999.

Equipment Related

Although the ISRB determined that FF Flynn's MAYDAY transmission on Bravo 2, which was neither identified by the Communications Center nor any crew at the incident scene, likely had no impact on the survivability of FF Flynn. However, the issue of a crew member operating on the wrong tactical channel has implications for the safety during future incident operations. As such, the ISRB conducted an extensive review of the radio equipment and have made recommendations to mitigate safety concerns identified by the ISRB.

First, FF Flynn affiliated his assigned portable radio to Bravo 2, which was the incorrect Talk Group for the incident. In Spring 2017, HCDFRS deployed the Motorola APX8000XE portable radios with an associated programming change. Previous portable radios allowed for manual switching of radio channels with the radio in the "off" position. The APX8000XE radios power up to the previous Talk Group and channel regardless of the channel selector knob or talk group toggle position. Manual manipulation of the knob or toggle with the radio in the "off" position does not change the radio channel selection once powered "on". There is evidence that FF Flynn affiliated first with the Alpha 2 Talk Group, then switched to Bravo 2 Talk Group and remained on that channel until extricated from the structure.

Second, FF Flynn's MAYDAY communication was transmitted on Bravo 2. This transmission occurred around the exact time that Engine 101A was transmitting a MAYDAY communication on Bravo 1. Any radio on the assigned Bravo 1 Talk Group and in scan mode defaulted to the selected channel of Bravo 1, hence not allowing the Bravo 2 transmission to be heard.

Third, FF Flynn's radio transmitted an emergency identifier, likely because of the man-down function, and the emergency identifier was transmitted on Bravo 2. No one on the scene or in the Communications Center recognized that the emergency identifier was sounding on the Bravo 2 Talk Group. The ISRB determined that the failure to recognize that the emergency identifier operated on the Bravo 2 Talk Group likely had no impact on the survivability of FF Flynn as the RIC had already been deployed and was rapidly gaining access to FF Flynn at the time of the activation.

Fourth, FF Flynn wore his assigned Motorola APX8000XE radio in a leather strap and holster assembly under his turnout coat. Wearing the radio in this fashion shielded the radio and microphone cord from thermal damage. The radio and lapel microphone is rated for sixty (60) degrees Celsius/ 140 degrees Fahrenheit, a temperature that was far exceeded in the environment. Had the radio and lapel microphone been exposed to the ambient temperatures in the crawlspace, there is a high likelihood that the radio and lapel microphone would have experienced failure. Of note, the Howard County 800 MHz radio system is coverage tested with the Motorola APX8000XE radio worn at the hip position, configured in the same manner as it was worn by FF Flynn.

Fifth, the portable radio worn by FF Flynn and assigned to the Engine 101 Firefighter "B" riding position passed all functional testing. The Howard County Radio Shop tested the portable radio assigned to and worn by FF Flynn during the incident on September 18, 2018. The radio used by

FF Flynn is a Motorola APX8000XE. The testing was conducted by system engineers from Motorola Solutions, Inc. and witnessed by various members of the ISRB, fire department administration, and a detective from the Howard County Department of Police. For technical expertise, the Howard County telecommunications manager as well as the Prince George's Radio telecommunications manager provided oversight. Also, two additional radio system engineers from Motorola Solutions, Inc. were present to provide technical expertise. Although the unit had received thermal and mechanical damage consistent with the fall and environmental conditions encountered in the crawlspace, the radio and the lapel microphone passed all bench testing and functioned as designed. This test established that FF Flynn's radio was functional and working as designed.

Additionally, forensic test conducted on FF Flynn's radio determined that FF Flynn's radio was set to operate on Bravo 2 and the scan function was engaged. On November 7, 2018 a series of tests were conducted on FF Flynn's radio by Motorola Solutions at their forensics facility in Plantation, Florida. These tests verified that although the radio had been exposed to high temperatures it had not lost any functionality or tactility. In other words, FF Flynn's radio was verified by the manufacturer to be fully functional and operated as programed. Reviewing the radio programming, the manufacturer and ISRB noted that features such as the Emergency Identifier program were suboptimal because it lacked an emergency identifier revert option to place the radio on the command channel.

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Figure 20 - Photos of the radio assigned and worn by FF Flynn. Photos provided by HCPD.

Findings	Recommendations
C.8. The transmission of FF Flynn's MAYDAY and emergency identifier on Bravo 2 likely had no impact on the survivability of FF Flynn as the RIC had already been deployed and was rapidly gaining access to FF Flynn at the time of the activation. C.9. The Motorola APX8000XE portable radio assigned and worn by FF Flynn functioned as designed and programmed. C.10. Activation of an emergency button (via manual depression or man-down feature) sounds on the radio channel the radio is set to operate on.	C.8.1. Current configuration of the radio broadcasts the emergency identifier on the radio channel on which the radio is currently operating. To mitigate human error of a crew member operating on a channel that is unmonitored, an emergency identifier activation on the Bravo, Charlie, and Delta Talk Groups should revert the member to a channel that is always monitored by the Communications Center and the Incident Commander.
C.11. The Motorola APX8000XE radio is a complex piece of life safety equipment, requiring specific training to operate appropriately. As detailed in the Training Section of this report, the department training for operation of this radio system prior to its wide deployment in the field was inadequate to ensure that all crew members could effectively operate the new equipment. A major shortcoming of the training was that it provided only an emailed slideshow of how to operate the radio and did not provide any "hands-on" practice to ensure that personnel could effectively operate the radio.	C.11.1 Because of the complexities of operating the Motorola APX8000XE radio, more extensive training prior to its deployment in the field should have been established to ensure that crews can operate the radio appropriately. A thorough training program, as detailed in Section III.J, that includes a didactic portion, practical evolutions, and a competency-based evaluation is appropriate for a piece of equipment so vital to hazard zone operations as the portable radio.
C.12. The Motorola APX8000XE radio programming was suboptimal for features such as the Emergency Identifier.	C.12.1. HCDFRS should convene a work group to evaluate all programming and accessory options in the Motorola APX8000XE radio to optimize the safety,

Findings	Recommendations
	efficiency, and technology of the equipment.

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D. MAYDAY

General Background: MAYDAY

The term MAYDAY is used to indicate when a member on the fireground is in a life-threating situation and needs immediate assistance. The national standard for MAYDAY is found in NFPA 1500 Section 8.2.4.3, which permits MAYDAY declarations, "by any member who is in or who becomes aware of a member who is in a life-threatening situation and in need of immediate assistance." In addition to the NFPA standard, the Maryland Fire Service Health and Safety Consensus Standard from the Maryland Occupational Safety and Health (MOSH) defines a MAYDAY situation as an, "... emergency distress signal indicating that one, or more, fire and rescue personnel is in need of emergency assistance."[22]

Procedurally, a MAYDAY message begins with "MAYDAY, MAYDAY, MAYDAY," followed by an articulation of assistance needed. NFPA 1561 Standard on Emergency Services and Incident Management System and Command Safety outlines the MAYDAY process, as well as the MOSH consensus standard.

[22] MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: MAYDAY

MAYDAY is defined by HCDFRS General Order 300.04 MAYDAY Situations as, "a term used to alert the Incident Commander (IC) and other individuals that operating personnel are in a life-threatening situation." Additionally, a MAYDAY can occur, "when personnel operating on the scene of an emergency incident find themselves in a life-threatening situation and require immediate assistance, they shall immediately declare a MAYDAY." In declaring a MAYDAY, the firefighter is to transmit "MAYDAY, MAYDAY, MAYDAY" followed by **who** is calling the MAYDAY, **what** the problem is, and **where** the MAYDAY is located.[23]

Additionally, the acronym LUNAR is included in the HCDFRS General Order 300.04 MAYDAY Situations as a guide for personnel to use in providing information to an incident commander. LUNAR is defined as:

- **L**ocation (last known location including floor number, quadrant, etc.)
- **U**nit (identification of the crew and their unit assignment)
- **N**ame (name of the individuals that need rescue or recovery)
- **A**ssignment/**A**ir (the last known assignment and amount of air left in the cylinder)
- **R**esources needed (what equipment is needed to implement the rescue plan).

Also, General Order 300.04 MAYDAY Situations provides several examples of situations where a MAYDAY is appropriate, including falls through a roof or floor, self-contained breathing apparatus (SCBA) failure, medical emergency and/or a situation in which personnel cannot self-extricate within sixty (60) seconds.

Portable radios used by HCDFRS are designed with two emergency identifier buttons. There is an emergency identifier button on the lapel microphone and an identifier button on top of the portable radio. A firefighter transmitting a MAYDAY should activate the emergency identifier button to ensure the MAYDAY is acknowledged by the incident commander and Communications Center pursuant to HCDFRS General Order 300.04 MAYDAY Situations (11). Upon transmitting the MAYDAY, the firefighter shall manually activate their, "Personal Alert Safety System (PASS) to alert personnel within hearing range that an emergency situation exists."

The Incident Commander's actions at the declaration of a MAYDAY are a critical factor in the success of the Rapid Intervention Crew (RIC) operation. Incident Commanders must simultaneously acknowledge the MAYDAY, deploy the RIC, and request additional resources while still directing incident operations. The declaration of a MAYDAY with RIC deployment may alter, but cannot preclude, addressing other incident needs such as rescue and fire suppression activities. Pursuant to HCDFRS General Order 300.04 MAYDAY Situations, an Incident Commander must, immediately following a MAYDAY transmission, acknowledge the individual

[23] Howard County Department of Fire and Rescue Services, General Order 300.04 MAYDAY Situations 12 (2013).

calling the MAYDAY, determine who is calling, what the problem is and where the emergency is taking place. Once that information is received the Incident Commander must request the emergency tone from Communications Center, declare a MAYDAY situation over the radio and repeat the who, what, and where of the emergency, at which point the Incident Commander will deploy the RIC. Additional resources may be requested by the Incident Commander to include additional personnel for continued fireground operations, establishing a second RIC, and have additional EMS units on stand-by. Under General Order 300.04 MAYDAY Situations the Incident Commander shall conduct a PAR of personnel operating in the hazard zone as soon as possible. At the completion of the MAYDAY operation, the Incident Commander shall resume normal operations and reassess incident priorities.

The Communications Center dispatchers are an essential component of the MAYDAY process once a MAYDAY has been declared. If the Incident Commander does not acknowledge the MAYDAY and the dispatcher hears the transmission, the dispatcher must immediately notify the Incident Commander. The dispatcher must then work with the Incident Commander to ensure requests are acknowledged and fulfilled. Pursuant to HCDFRS General Order 300.04 MAYDAY Situations, Public Safety Communications – Actions and Responsibilities Section, "a channel marker will be activated on the priority channel to ensure personnel understand that an emergency has been declared." The primary fireground channel will remain the priority channel for the MAYDAY operation. In the event a radio emergency identifier button is activated, the dispatcher shall notify the Incident Commander and provide any information regarding the activation. The Communications Center does not have the ability to differentiate between an emergency identifier button activation and an automatic man-down activation. The man-down activation alerts Communications Center of a potential emergency when any portable radio is left in a horizontal position (45 degrees or less) and not moved for four (4) minutes.[24]

[24] During the course of this investigation, HCDFRS reprogrammed the radios to have the man-down activation pre-alert at 30 seconds and an alarm after another 45 seconds passes, for a total time of one minute and fifteen seconds.

Woodscape Drive Incident Overview: MAYDAY

At 02:15:30 Engine 51 and Tower 10 advised that they were unable to find the fire. Shortly thereafter, Engine 101A relayed to Command visible fire on the first level of Side C. In response to Engine 101A, the Incident Commander asked whether it was possible to, "hit the fire from the exterior." Engine 101A replied that they needed to redeploy their line back to the initial entrance, referring to the upper level of Side C although that was not clear to the Incident Commander.

During the communication between Engine 101A and Command there was uncertainty as to Engine 101A's position, with the Incident Commander asking for Engine 101A to confirm their location at 02:17:16. Tower 10A responded to Command's clarification request, stating that Engine 101 and Engine 51 were making entry in Quadrant 2 on the first floor with crews having made access to the basement, experiencing smoke conditions, and closing the basement door to restrict airflow. Tower 10A advised that the only crews operating on the first level of Side C should have been Engine 101 and Engine 51. At 02:18:29 the Incident Commander directed Truck 7 to assume RIC duty and that they have Engine 51, Engine 101 and Tower 10 entering on Side C.

At 02:20:11 Engine 101A declared MAYDAY, although it was unclear to the Incident Commander whether it was Engine 101A or Engine 101B having a MAYDAY emergency. Engine 101A's MAYDAY transmission was immediately acknowledged by the Incident Commander. Engine 101A's second MAYDAY transmission was also partially unrecognizable. This contributed to confusion in determining the nature of the MAYDAY emergency. The Communications Center advised Command that the transmission was from Engine 101A. The Incident Commander deployed RIC to Side C to begin RIC operations. Once RIC was directed to Side C, the Incident Commander immediately attempted to obtain the Who-What-Where of the MAYDAY emergency from Tower 10A. Engine 51A and Tower 10A simultaneously attempted to notify the Incident Commander that they were trying to find Engine 101A. The Incident Commander initially believed Engine 101A had fallen through the floor. It was not until 02:24:05 that the Incident Commander ascertained FF Flynn (Engine 101B) as the person in distress. A second alarm was requested by the Incident Commander. Engine 71 was assigned to supplement Truck 7 as part of the RIC.

Findings and Recommendations: MAYDAY

First, a review of all radio transmissions from the incident revealed that FF Flynn transmitted a MAYDAY on Bravo 2 talk group. This incident was assigned and operating on the Bravo 1 talk group. FF Flynn had his radio operating on Bravo 2 in scan mode; this would have led FF Flynn to reasonably believe that he was operating on Bravo 1 talk group since he could hear all Bravo 1 transmissions with the exception of when his portable radio was transmitting on Bravo 2 talk group. FF Flynn's MAYDAY transmission was made at 02:21:05. His transmission went unnoticed by personnel on the fireground, Incident Command, and the Communications Center. In addition, another transmission was made on the Bravo 1 talk group simultaneously to FF Flynn's transmission on Bravo 2. The simultaneous transmission to FF Flynn's MAYDAY at 02:21:05 was Engine 101A's transmission following up her initial MAYDAY transmission to the Incident Commander. This simultaneous transmission on Bravo 1 prevented anyone with a radio scan feature activated and operating on the Bravo 1 talk group from hearing FF Flynn's MAYDAY transmission on the Bravo 2 talk group.

Aside from being on the wrong talk group, FF Flynn's MAYDAY transmission aligned with General Order 300.04 MAYDAY Situations. Based on information obtained from FF Flynn's radio, his radio was operating on scan mode on Talk Group Bravo 2. Although there is no evidence that FF Flynn transmitted a "MAYDAY, MAYDAY, MAYDAY," based on FF Flynn's subsequent transmissions on Bravo 2, FF Flynn presumably heard Engine 101A's articulation of "MAYDAY, MAYDAY, MAYDAY" on Bravo 1. The Incident Commander attempted to clarify the MAYDAY situation with the assistance of the Communication Center, believing that Engine 101A was in distress. The Incident Commander transmitted, "Engine 101, go ahead with your MAYDAY," to which FF Flynn transmitted on Bravo 2 his name, location, and status as specified in General Order 300.04 MAYDAY Situations.[25] Simultaneous with FF Flynn's transmission on Bravo 2, Engine 101A made a MAYDAY related transmission on Bravo 1, preventing his transmission from being heard.

Second, there was an activation on Bravo 2 from FF Flynn's portable radio at 02:19:45 without any verbal transmission. The exact cause of this transmission is unknown, but it is known that there was an activation of the push-to-talk button on the portable radio of FF Flynn. FF Flynn's radio was operating on the Bravo 2 talk group in the scan mode during this activation. Engine 101A transmitted the initial MAYDAY which shortly followed this activation.

Third, Engine 101A transmitted a MAYDAY on behalf of FF Flynn at 02:20:11 on Bravo 1. While Engine 101A's "MAYDAY, MAYDAY, MAYDAY" was transmitted in an understandable voice, a majority of the remaining transmission was unintelligible. Engine 101A made two additional radio transmissions directly connected to the MAYDAY declaration. One transmission was made at 02:20:31, where she stated, "101 is in the basement now, I believe he's in the basement now." The next transmission was at 02:21:05, where she states, "He's in the basement," followed by an

[25] In respect to the wishes of FF Flynn's family, the exact words FF Flynn transmitted during the MAYDAY are not included in this report.

incomprehensible statement, then "go through the basement." The Incident Commander, after Engine 101A's 02:20:31 hours transmission, acknowledged the MAYDAY at 02:20:47 stating, "101A I've got you on the MAYDAY," and deployed the RIC.

In taking these steps, Engine 101A followed the policy set in HCDFRS General Order 300.04 MAYDAY Situations for declaring a MAYDAY for a firefighter she believed required assistance and was unable to declare a MAYDAY themselves. However, the transmission she made that followed the initial MAYDAY statement was unintelligible. This led to confusion on the part of the Incident Commander as to who needed assistance, what assistance was needed and where the assistance was needed. The Incident Commander initially believed it was Engine 101A that had fallen through the floor, into a sub-basement, and was experiencing the emergency. Not until 02:24:05 was the Incident Commander given the information that confirmed it was FF Flynn that fell through the first floor and into the basement. This confusion was exacerbated by the lack of crew integrity, which made it difficult to account for all firefighters operating within the hazard zone and identify the number and location of firefighters requiring assistance.

Fourth, there is evidence that FF Flynn completed the actions recommended to take while awaiting rescue in line with General Order 300.04 MAYDAY Situations. While waiting for RIC, FF Flynn never removed his SCBA face-piece and data from FF Flynn's SCBA supports that he attempted to self-extricate. FF Flynn did not change radio channels, presumably because he believed that he was operating on Bravo 1.

Fifth, the Incident Commander worked to ascertain the MAYDAY situation and direct RIC to begin operations, but the efforts were complicated by a lack of crew integrity. FF Flynn was not identified as the person with a MAYDAY emergency until 02:24:05. Numerous factors led to this confusion, including the original MAYDAY transmission by Engine 101A that was partially unintelligible and FF Flynn's MAYDAY related transmission on Bravo 2. Other units could not initially confirm who was missing while operating in zero-visibility conditions. Once it was confirmed by Incident Command who was missing, a PAR was requested from the Charlie Division Supervisor for Engine 51 and Tower 10. This PAR was requested at 02:26:15. As discussed in Section III. A Incident Command. of this report, Incident Commander could not account for all the members assigned to Engine 51 until 02:28:41.

Sixth, the entire first alarm assignment was not on location and in position per HCDFRS General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines. This contributed to resources being redeployed to supplement the RIC. As units from the Task Force and Second Alarm assignment arrived on location, the Incident Commander assigned units to establish a second RIC. The second RIC was assigned at 02:39:29. The second RIC consisted of Engine 61, Engine 91 and Engine 22. These units were directed to position on Side C. Engine 22 had already been deployed to assist the first RIC by Charlie Division Supervisor, although the radio assignment occurred at this time.

Seventh, Incident Command ensured that non-essential radio traffic was minimized. Units operating on the scene maintained exceptional radio discipline to keep radio traffic to essential

transmissions only. Face-to-face communications were used whenever possible to keep traffic to a minimum. At 02:13:01, prior to the MAYDAY transmission, the Incident Commander assigned Battalion Chief 2 to assume the Charlie Division upon arrival. Throughout the MAYDAY emergency, Incident Command communicated directly with Charlie Division (Battalion Chief 2) and RIC (Truck 7A). There was not a need at the time of the MAYDAY emergency for the Incident Commander to assign units to another tactical talk group. This was the result of companies not being able to locate the fire at the time of the MAYDAY emergency and the lack of resources available to engage in other operational activities. Units assigned to staging were assigned to operate on the Bravo 6 talk group, however all units in staging were re-assigned to report to the scene to assist with the MAYDAY emergency by the Incident Commander.

Eighth, the Communications Center does not have a separate policy for MAYDAY situations, instead its duties are outlined in General Order 300.04 MAYDAY Situations. Under General Order 300.04 MAYDAY Situations, the Communications Center dispatchers are to monitor fireground radio talk groups and notify the Incident Commander when the dispatcher recognizes that an emergency exists.

At the time the MAYDAY Emergency was transmitted, there was not a Fire Liaison present in the Communications Center. This prevented the dispatchers from having the ability to immediately request guidance from an HCDFRS officer. The dispatcher on the Bravo 1 talk group, to the best of their ability, attempted to assist the Incident Commander in determining what the emergency was and who was calling the emergency. The dispatcher quickly confirmed to the Incident Commander that Engine 101A was the individual calling the MAYDAY.

The dispatcher activated the channel marker less than ninety (90) seconds after the MAYDAY per HCDFRS General Order 300.04 MAYDAY Situations. The channel marker remained activated until 02:47:03, after all units were reported PAR and the incident strategy transitioned to a defensive strategy. At 02:33:12 hours the Communications Center received the emergency identifier from FF Flynn on Bravo 2. The dispatcher immediately notified the Incident Commander of this activation, although they did not inform the Incident Commander that FF Flynn was operating on Bravo 2. Incident Command immediately attempted to contact FF Flynn on Bravo 1 upon notification of the activation from the dispatcher. The dispatcher also attempted to contact FF Flynn on Bravo 2 at 02:33:47. There was no response from FF Flynn.

In reviewing the incident with Communication Center staff, the dispatcher did not recognize that FF Flynn was operating on Bravo 2. Between the stress of the incident and task saturation among the dispatchers during the emergency, the dispatcher immediately acknowledged the transmission on Bravo 2 without realizing that the acknowledgement was on Bravo 2 instead of Bravo 1. The immediate acknowledgement was to quiet the audible alarm in the Communications Center associated with the emergency identifier.

Findings	Recommendations
D.1 FF Flynn transmitted a MAYDAY call, but it was unheard by the fireground personnel and Communications Center because it was on the unmonitored Bravo 2 talk group.	D.1.1 Prior to entering an IDLH environment, firefighters must verify that they are operating on the appropriate talk group. D.1.2 HCDFRS must reprogram its radios to have the emergency identifier button revert the firefighter experiencing a MAYDAY to the monitored talk group (e.g. Bravo 1). This should prompt the Communications Center to monitor all transmissions in the monitored talk group. D.1.3 HCDFRS must require Incident Commanders to confirm the operational channel with the individual calling the MAYDAY. The Incident Commander shall advise the individual to visually check their portable radio, if possible. Additionally, the Communications Center or Incident Commander on Bravo 7 should instruct a firefighter experiencing a MAYDAY emergency to press their emergency identifier.
D.2 Engine 101A's MAYDAY transmission was partially unintelligible, with the Incident Commander unable to ascertain who, what, where portions of the transmission.	D.2.1 Personnel must have consistent training on how to clearly make a MAYDAY transmission for themselves or others. This training should be done while the individual is in a high-stress environment and tasked with this responsibility.
D.3 The Incident Commander attempted to ascertain the necessary MAYDAY details, but due to a number of factors was not able to identify FF Flynn's distress and location until 02:24:05, at least four (4) minutes after FF Flynn fell through the floor.	D.3.1 Incident Commanders and officers must train on ways to clarify unclear MAYDAY transmissions, providing reassurance to individuals as appropriate. This training should also include processes for the Incident Commander to work with the Communications Center. This process includes having the Communication Center send emergency tones and announcing that a MAYDAY has been declared. The Incident Commander shall notify all personnel operating on

Findings	Recommendations
	the incident Who is calling the MAYDAY, What the problem is, and Where the emergency is located.
D.4 While an evacuation tone sounded after the Incident Commander ordered an evacuation, the emergency tone did not sound after the Incident Commander announced a change of strategy.	D.4.1 HCDFRS must use separate tones for an emergency tone and an evacuation tone. These separate tones shall be easily differentiable, with personnel able to easily identify the tone and understand what is required of them when the tones are activated.
D.5 There is evidence that FF Flynn attempted to self-extricate while awaiting RIC support.	D.5.1 HCDFRS must conduct training on MAYDAY emergencies on a regular basis. This training should include a review HCDFRS General Order 300.04 MAYDAY Situations and practical evaluations. Practical evaluations shall give personnel the opportunity to transmit and receive a MAYDAY emergency while operating under simulated emergency conditions.

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E. Structure Evacuation

General Background: Structure Evacuation

National Fire Protection Association (NFPA) 1407 Standard for Training Fire Service Rapid Intervention Crews, Section A.4.2.1 (1) addresses emergency evacuations. Under the standard, "[t]he [Authority Having Jurisdiction] AHJ should ensure that there is an emergency evacuation procedure designed to evacuate members from an area and to account for their safety when an imminent hazard is recognized."[26] Additionally, under NFPA 1561 Standard on Emergency Services Incident Management System and Command Safety, the Incident Commander, "should announce all companies evacuate the building,... Change from offensive to defensive attack..., and confirm a PAR for the entire incident." Then, "[a]t the conclusion of the MAYDAY or emergency traffic situation, the [Incident Commander] should... transmit all clear [and] resume radio traffic. ...Examples of emergency traffic could be evacuate the building... [or] change from offensive to defensive operations...."[27]

In addition to the NFPA standards, the Maryland Fire Service Health and Safety Consensus Standard provides guidelines for a Personnel Accountability Report (PAR). Under the consensus standard, the AHJ should have a policy for PAR for: "(i) The time of a change from offensive to defensive operation; (ii) The occurrence of a significant event... (iii) The time when a known life hazard is eliminated... [and] (iv) MAYDAY situations...."[28]

[26] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD FOR TRAINING FIRE SERVICE RAPID INTERVENTION CREWS (2015).
[27] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY 1561 (2014).
[28] MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Structure Evacuation

HCDFRS uses two types of evacuation, "exit" and "abandon", which are differentiated by the urgency of the situation. General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines describes each:

> Exit the structure will be defined as an orderly withdrawal where interior lines and equipment will be withdrawn and repositioned when changing to a defensive strategy.
>
> Abandon the structure will be defined as an emergency retreat where all hose lines and heavy equipment will be left in place and all operational personnel in the hazard zone will exit the structure as quickly and as safely as possible.[29]

Under this Order, the Incident Commander, when switching from an offensive to defensive strategy, has Communications Center broadcast the emergency tone after which the Incident Commander announces, "[S]hifting to the defensive strategy. All units Exit (or Abandon, as appropriate) the structure. All units report PAR's upon exit."[30] After which the Communications Center sounds the emergency tone a second time and repeats the statement of the Incident Commander verbatim, in alignment with the MOSH consensus standard.

General Order 410.01 Communications also addresses evacuation.

> Fire dispatch shall sound the evacuation tone (no longer than 15 seconds in duration) followed by a message advising all personal to evacuate the structure when requested by the Incident Commander. Tone and message are to be repeated twice.[31]

The two types of evacuation, exit and abandon (as identified in General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines), are not identified under this Order and the Incident Commander's statement is not required to be repeated verbatim by the Communications Center.[32]

The emergency tone is defined under General Order 300.04 MAYDAY Situations as, "an informational tone broadcast transmitted by emergency dispatchers at Howard County's Public

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[29] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 310.01 SINGLE FAMILY AND TOWNHOUSE STRUCTURE FIRE OPERATIONAL GUIDELINES (2002).
[30] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 310.01 SINGLE FAMILY AND TOWNHOUSE STRUCTURE FIRE OPERATIONAL GUIDELINES (2002).
HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 410.01 COMMUNICATION 11.8.4 (2005).
[32] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 310.01 SINGLE FAMILY AND TOWNHOUSE STRUCTURE FIRE OPERATIONAL GUIDELINES (2002).

Safety Answering Point (Howard Communications) for a period of five (5) seconds over all operational radio channels to notify personnel that an emergency has been declared."[33]

[33] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.04 MAYDAY SITUATIONS (2013).

Woodscape Drive Incident Overview: Structure Evacuation

At 02:42:34, the Incident Commander ordered: "[G]o ahead and give me the evacuation tone. Charlie Division I want all units pulled out. With Flynn found, all units pulled out and give me a PAR as soon as you can." The Communications Center broadcast the evacuation tone at 02:42:50 and at 02:42:56 announced "[H]oward to all units evacuate. Howard to all units evacuate the scene authority of Command 02:43."

Operating in offensive strategy since the beginning of the incident, the Incident Commander changed strategy at 02:46:36 to defensive. At 02:47:13 the Incident Commander confirmed the change of strategy with the Charlie Division Supervisor. By 02:48:13 the crews were able to verify that all units were PAR.

Findings and Recommendations: Structure Evacuation

First, the Incident Commander's evacuation order represented an "exit" or organized retreat from the dwelling pursuant to General Order 410.01 Communications. Under this General Order, the Incident Commander has the Communications Center broadcast the emergency tone and state the evacuation order. This process is done twice. At 7005 Woodscape Drive, the Incident Commander made his request of the Communications Center and the Communications Center complied by broadcasting the evacuation tone once and repeating the evacuation order twice.

After the evacuation order was issued by the Incident Commander at 02:42:34, the Charlie Division Supervisor never acknowledged reception of the evacuation order but rather started a regular dialog via the radio of individual unit PAR checks with the Incident Commander. In these PAR communications, the Charlie Division Supervisor did state that each of the units being identified in the PAR are out of the dwelling. Under HCDFRS General Orders, it is a normal practice for a division supervisor to be accountable for units operating within that division and do PARs of these units.

A review of the available data indicates that the Charlie Division Supervisor heard the evacuation order and acted on it. This is evidenced by the orderly and timely withdrawal of units from the dwelling shortly after the evacuation order and an immediate PAR completed of these units as they exited the dwelling which was then relayed to the Incident Commander.

Additionally, in the process the Communication Center's broadcast, the dispatcher reiterated the evacuation order twice as specified in the General Order. In the second reiteration, the dispatchers did state for all "units to evacuate the scene." Although this statement could have caused confusion for certain incidents, such as active assailants, in this incident the dispatcher's wording did not cause any units to relocate and it is assumed all firefighters understood the intent of the evacuation order was to evacuate the structure.

Second, the Incident Commander announced a change of strategy to defensive at 02:46:36 hours, after FF Flynn was removed from the structure. At the announcement of the change to the defensive strategy by the Incident Commander, transmitting that, "all units on the fireground, units are PAR. We are going to commit to a defensive strategy, a defensive strategy."

This change of strategy could be viewed as an evacuation order. Under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, when an Incident Commander changes from an offensive to a defensive strategy, the incident commander uses verbiage, either "exit" or "abandon", to assign urgency to unit evacuation and has the Communications Center broadcast the emergency tone followed by a repeating of the change of strategy order. After which a PAR is completed of operating units in the hazard zone.

In this instance, the Incident Commander announced a change of strategy but did not have the Communications Center broadcast the emergency tone or repeat the change of strategy order. However, the Incident Commander had previously relayed the urgency of the matter and had the emergency tone broadcast via his order to evacuate the structure at 02:42:34 or

approximately four (4) minutes prior to his order changing from an offensive to defensive posture. Additionally, at the time the Incident Commander issued the change of strategy order, all crews operating within the hazard zone as defined in General Order 300.04 MAYDAY Situations (37) were PAR. As such, even without the required broadcast by the Communication Center, the change of strategy was completed in an orderly process and that all crews responded appropriately in their transition to a defensive strategy.

Findings	**Recommendations**
E.1. The Incident Commander's evacuation order at 02:42:34 was an "exit" under General Order 410.01 Communications.	E.1.1 HCDFRS must revise General Orders to include a process for reentering a structure following an evacuation order. Currently the General Orders do not address the resumption of interior operations following an emergency evacuation order. Once an emergency evacuation has occurred, the incident commander should conduct size-up of the structure and evaluate fire conditions to determine an appropriate mode of operation. The proposed language should include a continuous reevaluation process of the incident. E.1.2 HCDFRS must revise General Orders to separate evacuation from strategy changes for clarity.
E.2. The change of strategy from offensive to defensive strategy also represented an exit, or evacuation of the dwelling.	See Recommendations E.1.1 & 1.2
E.3. There are conflicts between General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines and General	E.3.1 HCDFRS must examine the processes outlined in General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines

Findings	Recommendations
Order 410.01 Communications concerning the evacuation process.	and General Order 410.01 Communications to determine if either process meets current operational needs, make any needed modifications and then codify both process into one single process and rewrite each General Order with the same modified process. Additionally, the orders must be revised to: • Align with the intent of NFPA 1561's language: "[A]t the conclusion of the MAYDAY or emergency traffic situation, the Incident Commander should then transmit all clear, resume radio traffic." • Add the sounding of apparatus (air horns minimally) at the ordering of an abandon evacuation order. • Include PARs of all crews at an incident who are not in staging. E.3.2 HCDFRS personnel should be trained on all modified orders. The training should include a practical component that utilizes the audio warning(s) fire fighter will hear via Communications Center. This training should also include units from outside jurisdictions that regularly respond into Howard County. E.3.3 HCDFRS must standardize emergency evacuation procedures, practices and alerts with surrounding jurisdictions so that neighboring jurisdictions and HCDFRS have similar emergency evacuation and MAYDAY practices and audio warnings (air horns).

Findings	Recommendations
E.4. HCDFRS has discontinued the practice of sounding air horns at the order of an "exit" or "abandon" evacuation due to the proliferation of portable radios.	See Recommendation E.3.1

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F. Rapid Intervention Crew and Rescue Operations

General Background: RIC and Rescue

The Occupational Safety and Health Administration (OSHA) requires that a Rapid Intervention Crew (RIC) of at least two employees remain outside of an atmosphere that is considered immediately dangerous to life or health (IDLH) when a team consisting of a minimum of two members enters the IDLH atmosphere. This is defined in OSHA's Respiratory Protection standard 29 CFR 1910.134. The "Two-in/Two-out" team referred to in 29 CFR 1910.134 will be referred to as the Initial Rapid Intervention Crew (IRIC) throughout this chapter.

The Maryland Occupational Safety and Health's (MOSH) Maryland Fire Service Health and Safety Consensus Standard requires the Authority Having Jurisdiction (AHJ) to follow the standard set forth in 29 CFR 1910.134. In addition, the standard requires AHJ's to develop policies and procedures to ensure that a RIC is deployed at all incidents where an IDLH atmosphere is present. HCDFRS General Order 300.11 Rapid Intervention and IDLH Initial Entry Teams complies with the standards set forth by OSHA and MOSH. In addition, the 2018 National Fire Protection Association (NFPA) 1500 Standard on Fire Department Occupational Safety, Health, and Wellness Program, defines recommendations for fire and rescue services to adhere to during an emergency incident when a RIC crew is required. NFPA 1500, section 8.8 Rapid Intervention for Rescue of Members, outlines the recommendations set forth in this standard.

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: RIC and Rescue

Howard County Department of Fire and Rescue Services (HCDFRS) General Order 300.11 Rapid Intervention and IDLH Initial Entry Teams outlines the procedures for the deployment and rescue of operational personnel working in IDLH atmospheres. General Order 300.11 Rapid Intervention and IDLH Initial Entry Teams meets the expectations set forth in NFPA 1500, Standard on Fire Department Occupational Safety and Health Program Section 6-5 and 29 CFR 1910.134. HCDFRS reinforces the Two-in/Two-out crew with additional members as they become available. The reinforced IRIC team will be referred to as the RIC throughout this chapter.

HCDFRS General Order 300.11 Rapid Intervention and IDLH Initial Entry Teams requires an IRIC be implemented during the initial stages of any operation where crews will be operating in an IDLH atmosphere. The IRIC must be comprised of at least two qualified personnel who are positioned to observe the initial entry team entering the IDLH atmosphere. The personnel must be trained and equipped in full personal protective equipment (PPE), including self-contained breathing apparatus (SCBA). The IRIC must be available for immediate response to rescue the initial entry crew and ensure that at least one (1) member of the IRIC maintain contact with the initial entry crew visually, by voice, and/or by radio. Unless there is a known life hazard, no operation shall take place in the IDLH atmosphere until the IRIC is established. The IRIC function is typically assumed by the first arriving EMS transport unit, if qualified.

As personnel arrive and are available on the incident, the Incident Commander shall reinforce or replace the IRIC to establish a RIC. The RIC must consist of a minimum of four (4) qualified personnel. One of the members of the team, typically a company officer, shall be assigned as the RIC Supervisor. The RIC should remain available for the rescue of personnel operating in the IDLH atmosphere. Depending on the size and complexity of the incident, the Incident Commander should consider reinforcing the RIC with additional RIC's and/or special service companies (Aerial Apparatus or Squad Company).

HCDFRS General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines,, states that the crew of the first arriving EMS transport unit shall report to the scene in full PPE and assume IRIC. If IRIC has not been established, it is the responsibility of the second arriving engine to assume the IRIC function. Unless otherwise advised it is the responsibility of the fourth arriving engine to augment IRIC and establish a RIC. The primary responsibility of the third arriving special service is to establish or support RIC. General Order 300.11Rapid Intervention and IDLH Initial Entry Teams states that the Incident Commander may deviate from the default RIC assignment outlined in General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines providing the function of IRIC and RIC are still assigned to other companies.

Woodscape Drive Incident Overview: Rapid Intervention Crew: RIC and Rescue On July 23, 2018, the Rapid Intervention Crew (RIC) was challenged with the difficult task of locating and attempting to rescue FF Nathan Flynn (Engine 101B) after he fell through a hole in the floor of a burning structure. Prior to the MAYDAY, the Incident Commander assigned Paramedic 56 to Initial Rapid Intervention Crew (IRIC). At 02:18:29, the Incident Commander assigned Truck 7 Rapid Intervention Crew (RIC). Immediately after FF Flynn fell through the hole, Engine 101A pulled on the hose line and Engine 51B reached into the hole in hopes of rescuing FF Flynn. Those efforts were unsuccessful.

After the MAYDAY transmission, the Incident Commander augmented the RIC with Engine 71 at 2:22:18. As the RIC was redeploying resources to the basement entrance, members of Truck 7 and Engine 71 sent members in both directions around the structure from Side A. They were able to determine FF Flynn's point of entry. This also allowed them to view all sides of the structure to ensure the basement entrance was the best option to begin the operation.

Engine 71A and Truck 7A were the first members of the RIC to enter the basement. They reported "cold smoke" conditions creating poor visibility for the members entering. Engine 71A took a few seconds to map the layout of the basement with the use of their Thermal Imaging Camera (TIC). A right-handed search was initiated by the members of the RIC. Engine 71B was on the nozzle of the 300-foot 1¾-inch hose line that was initially deployed from Engine 101 on Side A. Engine 71C was positioned on the hose line with Engine 71B. Truck 7B, Truck 7C, Truck 7A, and Paramedic 56D made entry to begin the search. Truck 7D initially remained on the exterior to prepare the RIC bag for additional air if needed.



Figure 21 RIT entry door to the right, first steps encountered by RIT, and furniture crews had to work around.

Crews first came across a set of steps that led to the first floor (Figure 21). Truck 7B ascended the steps and found high heat conditions and low visibility. The firefighter descended the steps and continued the search. As crews were moving forward into the basement they encountered furniture in their path (Figure 21), smoke conditions that were described as having a black-oily residue consistency, and a slippery floor potentially from the residue in the air. Truck 7C and Paramedic 56D located the second set of steps that led up to the crawlspace where FF Flynn was

located (Figure 15). They could hear the fire in the same direction. Truck 7C wiped his SCBA face-piece and could see a glow. They notified Engine 71B that the fire was in that direction and continued through the door and ascended the steps into the crawlspace where FF Flynn was located.

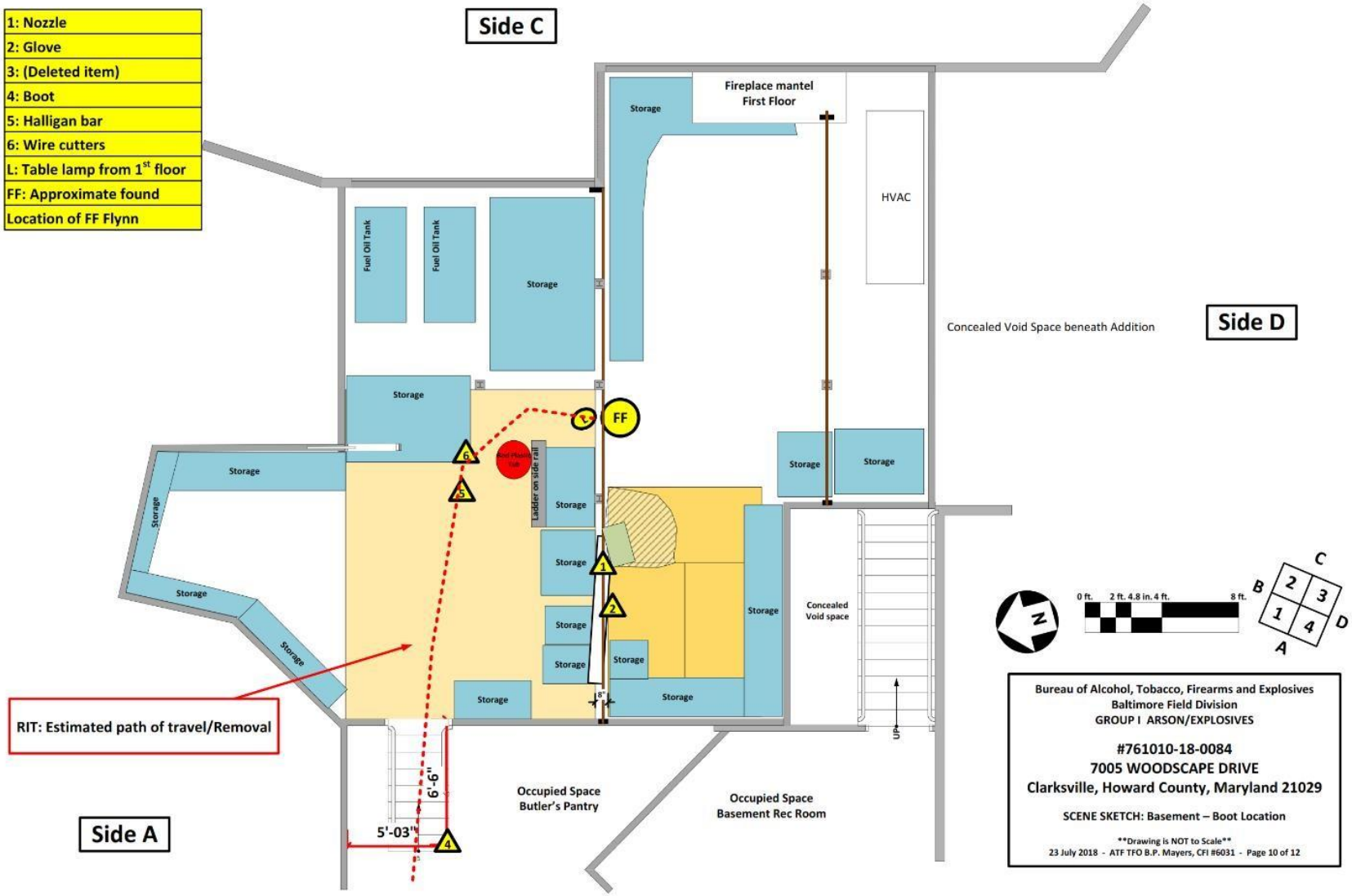


Figure 22 Diagram of RIC Path. Note, Side D on this diagram is incorrectly labeled. It is Side C for the purposes of this report.

Members of the RIC stated that as they got to the top of the steps, visibility was low, the heat had increased and they were able to hear FF Flynn's PASS Alarm. Fire was observed on both sides of the RIC. Engine 71A identified wires hanging from the ceiling level which were pushing against his chest. He removed his wire cutters and began to cut the wires to remove the hazard. At the same time, Truck 7A advised Engine 71B to extinguish the fire. Truck 7A had also become entangled in the wiring. Engine 71A felt Truck 7A's helmet hit his arm. It was determined that Engine 71B's nozzle opened accidentally while becoming entangled in the wiring knocking Truck 7A's helmet off. Engine 71A and Truck 7C assisted with freeing Truck 7A. Once Truck 7A was freed, Engine 71A advised Engine 71B to extinguish the fire. Engine 71B calmly stated to



Figure 23 Steps leading from basement to crawl space where FF. Flynn was located

Engine 71A that the nozzle, and himself, were entangled and he was unable to open the nozzle. Engine 71A removed the entanglement from Engine 71B. Once freed, Engine 71B was able to extinguish the visible fire. It is believed that this is the first water placed on the fire during this incident.

Engine 71C advised Engine 71A that he was progressing forward toward the sound of the PASS Alarm. As they moved forward, they remained low to the floor due to the amount of wires hanging. Engine 71C was the first member of the RIC to find FF Flynn (Figure 26) by following the sound of the activated PASS Alarm. He felt his hand come across FF Flynn's gear and felt around to see how he was positioned.



Figure 24 Crawlspace view from top of the steps. FF Flynn located just past folding ladder on other side of beam.

Engine 71C stated that when he found him, FF Flynn was very stiff, lying face down and slightly on his left side. They stated that there was no visible fire in that area, only smoke conditions. Engine 71C stated that

they felt what appeared to be a four-foot by four-foot hole in the wall and that FF Flynn may be stuck under something. The gauge on FF Flynn's SCBA showed that he still had a cylinder pressure above the red zone. Engine 71C removed his buddy-breathing line from the pouch on his SCBA, but decided not to remove FF Flynn's line and make the connection with air still remaining in FF Flynn's cylinder. As Engine 71C began to pull FF Flynn toward the steps (Figure 28), Engine 71A made it to their location to assist. Engine 71A believed they dragged FF Flynn approximately twenty-five (25) to thirty (30) feet to the steps. Truck 7C arrived at their location to assist with the removal of FF Flynn. Members of the RIC stated that when they saw FF Flynn his left glove was removed and his exposed hand was burned and stiff. FF Flynn's helmet began to fall forward during the removal process. While removing FF Flynn through smoldering debris, the members lost their footing and fell backwards toward the top of the steps.



Figure 29: View from location where FF Flynn was located back toward steps from crawlspace to basement.

At this point in the operation, members from Tower 10, Tower 3, and Engine 22 were inside the basement completing searches and standing by to provide additional assistance. Truck 7B removed FF Flynn down the steps to the main level of the basement. Members of the RIC noticed that some of their low-air alarms on their SCBA were activated at this point. As FF Flynn was removed from the basement crews had to move the furniture to make a straight path to the exterior. Other members in the basement assisted by removing FF Flynn the rest of the way to the exterior. FF Flynn was transferred to EMS personnel at the basement level for patient care and packaging.

Overall, Truck 7 was assigned RIC only one (1) minute and forty-two (42) seconds prior to the MAYDAY transmission from Engine 101A. The Incident Commander reassigned Engine 71 to work for Truck 7 as part of the RIC. Paramedic 56D, who was assigned as part of the Initial Rapid Intervention Crew (IRIC), also worked for Truck 7 as part of the RIC. In addition to the assigned RIC, Tower 3, Engine 22, Engine 61 and Tower 10 were assigned by Charlie Division to assist with rescue efforts. The RIC faced many challenges on that morning to include, but not limited to:

- Limited time to organize a sufficient tool cache
- Size of the structure
- Design and construction of the structure

- Limited personnel on scene at the time of the MAYDAY transmission
- Lack of accountability of all crew members immediately following the MAYDAY transmission
- Low visibility in the crawlspace
- Elevated temperature conditions inside the crawlspace
- Active fire conditions
- The potential of a floor collapse from above, in the area where FF Flynn was found and the RIC was operating
- Members of the RIC becoming entangled in electrical wiring
- Limited ability to communicate via portable radio to the exterior of the structure from areas within the basement.

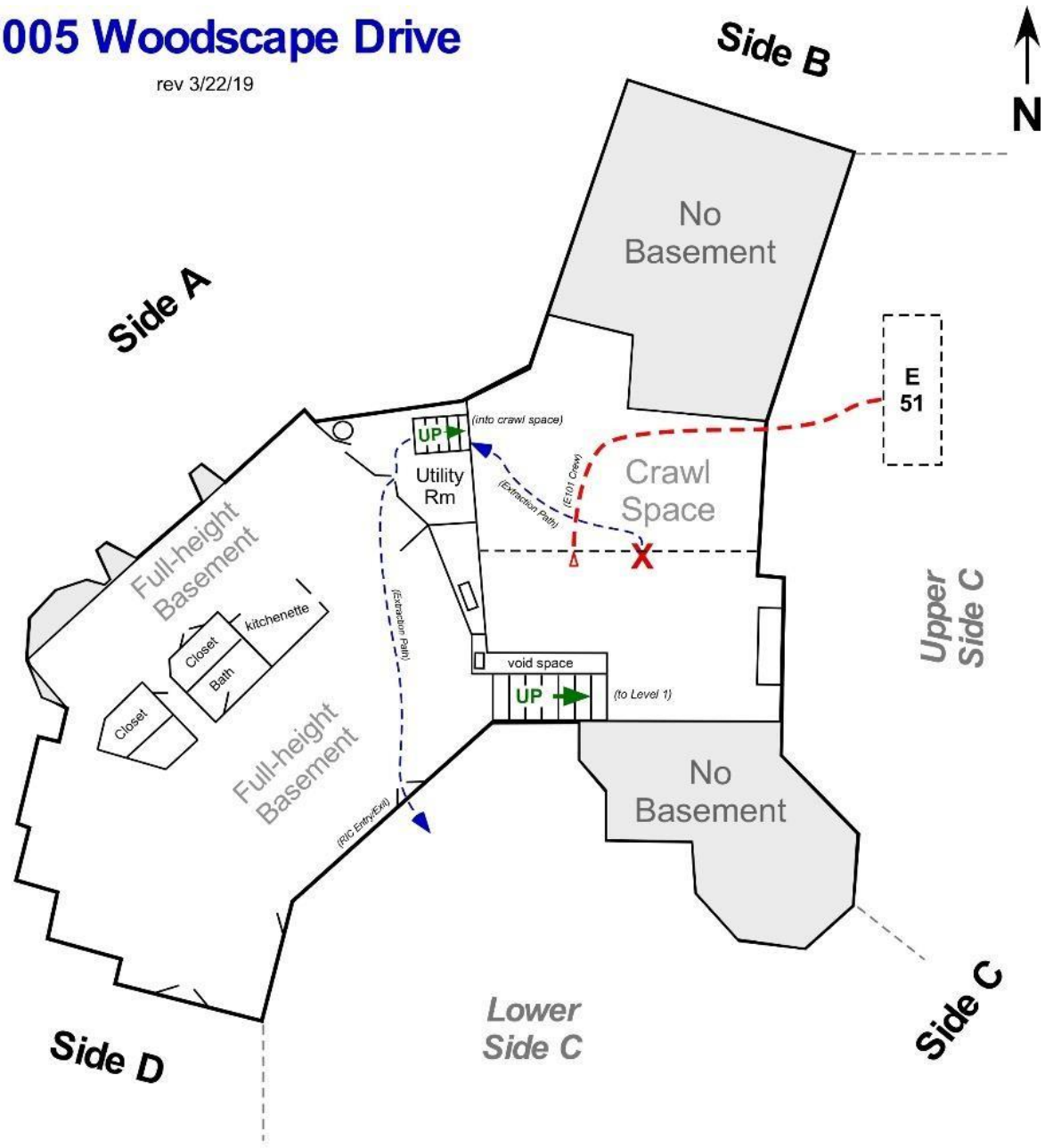


Figure 26 Conditions during RIC Operations from laundry room door (point of entry for FF Flynn).

Despite the many challenges faced by the RIC, FF Flynn was removed in twenty-three (23) minutes and twenty-eight (28) seconds following the MAYDAY transmission, according to incident radio transmission records. This operation was successful due to the training, discipline, knowledge, and skill of the crews assigned to RIC.

7005 Woodscape Drive

rev 3/22/19



Basement Level

B
A 1 2 C
4 3
D

Side/Quadrant Key

X = Victim Location

(drawing not to scale)

Findings and Recommendations: RIC and Rescue

In response to FF Flynn's MAYDAY call, the Rapid Intervention Crew (RIC) overcame numerous obstacles to reach their fallen comrade. These obstacles included the unusual design and size of the structure, limited personnel, low visibility, elevated temperature conditions, as well RIC members becoming entangled and encumbered by electrical wiring in the structure. Despite the many challenges faced by the RIC, according to radio transmission records FF Flynn was removed in twenty-three (23) minutes and twenty-eight (28) seconds following the MAYDAY transmission.

Although the RIC performed admirably, the ISRB identified several actions personnel on the first floor near where FF Flynn had fallen could have taken in attempting to rescue FF Flynn. It is impossible to determine if any of these actions would have altered the outcome of FF Flynn's fatality, but for future incidents these potential actions must be considered. The ISRB is not suggesting that a company should operate above a fire, rather the ISRB is suggesting that these actions should have been considered by other crews in the same proximity of FF Flynn prior to their evacuation from the structure.

First, crews should have considered a method to apply water into the collapsed area where FF Flynn fell. FF Flynn's charged hose line was also through the hole and based on personnel accounts there was an attempt to pull FF Flynn back up using the hose. However, the crews were unable to move the hose line from the hole—making it impossible for crews to use that hose line to apply water to the fire. At the time, there was a second charged hose line behind the remaining crews in the laundry room which could have been retrieved by the crews to apply water to the fire in the crawlspace. Applying water to the fire at that time could have helped control the conditions in the space.

Second, crews should have used their Thermal Imaging Cameras (TIC) to locate FF Flynn and identify associated conditions in the crawlspace. Although Engine 101A had a TIC on their person when FF Flynn fell into the space, there were no indications of crews scanning the hole prior to Engine 101A and Engine 51A evacuating the space. Had it been possible to scan the area, crews may have located FF Flynn, contextualized the conditions in the space, and identified any special resources that may have been needed to extricate FF Flynn.

Third, crews in close proximity to the space in which a MAYDAY firefighter has fallen should attempt a rescue from above. In this particular incident, crews close to the hole FF Flynn fell into did not believe that it was possible to rescue FF Flynn from above. Rather, they believed a rescue from below was the best course of action. The ISRB is not questioning this assessment by crews faced with the strenuous conditions they encountered. However, the ISRB review notes the general lack of training available to HCDFRS members on how to effectuate a rescue from above in realistic conditions. Without even the opportunity for such a training, crews remain unable to conduct MAYDAY rescues from above.

Fourth, the Initial Rapid Intervention Crew (IRIC) was not established near the point of entry of crews operating in an IDLH environment and were not operating as a team during this incident. Under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, IRIC responsibility fell to Paramedic 56 based on arrival order. Upon arrival, Paramedic 56's crew dressed out in PPE and reported to the scene. On the scene, Paramedic 56A and Paramedic 56D split up. Paramedic 56D began IRIC functions (deploying ground ladders and forcing and controlling doors as a means of egress for interior crews) and met up with the RIC once it was established. Paramedic 56A reported to Engine 51D to assist with establishing a water supply from the pool.

Paramedic 56A was in a separate location from Paramedic 56D and was not part of the RIC or IRIC functions for FF Flynn. Based on statements from individuals on the fireground, Paramedic 56A assisted in establishing water supply based on a standing practice for Station 5 A-shift. Paramedic 56A continued to assist Engine 51D in establishing a water supply as RIC operations were being conducted. Once the water supply was established, Paramedic 56A reported to assist with patient care of FF Flynn as he was removed from the structure.

Throughout the incident, the Incident Commander was unaware that Paramedic 56 separated, assuming that Paramedic 56 was operating as a team of two and fulfilling IRIC functions. At 02:12:01, Incident Command asked Paramedic 56 to confirm their location. Paramedic 56D confirmed IRIC on Side A. At no point during the incident did the crew from Paramedic 56 operate as a team while performing IRIC functions. For future incidents, crews designated as the IRIC should remain operating as a unit until they are assigned to another function by the Incident Commander.

Fifth, Engine 111 was the fourth arriving engine company on location and should have established the RIC based on General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, however Engine 111 first reported to a secondary water supply location to assist Engine 71. This decision was confirmed by the Incident Commander and the Incident Commander did not provide Engine 111 another assignment until FF Flynn was removed from the structure. Engine 111 not reporting to the scene after securing Engine 71's water supply limited the tactical options available to the Incident Commander.

Sixth, Truck 7 was assigned RIC duties at 02:18:19 by the Incident Commander. At that time, RIC was positioned at the entrance to the first floor on Side A. One (1) minute and forty-two (42) seconds later (02:20:11) the MAYDAY was declared. This did not afford Truck 7 enough time to complete a 360-degree survey of the building, a risk assessment, rescue plan, and the time to gather the proper cache of RIC equipment. With the extreme time constraint, Truck 7 was not able to meet with the Incident Commander to confer about the operational plan and location of all companies within the structure. Additionally, the location and extent of the fire had not been determined by companies operating on the fireground.

Seventh, Engine 71 and Paramedic 56D were assigned to assist Truck 7 as part of the RIC. Engine 71 and Paramedic 56D were positioned on Side A of the structure at the front door with Truck 7

when the MAYDAY was declared. Engine 71 was manning a 300-foot 1¾-inch charged hose line from Engine 101's apparatus. Following the MAYDAY transmission, Engine 71 was reassigned by the Incident Commander to work for Truck 7 as part of RIC. Paramedic 56D that was performing the IRIC functions also joined RIC per General Order 300.11 Rapid Intervention and IDLH Initial Entry Teams. The Incident Commander did not verbally assign Paramedic 56 to RIC, however, later radio transmissions show that the Incident Commander was under the impression that Paramedic 56 was working with the RIC.

Engine 71 redeployed the 300-foot 1¾-inch charged hose line around Side D to the Side C basement entrance. While this was being completed, Truck 7A repositioned around Side B to the Side C basement entrance. This allowed members of the RIC to collectively see all sides of the structure. The RIC assembled at the entrance to the basement on Side C and eventually made entry from this point to conduct the RIC operation. At 02:30:12 hours, the Incident Commander notified the Side C Division Supervisor that he was sending Tower 3 to assist Truck 7 and Engine 71. At this point in the operation, the RIC was inside the structure attempting to locate FF Flynn.

Eighth, crews working on the first floor of the structure during the MAYDAY immediately attempted to rescue FF Flynn. After FF Flynn fell through the hole in the floor, Engine 51B reached into the hole in an attempt to help FF Flynn out, but was unable to locate FF Flynn. Engine 51B advised Engine 101A that the fire was below them, with heat coming through the hole. He also advised that they needed help and were unable to reach FF Flynn from that location. Engine 51A located and removed Engine 101A from the immediate area. Engine 51B exited the structure with them.

While Engine 101A, Engine 51A, and Engine 51B were exiting, Tower 10A and Tower 10B identified two hose lines leading into the laundry room on Floor 1. The first hose line was the one FF Flynn had been operating and the second was the one deployed by Engine 51's crew. To avoid confusion during RIC operations, Tower 10A instructed Tower 10B to remove the line deployed by Engine 51. Tower 10B removed the line, leaving only the hose line FF Flynn had operated. Tower 10A and Tower 10B exited the structure once they heard that Engine 101A was out of the building and FF Flynn was in the basement.

Ninth, RIC operations were successfully completed using the basement entrance on the lower Side C. The RIC was comprised of Truck 7, Engine 71, and Paramedic 56D. Tower 3, Engine 22, Engine 61 and Tower 10 assisted in RIC operations, making entry from the same location. Many challenges were presented to the RIC during the operation. The RIC Supervisor was unable to transmit radio communications from the area where FF Flynn was found. Members of the RIC operated in low-visibility conditions with elevated temperatures and active fire in the space. Multiple RIC members and the nozzle of the hose line became entangled in wiring that was hanging in the space. The members of the RIC and members that assisted with the operation overcame all of the obstacles presented to them. While FF Flynn did not survive his injuries, the actions and bravery of the crews allowed the safe recovery of FF Flynn from the structure.

Lastly, the Incident Commander assigned additional RIC crew resources as soon as more units arrived at the incident scene. A second RIC, referred to as "RIC Number Two," was assigned to the basement entrance on Side C. This second RIC team included Engine 61, Engine 91, and Engine 22. Prior to being assigned to RIC Number Two, Charlie Division assigned Engine 22 to assist the RIC inside the basement. Engine 61A was assigned as the second RIC Supervisor. Although RIC Number Two was never officially deployed, members assisted with the removal of FF Flynn from the basement level.

Findings	**Recommendations**
F.1. Crews near the collapsed area where FF Flynn fell should have considered a method to apply water to the area	F.1.1. Train crews who may be operating near a MAYDAY to respond to the MAYDAY situation while continuing to address suppression activities. F.1.2. HCDFRS must develop a progressive training plan that develops and reinforces basic skills. This training plan must include: • RIC training at least bi-annually, focusing on low frequency, high stress situations for operations and communication staffing. • Instruction for personnel on actions to be taken from different positions within the structure. For example, personnel shall be instructed on proper search techniques when searching for a downed firefighter, rescue from the floor above, stabilizing conditions, and providing protection to the MAYDAY firefighter. • Officer training on managing a MAYDAY emergency. This training can take place simultaneously with the RIC training previously discussed.
F.2. Crews should have used their Thermal Imaging Cameras (TIC) to locate FF Flynn and identify associated conditions in the crawlspace.	F.2.1 Crews should receive training on TIC usage and TIC limitations, and they should regularly use the TIC on various types of incidents to gain familiarity with the devices.

Findings	Recommendations
F.3. Crews near the space in which a MAYDAY firefighter has fallen should attempt a rescue from above	See Recommendation F.1.1
F.4. The IRIC did not function as a team, with the two members in separate physical locations completing separate tasks.	F.4.1. The Incident Commander should ensure that IRIC remains ready for deployment as a team of two. The IRIC shall be positioned at the initial point of entry for rapid deployment. F.4.2. Train IRIC personnel to remain a team of two. Personnel must understand the difference between functioning as a back-up crew and IRIC.
F.5. Engine 111's failure to assume RIC as dictated in General Order 310.01 did not impact RIC operations during the incident because the Incident Commander assigned RIC duties to Truck 7 prior to the MAYDAY.	F.5.1 Notwithstanding the lack of impact, HCDFRS must revise General Orders to instruct the Communications Center to advise the third arriving engine that they are the RIC. (See F.6.1). F.5.2 The highest-ranking responding officer, typically the responding Battalion Chief, should confirm with the third engine company that they will be the RIC engine. The RIC engine should acknowledge the assignment shortly after units transmit they are responding. F.5.3 Shift directives that may alter assignments must be communicated to the Incident Commander.
F.6. Truck 7 lacked enough time because of their delayed assignment to RIC and the subsequent immediate MAYDAY to gather all standard RIC equipment and do a 360-degree assessment of the dwelling.	F.6.1 HCDFRS must add an additional engine company to all Box Alarms, including Local Box assignments, with the third due engine (minimum 4 personnel) dedicated as the RIC.
F.7. The RIC at Woodscape Drive consisted of Truck 7, Engine 71, and Paramedic 56D. Engine 71 supplemented Truck 7 in completing the 360-degree assessment of the dwelling.	F.7.1 The IC must articulate the companies that form a RIC at an incident, including single resources like Paramedic 56D at this incident.
F.8. Crews working on the first floor of the structure during the MAYDAY immediately attempted to rescue FF	F.8.1 An additional Safety Officer should be assigned to RIC operations with responsibility of the safety of the RIC. The Safety Officer should monitor incident

Findings	Recommendations
Flynn but determine that rescue should be made via the basement.	conditions and operational periods to assist with managing air supply. If necessary, the Safety Officer should request additional resources to ensure the RIC operation may continue with minimal interruption.
F.9. The RIC members and members that assisted with the operation overcame all obstacles presented to them. Although FF Flynn did not survive, the actions and bravery of the crews allowed the safe recovery of him from the structure.	No recommendation
F.10. For large structures with multiple points of entry, a second RIC is needed to ensure quick response time to any potential MAYDAY emergency.	F.10.1 ICs should consider assigning additional RICs when multiple points of entry are used. The size of the structure should identify the need for additional RIC's and/or enlarging the RIC to ensure adequate personnel are assigned if an emergency occurs. F.10.2 HCDFRS must develop a General Order that Addresses tiered RIC structures based on the complexity of an incident (e.g., adding additional engine(s), special services, or a collapse team with a Level II RIC structure).

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G. Accountability

General Background: Accountability

Fire and Rescue Departments employ a variety of operational measures to improve firefighter safety during an incident.[34] One operational measure that is widely used and accepted is the development and implementation of an accountability system. Accountability, as defined in the National Fire Protection Association (NFPA) 1561 Standards on Emergency Services Incident Management System and Command Safety, refers to the process or system used at an incident scene to track resources, including personnel. A Personnel Accountability System (PAS) is one that, "readily identifies both the location and function of all members operating at an incident scene."[35]

NFPA has developed voluntary national consensus standards regarding firefighter occupational health and safety. Under the 2018 NFPA 1500 Standards on Fire Department Occupational Safety, Health, and Wellness Program, Section 8.5 outlines personnel accountability standards for fire and rescue services departments to improve personnel safety during a fire incident. This standard requires a fire department to, "establish written standard operating procedures for a personnel accountability system that is in accordance with NFPA 1561."[36] Additionally, under this standard, "[T]he incident commander shall maintain an awareness of the location and function of all companies or crews at the scene of the incident."[37]

Aligned with the national standard, the Maryland Occupational Safety and Health (MOSH) consensus standard requires fire departments to develop, "a resource and personnel accountability system that meets the general concepts of NFPA 1500, and NFPA 1561."[38] More specifically, under the MOSH standard the system must include:

(a) Activation of the system upon arrival at all emergency incidents
(b) A provision for requirements for a Personnel Accountability Report (PAR) at specified times during the incident, as identified by the AHJ, including each of the following:
    i. The time of a change from offensive to defensive operations
    ii. The occurrence of a significant event, such as a building collapse;
    iii. The time when a known life hazard is eliminated···and;
    iv. MAYDAY situation

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[34] Kumar Kunadharaju, Todd D. Smith, David M. DeJoy, Line-of-Duty Deaths Among U.S. Firefighters: An Analysis of Fatality Investigations, 43 ACCIDENT ANALYSIS & PREVENTION 1171-1180 (2011).

[35] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY 1561 (2014).

[36] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY 1500.8.5.1 (2014).

[37] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY 1500.8.5.1 (2014).

[38] MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).

(c) All emergency responders operating at an emergency operation shall participate in the AHJ's personnel accountability system.

This section addresses only the accountability of personnel at an incident, not the responsibility that is assigned to department members in the care, understanding, and use of their assigned apparatus and equipment. The accountability as to apparatus and equipment will be addressed in a Section III.L Apparatus and Equipment of this report.

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Accountability

HCDFRS General Order 300.02: Personnel Accountability established its personnel accountability system on February 2, 1993 (revised on June 4, 2013), with the goal being, "...to efficiently account for personnel responding to and operating on the scene of an emergency incident. The personnel accountability system gives incident commanders a fast and efficient means to account for all fire and rescue personnel responding to or on the scene of an emergency."[39]

When the Howard County Communications Center (Communications Center) dispatches units to a fire incident, the dispatchers, "monitor and record the number of personnel responding to an incident."[40] After all units report as responding for the initial alarm and each subsequent alarm, the Communications Center will report total staffing numbers to the Incident Commander. Additionally, in the time between the arrival of the first unit and the transmission of the "fire out" benchmark by the Incident Commander, the Communications Center will transmit an alert tone every fifteen (15) minutes. On hearing the fifteen (15) minute duration reminder, the Incident Commander or Accountability Manager will request Personnel Accountability Reports (PARs) from all supervisors.

The HCDRFS incident scene personnel accountability system relies on the use of Personnel Accountability Tags (PATs) and Personnel Accountability Reports (PAR). All HCDFRS personnel are issued a PAT, attached to a snap fastener, which they are to keep on their turncoat using an existing "D" ring when not responding to an incident. HCDFRS personnel place their PAT on a collector ring inside the cab of their assigned unit, usually at the beginning of a shift. While operating within the hazard zone, personnel assigned to divisions, groups, or units will provide periodic PARs to signify that, "all personnel assigned to that division, group, or unit operating in the hazard zone have been identified, positively located, and accounted for."[41]



Figure 27 HCDFRS Collector Ring

Under the HCDFRS Personnel Accountability System there are three levels of accountability. Level I Accountability, the minimum for an incident, requires that supervisors, "maintain a constant awareness of the position and function of all personnel

[39] Howard County Dept. of Fire and Rescue Services, General Order 300.2 Personnel Accountability (1993).
[40] Howard County Dept. of Fire and Rescue Services, General Order 410.01 Communication (2005).
[41] Howard County Dept. of Fire and Rescue Services, General Order 300.2 Personnel Accountability (1993).

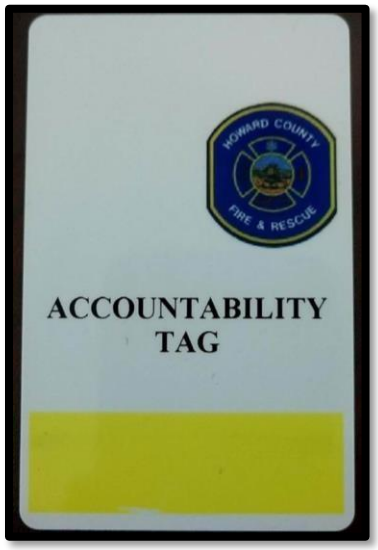


Figure 28 HCDFRS Accountability Tag

assigned to operate under their supervision."[42] As a practical matter, at this level the PATs are on the dispatched units' respective collector rings and maintained in the cab of each unit. For any responder on scene that was not on a dispatched unit, they must report to the Incident Commander for assignment. After assignment, their PAT should be added to the collector ring of their assigned unit.

Level II Accountability, which is activated when conditions within the hazard zone may pose a danger to operational personnel, an Accountability Manager (or the Incident Commander) gathers and organizes the PAT collector rings on an Accountability Control Board located near the Command Post. Additionally, the Accountability Manager or Incident Commander will seek PAR Status Reports from all units operating within the hazard zone at fifteen (15) minute intervals.

Level III Accountability is activated by an Incident Commander when the Incident Commander determines an incident requires, "more stringent accountability." At this level there is "Point of Entry" accountability, which involves a designated division or group supervisor assigned to every point of entry to a structure or confined space. Additionally, supervisors should monitor air supply and work period longevity, recording the name, company number, duration of air supply, time of entry, and assignment on an Entry Control Chart.

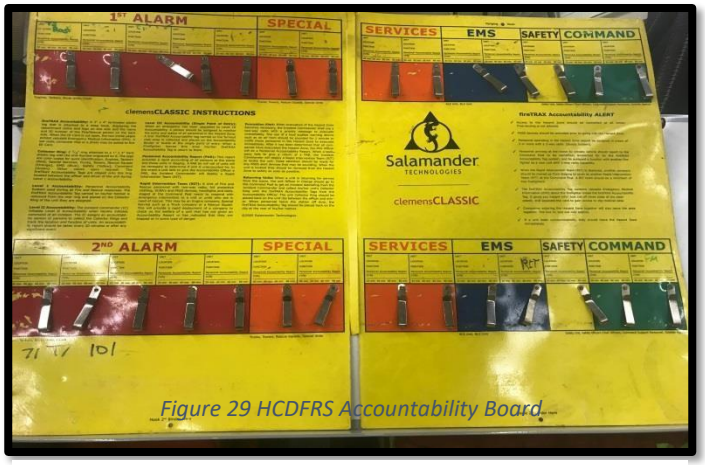


Figure 29 HCDFRS Accountability Board

When personnel exit a control point, the supervisor at that area should record it while the personnel inform their division or group supervisor of their exit. Should there be personnel unaccounted for, the supervisor will report the "missing" personnel to the Incident Safety Officer, with that information then being relayed to the Incident Commander. If the crew is unable to contact the "missing" personnel through either a physical search or radio contact, a MAYDAY is declared.

[42] Howard County Dept. of Fire and Rescue Services, General Order 300.2 Personnel Accountability (1993).

Beyond the Accountability measures in HCDFRS General Order 300.02: Accountability, HCDFRS General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines requires PAR. Specifically, in General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines the Incident Commander is to,

> "actively request and receive ongoing **Unit Status Reports** from the units (or their division or group supervisors) that have been assigned tasks in the hazard zone. When reporting status, units should report the conditions they have, the actions they have taken, and their needs for additional resources or actions of others, and end the report with their PAR status." (emphasis in original).

Woodscape Drive Incident Overview: Accountability

The Communications Center dispatched Paramedic 56, Engine 51, Engine 101, Tower 10, and Battalion Chief 1 at 01:52:14 on July 23, 2018 for a Local Box Alarm 5-62 after receiving a resident call advising of an odor of smoke but no visible flames. Tower 10 acknowledged with four personnel and Engine 51 acknowledged with five personnel at 01:54. There were no radio acknowledgements of personnel numbers from Engine 101, Paramedic 56, or Battalion 1. Engine 51 arrived on scene at 02:00:29 and upgraded the assignment to a full Box Alarm.

Upgrading to a Full Box Alarm assignment, the Communications Center dispatched Truck 7, Paramedic Engine 71, Paramedic Tower 3, Engine 111, and Paramedic 105 at 02:01:56. Paramedic Engine 71 acknowledged with 4 personnel at 02:03:11. Paramedic 105 acknowledged the call, but did not state its staffing levels. There were no radio acknowledgements of personnel numbers from Truck 7, Engine 111, or Tower 3.

Incident Command was established at 02:03:55 with Battalion Chief 1 as Command. Engine 51 was assigned Fire Attack at 02:04:31. At 02:19:10 Command acknowledged the fifteen (15) minute mark and requested a task force, for which the Communications Center dispatched Squad 1, Engine 61, and Engine 91. Before the Incident Commander was able to call for a PAR, there was a MAYDAY call from Engine 101A at 02:20:11. After the MAYDAY call, the Communications Center stopped fifteen (15) minute notifications and activated channel markers (a periodic audible tone) indicating a restriction on non-essential radio communications. The Channel markers continued until FF Flynn was removed from the dwelling, the Incident Commander issued an evacuation order and switched to a defensive strategy, and a PAR was completed of all units. Specifically, channel markers were activated at 02:21:13 and continued until 02:47:00. The only indication of a fifteen (15) minute marker was the Incident Commander's acknowledgement at 02:19:10, although the channel markers stopped at 02:47:00 and the Incident Commander had not issued the requisite "fire out" benchmark.

After the MAYDAY was called by Engine 101A, the Incident Commander issued a number of PARs for operating units. The initial PARs were disjointed because Engine 51 and Engine 101 lacked crew integrity, as discussed in Section III. H Crew Integrity of this report. The Incident Commander conducted PARs of operating units, but his confusion as to where crews were operating and the crew leaders' lack of crew accountability undermined the PARs. A particular note of confusion was from Engine 51A, who was unable to account for the location of his crewmembers after the MAYDAY.

Findings and Recommendations: Accountability

Personnel Accountability was generally lacking throughout this incident due to a number of factors. First, some of the responding units lacked Level I accountability because of inconsistent collection and organization of PATs. Some responding personnel used Level II Accountability before it was established by Incident Command. Specifically, a few units brought their collector rings to the Command Post before Level II Accountability was established. The rings were left either on the vehicle hood or on the ground next to the vehicle hood. This action caused problems for the Battalion Aides as they attempted to locate and place collector rings on the Personnel Accountability Control Board once Level II Accountability was established. Although well intentioned, this practice caused delays in establishing Level II Accountability and could negatively impact future incidents. This common practice with HCDFRS should be changed to ensure accountability in future incidents.

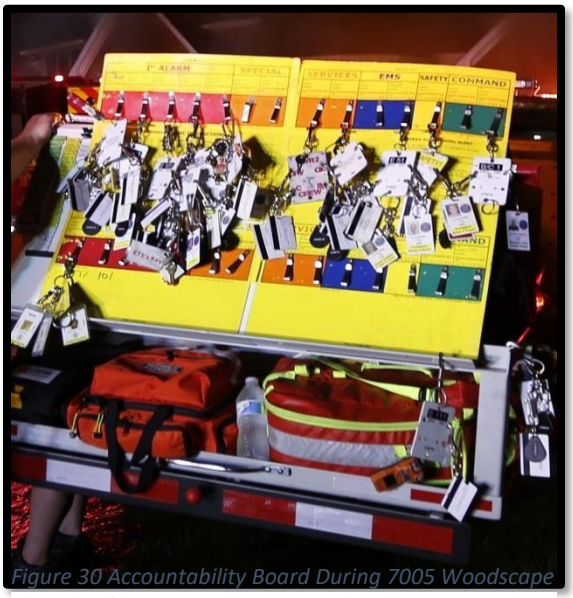


Figure 30 Accountability Board During 7005 Woodscape Drive Incident at 0353.

Second, the Incident Commander's understanding of crew location and deployment did not match the actual locations of the crew. At 7005 Woodscape Drive, the Incident Commander arrived on location, assigned a Fire Attack group, and then ordered tactical assignments including confirming Initial Rapid Intervention Crew (IRIC) duties, assigning Rapid Intervention Crew (RIC) duties, addressing water supply, and having an engine company on-deck for any needed assignment. During this time, communications between the Incident Commander and members operating in the offensive suppression mode as the Fire Attack group became confused. One possible reason for the confusion is that responding crew did not use the multi-story numbering convention outlined in HCDFRS General Order 300.07: Incident Command System. Instead, there were different terms used to describe similar areas of the structure, referencing "basement," "ground level," "first level," "floor number one" and "lower section" all within the first 28 minutes of the incident to communicate geographical information to the Incident Commander. The lack of common terminology created different mental pictures in the operating members and the Incident Commander.

FLOOR NUMBER 4
FLOOR NUMBER 3
FLOOR NUMBER 2
FLOOR NUMBER 1
SUB-FLOORS AND LEVELS DESIGNATED AS ACTUAL NAME OF THE SUB-FLOOR
"BASEMENT FLOOR" "MEZZANINE LEVEL" PARKING LEVEL 1"

Third, although the Incident Commander had a general understanding of staffing levels from Engine 51, Engine 101, Tower 10 and later

responding units — and the officers of those units clearly know the number of firefighters, their names, and their crew numbers — there is no indication that the Incident Commander had foreknowledge of additional staffing provided by volunteer firefighters on Engine 51 or any other volunteer station. Additionally, it is unlikely that the Incident Commander could have known that Engine 111A ordered Tanker 11 and Paramedic 115 to initiate a self-dispatched response to the scene via telephone. This action is not a common practice in HCDFRS. There was no indication that the Incident Commander knew that these crews arrived, and the crews divided and assumed operational tasks without being assigned by the Incident Commander.

Separate of any requirement by HCDFRS, it is common practice for operational Battalion Chiefs to carry a printout of daily TeleStaffing which is the Department's electronic staffing management program. An issue identified with this practice is that station officers may rotate assignments of firefighters to meet daily operational needs. Thus, what is depicted in TeleStaff does not always represent unit assignments within a particular station.

Fourth, in reviewing the policies and practices of Heavy Vehicle Operators (HVOs), the ISRB found that there is understandable confusion about whether HVO PATs should remain with their assigned apparatus or be included on the collector ring with the crew. If the HVO's tag is not included as part of the crew's collector ring, the HVO may inadvertently be missed in a PAR check. However, an HVO tag included on the collector ring while the HVO remains outside of the hot zone could lead to confusion.

Fifth, it is unclear whether personnel who responded to the scene, but were not dispatched, followed the appropriate protocols for accountability. Under General Order 300.02: Personnel Accountability responders that are not on a dispatched apparatus must:

1. Report to the Incident Commander and identify themselves on arrival
2. Await assignment from the Incident Commander
3. Place their PAT on the assigned unit collector ring

The purpose of this policy is to provide the Incident Commander awareness of the incident while maintaining flexibility to incorporate personnel for larger incidents in Howard County and surrounding jurisdictions. On this incident various personnel responded, but the ISRB was unable to determine if these responders followed these requirements. One notable instance, however, was the notification of Station 11 by the officer of Engine 111's cell phone. From that call, Tanker 11 and Paramedic 115 responded to the incident instead of being dispatched by the Communications Center or requested by the Incident Commander. These units responded and notified the Communications Center on Alpha 1, then switched to Bravo 6.

Sixth, while there are clear guidelines for the Communications Center responsibilities to support accountability efforts, the ISRB found a conflict between the Communications Center's practices and the General Orders. In a December 2, 2016 email from the Fire Department Liaison, dispatchers were instructed to no longer, "do personnel counts on box alarms." An email dated December 3, 2016 from the Assistant Chief of Emergency Services explained that notations

concerning staffing will no longer appear in Computer Aided Dispatch (CAD) notes. This was corroborated by a December 12, 2016 email from the Fire Department Liaison Supervisor to the 911 Center. The sum of all three emails creates a conflict with General Order 300.02: Personnel Accountability in the Procedures Section, Item 11, which requires dispatchers to include personnel counts on box alarms. These inconsistencies could cause confusion between the dispatchers and the Incident Commanders.

Seventh, the Communications Center discontinued the fifteen (15) minute notifications during the incident after the MAYDAY transmission. The IRSB understands that, in general, units and Communications Center limited their radio transmissions on Bravo 1 so as not to interfere with the RIC operation, however, a continuation of the notification (possibly on a different tactical channel) may have improved incident management. The Communications Center did provide the Incident Commander with a delayed fifteen (15) minute notification which the Incident Commander acknowledged at 02:19:10. In this particular incident, the notification was delayed four (4) minutes due to heavy radio traffic. Also, the Incident Commander received various other face-to-face communications in quick succession at this same time and the MAYDAY occurred a minute after the Communications Center fifteen (15) minute notification.

Eighth, HCDFRS General Order 300.02: Personnel Accountability does not reflect current fireground operations. Under the MOSH Consensus Standard, departments should routinely review and update procedures. It is unclear when General Order 300.02: Personnel Accountability was last reviewed, but its most recent revision was on June 4, 2013.

Ninth, the current system for accountability using verbal PAR reports is time consuming and requires significant radio communications. For example, Engine 101's officer declared a MAYDAY at 02:20:11 before Incident Command initiated PAR at the fifteen (15) minute notification mark. After the initial MAYDAY, there were no additional MAYDAYs. The Incident Commander on receipt of the MAYDAY initiated efforts to determine which members of each operating crew were missing (02:23:47 to 02:29:33). Seven (7) minutes (02:27:10) after the MAYDAY the Incident Commander conducted a formal PAR, which took five (5) minutes to complete (02:32:09). During that time, the Incident Commander and operating crews identified that FF Flynn was missing and located all other firefighters and officers from Engine 51, Engine 101 and Tower 10. This entire process took twelve (12) minutes to complete. This delay could be shortened, and radio traffic lessened, by new technologies available.

Tenth, the Charlie Division supervisor was unclear as to which crews were assigned to his division during the incident. Although the Incident Commander believed that he had clearly communicated which crews had been assigned to Charlie Division, an accumulation of factors, including imprecise wording, led to confusion. HCDFRS should assign an accountability manager to Incident Commanders, as well as division and group supervisors, to assist with accountability when the situational demands exceed the ability of an incident commander and division supervisors to make decisions and maintain accountability of units and personnel.

Lastly, crews were provided specific assignments, but did not consistently refer to themselves by their assignments. Clear and consistent communication is an important component of crew accountability. Based on a review of radio transmissions, Engine 51A was assigned as the Fire Attack group supervisor and Engine 51 and Tower 10 were assigned to the Fire Attack group. However, Engine 51A continued to refer to himself as "Engine 51" and not "Fire Attack." Tower 10A attempted to contact Fire Attack after Engine 51's assignment, but Fire Attack failed to respond back to Tower 10. HCDFRS should provide additional training on proper radio procedures pursuant to General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines and General Order 300.07: Incident Command System. Additionally, training should be provided on the use of the "communications order model" as specified in General Order 410.01: Communications, Section 9.3.

Findings	**Recommendations**
G.1 Some responding units lacked Level I accountability established under HCDFRS General Order 300.02: Personnel Accountability because of inconsistent collection and organization of Personnel Accountability Tags.	G.1.1 Revise General Order 300.02 Personnel Accountability. Specifically, an accountability manager is critical to the safety of operating crews and there should be a standard process to quickly appoint one on all multi-unit responses. G.1.2 All members of HCDFRS shall be provided accountability and crew integrity training so they understand the necessity for and implementation of accountability relating to incident management, PARs, and MAYDAY situations. G.1.3 HCDFRS must revise the personnel accountability control boards to better meet the intent of NFPA 1561 4.5.2, particularly to identify units' geographical location and functional assignments. G.1.4 HCDFRS should provide initial and continuous training to responders on General Order 300.02: Personnel Accountability and, in particular, identify the need for use of remote accountability boards at incidents that involve large structures or large incident scenes. This should include training for initial responders serving

Findings	Recommendations
	as an accountability manager for an incident commander or division and group supervisors.
G.2 The Incident Commander's understanding of crew location and deployment did not match the actual locations of the crew.	G.2.1 HCDFRS should initiate the use of common terminology when referencing occupancies in all communications, to maintain a shared mental model. In particular, all HCDFRS members should reference occupancies based on NIMS Incident Command System. G.2.2 General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines (41) should be revised to reflect this recommendation and crews should use "floor number ____" in all communications when referencing floors of a structure in conjunction with basement, attic and roof as specified in General Order 300.07: Incident Command System (Line 278). G.2.3 HCDFRS crews should state Location in addition to Conditions, Actions and Needs (LCAN) when an assignment is completed or when requested by the Incident Commander. This change should be reflected in the applicable General Orders. G.2.4 In revising General Orders, HCDFRS should consider emphasizing reporting a PAR at the end of an LCAN report.
G.3 Although the Incident Commander had a general understanding of staffing levels from Engine 51, Engine 101, Tower 10 and later responding units—and the officers of those units clearly know the number of	G.3.1 HCDFRS should examine how volunteer member accountability is maintained and should determine a means of tracking volunteer members staffing on units as it changes throughout any particular shift.

Findings	Recommendations
firefighters, their names, and their crew numbers—there is no indication that the Incident Commander had foreknowledge of additional staffing provided by volunteer firefighters on Engine 51 or any other volunteer station.	G.3.2 Use of new or existing technologies could assist in identifying staffing levels. HCDFRS should explore technologies and procedures available to address volunteer and career staffing assignments.
G.4 In reviewing the policies and practices of Heavy Vehicle Operators (HVOs) there appears to be room for interpretation of whether HVO PATs should remain with their assigned apparatus or be included in the collector ring with the crew.	G.4.1 HCDFRS should establish a procedure to account for an HVO and the HVO's PAT when a HVO operates separate of a crew as represented on the crew's collector ring. G.4.2 Establishing a procedure for PATs and collector rings to account for a firefighter who moves between crews.
G.5 It is unclear whether personnel who responded to the scene, but were not dispatched, followed the appropriate protocols for accountability.	G.5.1 HCDFRS should review associated General Orders and modify as needed to restrict an officer from self-dispatching units by phone or radio to an incident, separate of the Incident Commander.
G.6 While there are clear guidelines for the Communications Center responsibilities to support accountability efforts, the ISRB found a conflict between the Communications Center's policies and practices and the General Orders.	G.6.1 The HCDFRS and Communications Center must agree upon how unit staffing information will be relayed from units and summarized to the incident commander on multi-unit responses. The result should be consistent written policies and training for both HCDFRS and Communications Center staff.
G.7 Communications Center discontinued the fifteen (15) minute notifications during the incident after the MAYDAY transmission.	G.7.1 HCDFS should establish a command channel on incidents as needed. G.7.2 To align with NFPA Standard 1500, Section 8.2.5.1, HCDFRS should

Findings	Recommendations
	adjust its interval notifications from fifteen (15) minutes to ten (10) minutes. G.7.3 The practice of time interval notifications from Communications Center to the Incident Commander is a critical task that should be continued. During a MAYDAY, the notifications should be restricted to a command channel. After the MAYDAY situation is resolved, interval notifications should resume on the operations channel.
G.8 HCDFRS General Order 300.02 Personal Accountability does not reflect current fireground operations.	G.8.1 General Order 300.02 Personnel Accountability should be reviewed, updated, and republished. G.8.2 All General Orders that reference or discuss Accountability procedures should be congruent to the revised General Order 300.02: Personnel Accountability.
G.9 The current system for accountability using verbal PAR reports is time consuming and requires significant radio communications.	G.9.1 HCDFRS should consider moving to an electronic or radio-based PAR system.
G.10 The Charlie Division supervisor was unclear as to which crews were assigned to his division during the Incident.	G.10.1 HCDFRS should consider division and group supervisors having an accountability manager to assist with accountability when the situational demands exceed the ability of a group or division supervisor to make decisions and maintain accountability of units and personnel.
G.11 Crews were provided specific assignments but did not consistently refer to themselves by their assignments.	G.11.1 HCDFRS should provide additional training on proper radio procedures pursuant to General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines

Findings	Recommendations
	and General Order 300.07: Incident Command System. Additionally, training should be provided on the use of the "communications order model" as specified in General Order 410.01: Communications, Section 9.3.

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H. Crew Integrity

General Background: Crew Integrity

Firefighting is inherently risky, but there are several industry-wide norms used to mitigate those risks. A primary example is the concept of crew integrity. Although there is not a universal definition of crew integrity, it is generally understood as a group of firefighters working together as a team to complete a mission. A critical component of maintaining that team is keeping contact with other team members through sight, verbal commands, or physical contact.[43]

Crew integrity was well defined in Line of Duty Death Investigative Report for Technician I Kyle Wilson from the Prince William County (Virginia) Department of Fire and Rescue,

> "crews involved in incident operations within a hazardous environment must operate as a member of a team of at least two or more qualified personnel. Team members are to maintain contact with each other at all times by sight, voice, or physical contact depending on the conditions in which they are operating."

This description incorporates Occupational Safety and Health Administration regulatory requirements set by 29 CFR 1910.134 (g)(3)(ii), 1910.134(g)(4), and 1910.134(g)(4)(i).

Physical means of maintaining crew integrity include, but are not limited to, physical touch, use of a hose line, signal line or search rope. Audible communication being either face-to-face or radio communications between all members of a crew. No matter what form of contact is used, members must remain in close proximity to each other to provide assistance if needed.

National Fire Protection Association (NFPA) Standard 1561 Standard for Emergency Services Incident Management System and Command Safety, provides a framework to analyze crew integrity.[44] Specifically, the standard places responsibility for crew integrity with the supervisor of the resources (including crew) assigned within the supervisors geographical or functional area of responsibility.[45] Additionally, NFPA 1561 Section 4.5.8 states that, "[w]here assigned as a company/crew/unit, responders shall be responsible to remain under the supervision of their assigned company/crew/unit supervisor."[46]

Beyond the NFPA standard, the Maryland Occupational Safety and Health (MOSH) Consensus standard includes the concept of maintaining crew integrity. Specifically, Section 9(f)(3)(d) and (e) state that:

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[43] Chris Whitby, Maintain Crew Integrity, FIRE ENGINEERING 153-154 (2005).
[44] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY (2014).
[45] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY §4.5.6 (2014).
[46] National Fire Protection Association (NFPA) Standard 1561 Standard for Emergency Services Incident Management System and Command Safety,

> An entry team shall consist of at least two properly equipped qualified emergency responders operating in a buddy system maintaining visual, voice or signal rope communications with each other at all times. The incident commander shall ensure that the standby team personnel are not assigned to other activities that would prevent them from rapidly responding to an emergency or endanger others if they abandon their previous assignment. At least one standby team member shall maintain contact with the entry team by voice, visual, signal rope or radio.[47]

[47] MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Crew Integrity

HCDFRS implemented General Orders that support NFPA consensus standard 1561.[48] In particular, General Order 300.04: MAYDAY Situations which states, "[a]ll personnel operating on the scene of an emergency incident shall ensure that accountability is maintained at all times. Personnel shall keep their supervisor aware of their location and any progress being made."[49] Additionally, General Order 300.02 Personnel Accountability[50] identifies the responsibilities of the supervisor to know the number and identification of the personnel and units assigned to them. The language identified above in General Order 300.04 MAYDAY Situations and General Order 300.02 Personnel Accountability is also paralleled in General Order 300.11, Rapid Intervention and Immediately Dangerous to Life or Health (IDLH) Initial Entry Teams.[51]

[48] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY (2014).

[49] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.04 MAYDAY SITUATIONS (2013).

[50] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.02 PERSONNEL ACCOUNTABILITY (2013).

[51] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 300.11 RAPID INTERVENTION AND IDLH INITIAL ENTRY TEAMS (2013).

Woodscape Drive Incident Overview: Crew Integrity

Each apparatus that arrived on scene had an assigned crew. Engine 51 (5 personnel), Engine 101 (3 personnel), Tower 10 (4 personnel) Paramedic 56 (2 personnel), and Battalion Chief 1 (2 personnel). When Paramedic 56 arrived on scene, the two-person crew donned their personal protective equipment and then separated, with Paramedic 56A joining Engine 51D in securing water supply from a pool in the rear of the property and Paramedic 56D beginning Initial Rapid Intervention Crew (IRIC) functions. Upon Engine 101's arrival, the crew deployed a hose line from Engine 51 to back up Engine 51's initial hand line on the first floor.

Engine 101 took their hose line to the lower level on Side C without making entry on the first-floor because Engine 51 backed out of the first floor, recognizing a possible basement fire. Engine 51 moved their charged hose line to the lower level on Side C with Engine 101's crew. Engine 101A, while on Side C, advised the Incident Commander by radio, "...of heavy fire on floor number one Side Charlie⋯We need to redeploy our line back up to the initial entrance." At which point Engine 51 redeployed their charged hose line to the initial point of entry and FF Flynn deployed a second 200-foot hose line from Engine 51. Once FF Flynn pulled the second 200-foot hose line, Engine 101's crew with FF Flynn on the nozzle made entry into the upper level Side C. Engine 101A was positioned behind FF Flynn moving up the hand line.

After upgrading the incident to a full box alarm, more apparatus were dispatched and arrived with associated crews: Engine 71 (4 personnel), Engine 111 (3 personnel), Truck 7 (4 personnel), Tower 3 (5 personnel), Paramedic 105 (2 personnel), EMS 1 (1 personnel) and Safety 1 (1 personnel). Additionally, Battalion 2 (2 personnel) self-dispatched, as is standard practice for HCDFRS.

On arrival, Engine 111 with its entire crew reported to the hydrant that Engine 71 laid out from with their supply line. The crew then assisted Engine 111D with securing water supply. Shortly after the MAYDAY was declared, Engine 111A ordered Engine 111B to report to the scene and "find something to do" while he remained at the hydrant with Engine 111D. Engine 111A remained with Engine 111D to ensure a continuous water supply was established for the incident. The order by Engine 111A to Engine 111B resulted in loss of crew integrity, with Engine 111B unsupervised and working unassigned of any other members. Additionally, when Engine 111A reported to the incident scene, Engine 111B had become part of Paramedic 105's crew which was the transport unit for FF Flynn.

Findings and Recommendations: Crew Integrity

First, the crew of Paramedic 56 failed to maintain crew integrity as the Initial Rapid Intervention Crew (IRIC) because the two-person crew split up to perform unrelated tasks. Specifically, Paramedic 56A assisted Engine 51D in securing water supply from the pool and Paramedic 56D began IRIC functions. Although both members stayed in contact with the entry team by radio, Paramedic 56A's assistance in water supply duties physically separated the IRIC, creating a potential time delay should the IRIC be needed. Through the investigation, the ISRB learned that there is a company standing order for A-Shift of Station 5 for Paramedic 56A to assist the Engine driver in securing water supply. This practice of a station creating a standing order for a shift is inconsistent with General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines.

Second, the Rapid Intervention Crew (RIC) demonstrated an extraordinary level of crew integrity despite its composition of personnel from three different crews: Engine 71, Truck 7, and Paramedic 56D. On this incident, Paramedic 56 assumed the initial IRIC pursuant to General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines and by the direction of the Incident Commander. On Truck 7's arrival they were redirected to assume RIC prior to the MAYDAY by the Incident Commander after a different initial assignment. After the MAYDAY was declared, the Incident Commander ordered Engine 71 to join Truck 7 as the RIC. Engine 71A verbally ordered the Paramedic 56D to remain with the RIC during the rescue attempt of FF Flynn.

Incident Commanders have authority to make assignments outside of the standing General Orders. In this case, the Incident Commander assigned Engine 71 to RIC duties even though it was not the fourth arriving engine on this incident. The Rapid Intervention Crew (RIC) Supervisor was responsible for accounting for approximately seven members as they entered the structure. The RIC kept constant verbal communication between the RIC members and the RIC Supervisor, and when possible, maintained communication with the Incident Commander. Even with members of the RIC becoming entangled in wires and lacking radio reception in the crawlspace, crew integrity was never lost. This prevented additional MAYDAYs from occurring. Throughout the entire RIC deployment, the members of the RIC worked in close proximity to each other and remained in constant communication.

Third, Engine 111 failed to maintain crew integrity when Engine 111A ordered Engine 111B to report to the incident scene unsupervised. On arrival, Engine 111 with its' entire crew reported to the hydrant that Engine 71 laid out from with their supply line. The crew then assisted Engine 111D with securing water supply. Engine 111A remained with Engine 111D to ensure a continuous water supply was established for the incident. The order by Engine 111A to Engine 111B resulted in loss of crew integrity, with Engine 111B unsupervised and working unassigned of any other members. Additionally, when Engine 111A reported to the incident scene, Engine 111B had become part of Paramedic 105's crew which was the transport unit for FF Flynn.

Four, Engine 51A could not account for all of his members initially after the MAYDAY was declared. Engine 51C redeployed and reentered the first floor with Engine 51's crew after the hand line was moved back to their initial entry point, however after the MAYDAY was declared Engine 51C relocated to the basement entrance in an attempt to assist RIC operations. Engine 51C did not respond to radio calls or acknowledge PAR attempts until he was accounted for by Truck 7D. At which time Engine 51C was instructed to return to Engine 51's location by the Incident Commander.

Fifth, Battalion Chief 1 maintained accountability for his Aide and conversely the Aide maintained accountability for the Battalion Chief during this incident. While it is common practice within HCDFRS for the Aide to complete a 360-degree survey of the structure, on this incident the Aide was requested by other personnel to assist with completing additional tasks during his 360-degree survey, in particular water supply duties. While these tasks assisted with accomplishing tactical priorities, the personnel requesting assistance of the Aide may not have been mindful that they are responsible to ensure the Aide's safety when operating outside their normal duties as an Aide. This practice could inadvertently lead to a loss of crew integrity if the Aide is involved in an emergency action that results in the Aide's injury or incapacity.

While it was not an issue in this incident, the ISRB in its investigation believes that it may be a future issue if resources operating individually, such as the EMS Officer and the Safety Officer, enter the IDLH without being part of a crew. The Incident Commander should ensure that any such resources operate as part of a minimum 2-person crew if entering the IDLH.

Lastly, Engine 101 maintained crew integrity until FF Flynn fell through the floor into the crawlspace.

Findings	**Recommendations**
H.1. Paramedic 56's crew did not maintain crew integrity as the crew divided to accomplish both Initial Rapid Intervention Crew (IRIC) duties and water supply duties.	H.1.1 Fire Chief must ensure unit supervisors and crew members are trained on and implement best practices for maintaining crew integrity. This includes: o Verbalizing to all responders any deviations from a General Order; o Pausing operations to restate crew tasks and objective and regain crew integrity whenever a supervisor observes crew members violating such integrity; o Ensuring crew members inform their supervisors of their location and task or

Findings	Recommendations
	objective if they are given a conflicting order by a different supervisor. H.1.2 Implement Crew Resource Management to make crew responsible for crew safety and situational awareness
H.2. The Rapid Intervention Crew demonstrated an extraordinary level of crew integrity on this incident given the fact that the Rapid Intervention Crew (RIC) comprised crews from Engine 71, Truck 7, and Paramedic 56D.	H.2.1 Personnel must train together on a regular basis to allow all crew members to identify the crew's strengths, weaknesses, and enhance team cohesiveness. Training priorities should include topics that are low-frequency, high-risk, such as RIC deployments. The goal being that crew integrity will be maintained as various types of operations are conducted.
H.3. Engine 111 also did not maintain crew integrity by separating crew.	See recommendation [H.1.1]
H.4. Engine 51A could not account for crew members after the MAYDAY.	See recommendation [H.1.1.]
H.5. Battalion Chief 1 and Command Aide maintained crew integrity, although the Command Aide completed duties outside of their normal tasks.	H.5.1 When the Command Aide assists crew members with tasks outside of their scope, the Command Aide must notify the Battalion Chief of the additional task.
H.6. Other resources operating individually may pose a problem if they enter the IDLH without becoming part of a crew.	H.6.1 Ensure that Incident Commanders require any individual entering the IDLH to become part of a minimum 2-person crew.

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I. Effective Response Force

General Background: Effective Response Force

National Fire Protection Association (NFPA) Standard 1710 Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to Public by Career Fire Departments is the national industry consensus standard for "career firefighter deployment, including requirements for fire department arrival time, staffing levels, and fireground responsibility."[52] Under this consensus standard, Authority Having Jurisdiction (AHJ) should have a minimum of four (4) on-duty members on engine companies (apparatus with a primary function to pump and deliver water). Additionally, an AHJ with a high volume of activity or many geographic restrictions ought to have five (5) on-duty personnel assigned to an engine company. All other companies, specifically those with specialized equipment, should be staffed with, "the minimum number of on-duty members required to deal with the tactical hazards, high-hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the AHJ."[53]

Additionally, NFPA Standard 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments, addresses combination departments. The standards in NFPA 1720 apply to deployment models, crew size, and other factors. However, NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations by Career Fire Departments is a more appropriate benchmark for service delivery and safety even though Howard County Department of Fire and Rescue Services is a combination system.[54] Using NFPA Standard 1710Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations by Career Fire Departments is a better benchmark for HCDFRS because all HCDFRS stations are career staffed, with response patterns and standards of coverage reliant on career staffing with volunteer units augmenting the system.

In 2010, the National Institute for Standards and Technology (NIST) — in conjunction with the International Fire Chiefs Association, International Association of Fire Fighters, and others — conducted a systematic study to provide quantitative data on the effect firefighter crew size,

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[52] NAT. INST. OF STAND. AND TECH., REPORT ON RESIDENTIAL FIREGROUND FIELD EXPERIMENTS, TECHNICAL NOTE 1661 (2010)

[53] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD FOR THE ORGANIZATION AND DEPLOYMENT OF FIRE SUPPRESSION OPERATIONS, EMERGENCY MEDICAL OPERATIONS, AND SPECIAL OPERATIONS TO THE PUBLIC BY CAREER FIRE DEPARTMENTS 1710 (2010)

[54] See HOWARD CO. FIRE DEP'T EMERGENCY SERV. STAFFING JOINT STUDY GROUP: FINAL REPORT (2019), https://www.howardcountymd.gov/LinkClick.aspx?fileticket=ZgKy8B2Rat8%3d&portalid=0. The Final Report uses NFPA 1710 as a benchmark for its recommendations: "The goal is to strive for improved response times as recommended by NFPA 1710." Id. At 11. Specifically, the report also recommends "evaluating how to improve our effective response force of fifteen firefighter on the scene within ten minutes . . ." Id.

arrival time, and other factors had on a fire departments ability to protect civilians and their property as well as the occupational safety of firefighters. From this study, which was limited to low-hazard, residential structure fires, there were statistically significant changes to outcome based on apparatus arrival time and/or crew sizes. Key findings include:[55]

- Four (4) person crews completing fireground tasks an average of seven (7) minutes faster than two (2) person crews in low-hazard residential fires
- Four (4) person crews completing fireground tasks an average of five (5) minutes faster than three (3) person crews in low hazard residential fires
- Three (3) person crews were 10-percent faster to getting water onto the fire than two (2) person crews
- Three (3) person crews completed primary search and rescue 25% faster than two (2) person crews
- Five (5) person crews assembled the industry standard effective response force three minutes faster than four-person crews

Specific staffing levels for effective firefighting are found in the NFPA standards, with the Maryland Occupational Safety and Health consensus standard only stating that all AHJs "shall develop policies and procedures that determine the type, number and staffing of units that are dispatched to specific call types."[56]

[55] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD FOR THE ORGANIZATION AND DEPLOYMENT OF FIRE SUPPRESSION OPERATIONS, EMERGENCY MEDICAL OPERATIONS, AND SPECIAL OPERATIONS TO THE PUBLIC BY CAREER FIRE DEPARTMENTS 1710 (2010)

[56] MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Effective Response Force

Howard County Department of Fire and Rescue Services (HCDFRS) General Order 100.17 Standard of Coverage establishes the minimum staffing levels for fire and non-fire emergencies.[57] Under General Order 100.17 Standard of Coverage, the regular staffing by apparatus is:

- Special Services – includes aerial apparatus, squads: four (4) personnel
- Extrication Unit – includes aerial apparatus with extrication equipment, squads, and rescues: four (4) personnel
- Engines: three (3) personnel
- Tankers – unit carrying 1,500 gallons or greater of water: two (2) personnel
- EMS Transport Units: two (2) personnel
- Chief Officers and Staff Personnel: one (1) personnel

Additionally, under the order the staffing levels sent to a residential structure incident is separated into two categories: rural and metro. The specific list of equipment and personnel in use to respond to each type are detailed below:

Unit Type	Metro	Rural
Engines	4 (12 personnel)	4 (12 personnel)
Special Services	2 (8 personnel)	2 (8 personnel)
Aerial	1 (4 personnel)	1 (4 personnel)
Water Tankers		1 (2 personnel)
Transport unit	1 (2 personnel)	1 (2 personnel)
Battalion Chief	1 (1 personnel)	1 (1 personnel)
Personnel Totals	27 personnel	29 personnel

Notably, the Standards of Coverage listed in General Order 100.17 Standards of Coverage is no longer aligned with HCDFRS daily practices. Response packages sent to a box alarm in daily practice is different from the packages established in the General Order.

[57] HOWARD CO. DEP'T OF FIRE AND RESCUE SERV. GENERAL ORDER 100.17 STANDARD OF COVERAGE (2006).

Woodscape Drive Incident Overview: Impact of Initial Response Assignment: Effective Response Force

A 911 call was received from the occupants of 7005 Woodscape Drive at 01:51 on July 23, 2018 reporting smoke in the house and indicating that there was a recent nearby lightning strike. The callers did not report seeing visible flames and a Local Box 5-62 was dispatched. The Local Box assignment consisted of two (2) engines, one (1) aerial, one (1) ambulance, and one (1) battalion chief. The compilations of these crews are below:

Apparatus Type	Identification Number	Number of Personnel
Engine	E51	5
Engine	E101	3
Aerial	Tower 10	4
Ambulance	Paramedic 56	2
Battalion Chief	Battalion 1	2
Total Personnel		16

After arriving at the dwelling, Engine 51's officer in the role of Incident Commander in Tactical Command mode upgraded the incident to a full box. This upgrade added two (2) engines, two (2) aerials, one (1) ambulance, one (1) medical duty officer, and one (1) safety officer. The compilations of these crews are below:

Apparatus Type	Identification Number	Number of Personnel
Engine	E71	4
Engine	E111	3
Aerial	Truck 7	4
Aerial	Tower 3	5
Ambulance	Paramedic 105	2
Medical Duty Officer	EMS1	1
Safety Officer	Safety1	1
Total Personnel		20

Additionally, Battalion Chief 2 self-initiated his response to the scene when the full-box upgrade was dispatched. Then, at 02:19 hours Command requested the working fire task force, adding the following operational units: two (2) engines, one (1) special service, and one (1) on-call battalion chief/safety officer. The compilation of those units are below:

Apparatus Type	Identification Number	Number of Personnel
Engine	E91	4
Engine	E61	4
Special Service	SQ1	4

Battalion Chief	BC2	2
Total Personnel		14

By the end of the period covered by this investigation, there were fifty (50) personnel on the fireground to respond to the rural residential structure with active fire.

Findings and Recommendations: Effective Response Force

First, the response force dispatched to manage this incident—two (2) engines, one (1) aerial, one (1) EMS unit and one (1) Battalion Chief—was consistent with HCDFRS policies in place at the time of the incident. However, this initial dispatch was insufficient to conduct fire department operations at the normal scale and with the normal speed of progression as a standard house fire assignment. This is likely due to unclear parameters in determining whether to issue a Local Box Alarm or a Full Box Alarm.

In reviewing current dispatch parameters, HCDFRS should also address the expectations of units responding to a Local Box Alarm. For example, current dispatch of a Local Box Alarm does not have a dedicated RIC company or an ability to establish a secondary water supply. In revising the dispatch numbers, HCDFRS should both increase the number of units dispatched on a Local Box Alarm as well as establish standardized roles assigned in order of dispatch. Additionally, Local Box Alarm and Full Box Alarm assignments should be standardized throughout the Baltimore Metropolitan Region, enabling mutual aid companies to easily integrate with HCDFRS crews when responding to either a Local Box or Full Box Alarm.

Second, 7005 Woodscape Drive was an 8,400 square foot residential structure, however, initial response treated it similarly to a smaller single-family home rather than adapting staffing, strategy and tactics for the unique size and scale of the residence. The size of a structure, especially interior volume, affects smoke characteristics observed from the exterior of a structure. During this incident, smoke venting from the structure was described as "lazy" and not venting under pressure when initial units arrived on scene. This was likely due to the size and construction of the structure, which had large open areas more consistent with a commercial structure than a typical residential ranch-type structure. These larger open areas affect smoke travel and require a greater volume of smoke to build within the structure before it vents under pressure. When "lazy" smoke is observed from a ranch-style structure the fire would likely be relatively small. Whereas, a significant fire could evolve in a mansion-type structure and present with the same "lazy" smoke, due to the volume provided for the smoke to fill inside the structure. Personnel should be aware of this aspect of building construction and view structures, also, by size and volume. With this mindset, a mansion-type structure may be more effectively evaluated from a firefighting perspective similarly to a commercial structure of the same size.

Findings	Recommendations
I.1 Response assignment initially dispatched to manage this incident was consistent with HCDFRS policies in place at the time of the incident. However, the initial dispatch was insufficient to conduct full-scale fire department operations.	I.1.1 HCDFRS must clearly define parameters of a Local Box Alarm versus a Full Box Alarm. I.1.2 HCDFRS should define expectations for units responding to Local Box Alarms, including adding a dedicated RIC

Findings	Recommendations
	company and an ability to establish a secondary water supply. I.1.3 Local Box Alarm and Full Box Alarm assignments should be standardized throughout the Baltimore Metropolitan Region.
I.2 7005 Woodscape Drive was an 8,400 square foot residential structure, however initial response treated it similarly to a smaller single-family home rather than adapting staffing, strategy and tactics for the unique size and scale of the residence.	I.2.1 HCDFRS must train personnel to recognize how structure size, residential or commercial, affects visual cues such as smoke characteristics.


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J. Health and Safety

General Background: Health and Safety

Firefighting is a dangerous occupation that requires firefighters to maintain high levels of physical fitness in order to perform their necessary duties safely.[58] This is particularly true for the more physically demanding tasks on the fireground—fire attack, search and rescue, exterior ventilation, and overhaul operations—which require firefighters to regularly exercise within a range of 60-95% of maximum capacity to maintain optimal readiness.[59] One of the best measures of determining fitness for fireground operations is aerobic capacity, with lower levels of aerobic capacity associated with increased risk of injury.[60] This is why standards of ideal aerobic capacity have been incorporated into the National Fire Protection Association (NFPA) fitness standards detailed in NFPA 1582 Standard on Comprehensive Occupational Medical Program for Fire Departments.[61] NFPA 1582 Annex C sets out the components of firefighter fitness evaluations, including ways to measure aerobic capacity.

To advance holistic wellness among firefighters, the International Association of Fire Fighters (IAFF) and International Association of Fire Chiefs (IAFC) created a joint Wellness-Fitness Initiative (WFI) to promote the health and safety of career and volunteer firefighters. Achieving holistic wellness under the IAFF and IAFC Wellness-Fitness Initiative includes five components:

1. Medical Evaluations;
2. Physical fitness;
3. Medical/fitness/injury rehabilitation;
4. Behavioral health; and
5. Data collection and reporting.

Aligned with NFPA 1582, which provides strict health and wellness standards for candidate fire fighters and guidelines that are more flexible for incumbent fire fighters, WFI also establishes guidelines for a progressive preventative and occupational health care services program for both new recruits and veteran fire fighters. Under this framework, WFI promotes an annual medical assessment of personnel to:

1. Identify their physical and mental ability to perform essential job duties without harming themselves or others;

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[58] INT'L ASSOC. OF FIREFIGHTERS & INT'L ASSOC. OF FIRE CHIEFS, THE FIRE SERVICE JOINT LABOR MANAGEMENT WELLNESS-FITNESS INITIATIVE (4th ed. 2018).

[59] Gerald S. Polin, Denise J. Roe, Jeffrey L. Burgess, Wayne F. Peate, & Robin B. Harris, Fire Fit: Assessing Comprehensive Fitness and Injury Risk in the Fire Service, 89 INT'L ARCHIVE OCCUPATIONAL ENVTL. HEALTH 251-259 (2016).

[60] Gerald S. Poplin, Denise J. Roe, Wayne Peate, Robin B. Harris, & Jeffrey L. Burgess, The Association of Aerobic Fitness with Injuries in the Fire Service, 179 AM. J. EPIDEMIOLOGY 149-155 (2014).

[61] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON COMPREHENSIVE OCCUPATIONAL MEDICAL PROGRAM FOR FIRE DEPARTMENTS 1582 (2018).

2. Monitor acute and long-term effects of working in the fire service;
3. Detect patterns of diseases that may indicate underlying work-related health concerns;
4. Collect and monitor quantifiable medical information of the fire department as a whole;
5. Inform uniformed personnel of their occupational health hazards and health status;
6. Provide cost-effective health promotion and disease prevention
7. Comply with federal, state, and local safety requirements.[62]

Additionally, WFI promotes the incorporation of exercise into firefighting duty shifts as well as a promotion of health and performance-based nutrition, potentially with the support of a nutritional counselor, dietitian, or sports nutritionist. For firefighters that experience an injury, WFI includes stages of rehabilitation to prevent aggravation of an existing injury or re-injury. Lastly, WFI also promotes behavioral wellness, which involves an individual's thoughts, feelings and behavior. Firefighting is a stressful job and departments that invest holistically in their members physical and behavioral health see a healthier fire fighting force.

Beyond the baseline fitness and wellness of fire fighters, NFPA 1500 Standard of Fire Department Occupational Safety, Health, and Wellness Program, advises departments to create written policies for occupational safety, health and wellness. This includes department goals for promoting wellness, limiting exposure to disease and hazardous materials like carcinogens, and the use of personal protective equipment.[63]

In addition to personal protective equipment standards from NFPA 1500, departments must also follow federal regulations for Personal Protective Equipment (PPE) in 29 CFR 1910.132 and Respiratory Protection in 29 CFR 1910.134. PPE regulations require employers to assess workplace hazards and identify the appropriate PPE to provide employees that will encounter those hazards. For PPE purchased for employees, the employer is also required to ensure that the PPE fits properly and train employees on the appropriate use of the PPE. In the fire service, PPE typically includes a protective coat and trousers, gloves, protective hood, helmet, boots, and a Self-Contained Breathing Apparatus (SCBA). SCBA provides respiratory protection governed by 29 CFR 1910.134, which requires an employer to conduct a medical evaluation to determine whether an employee is medically qualified to use a respirator and conduct a fit test.

On the fireground, NFPA 1584 establishes standards for rehabilitating personnel during emergency operations and training exercises. Under NFPA 1584 the Incident Commander or their designee should establish a rehabilitation group to make sure that responding personnel adequately rest and are physically and mentally prepared to resume operations. Generally, a rehabilitation site is established where personnel can remove their PPE, hydrate, eat, and be shielded from the elements. The rehabilitation site should include personnel able to provide

[62] INT'L ASSOC. OF FIREFIGHTERS & INT'L ASSOC. OF FIRE CHIEFS, THE FIRE SERVICE JOINT LABOR MANAGEMENT WELLNESS-FITNESS INITIATIVE (4th ed. 2018).
[63] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON FIRE DEPARTMENT OCCUPATIONAL SAFETY, HEALTH, AND WELLNESS PROGRAM 1500 (2018).

Basic Life Support (BLS) and monitor personnel for physical signs of abnormal heart rate, respiration, blood pressure, pulse oximetry, and temperature.

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Health and Safety

Administrative Health and Safety

The Howard County Department of Fire and Rescue Services (HCDFRS) established the Bureau of Occupational Safety and Health (BOSH) in October 2013 through Information Bulletin 2013.001. With a mission to foster "a safe work environment, wellness and health lifestyle as an underlying value for all personnel to reduce risk and ensure safe, healthy and productive workforce," BOSH has five core functions: safety, health, wellness, risk management, and exposure support.[64] BOSH staff include six (6) administrative detail positions, including:

1. An Assistant Chief responsible for policy development, budget and overall bureau operations
2. A Battalion Chief responsible for safety operations and investigations
3. A Health and Safety Officer (Captain Rank), to oversee OSHA compliance and reporting as well as general occupational medical programming, injury care and exposure support, and infection control program support
4. A Health and Wellness Coordinator to manage the peer support team, peer fitness trainer program, health and wellness education program, fitness room inventory and maintenance
5. A Senior Analyst to collect and analyze data provided through health programs and provide support to all bureau members with various programs
6. An Administrative Assistant to support administrative duties to the Bureau

The BOSH wellness program overseen by the Health and Wellness Coordinator includes both the department fitness program and its peer support team. The Fitness Program includes fifteen (15) ACE certified Peer Fitness Trainers, who are available to help department members achieve positive fitness results. Additionally, all fourteen (14) HCDFRS facilities have current fitness centers equipped with a standard minimum inventory to support strength, aerobic conditioning, and flexibility. All equipment is commercial grade fitness equipment similar to that found in commercial gyms. Use of the facilities is encouraged both on duty and off duty. The Peer Support Team is a loosely administered group of individuals trained by the International Critical Incident Stress Foundation (ICISF). Although the Peer Support Team, unofficially renamed from the Critical Incident Stress Management (CISM) Team, is established through General Order 100.19 Critical Incident Stress Management (CISM), the team is still under development.[65] For example, although General Order 100.19 Critical Incident Stress Management refers to an on-

[64] HOWARD CO. DEP'T. OF FIRE AND RESCUE SERV., BUREAU OF OCCUPATIONAL SAFETY AND HEALTH, BOSH STRATEGIC UPDATE PLAN (2018).
[65] Howard County Dept. of Fire and Rescue Services, General Order 100.19 Critical Incident Stress Management (2013).

call Peer Support Team Coordinator and behavioral health specialists, no such dedicated personnel currently exist in HCDFRS.

BOSH also oversees the administration of annual physicals for both career and volunteer Howard County fire fighters, which is provided through the third party contractor CorpOHS, LLC/Carroll Occupational Health. The no cost pre-placement and annual physicals provided by the department comply with federal regulations and national standards, but do not include lung cancer screening or Pap smear tests. Under General Order 150.09 Respiratory Protection[66] and General Order 120.02 Volunteer Officer Requirements,[67] annual physicals are mandatory for all career firefighters and volunteer officers, with physicals of non-officer volunteers strongly encouraged but not required. In addition to providing physicals, the Fire Department Occupational Health Clinician provides minor injury care, infection control, fit for duty and return to work evaluations Monday through Friday between 07:00 and 15:30 hours, and on select evenings and weekends to accommodate volunteer members.

Fireground Health and Safety

Under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, the first arriving EMS transport unit is to assume the function of the Initial Rapid Intervention Crew (IRIC) to ensure that at least one unit is prepared to provide assistance or rapid rescue if needed.[68] The IRIC is intended to be a temporary team until the Incident Commander establishes the Rapid Intervention Crew (RIC) for the incident.

During fireground operations, HCDFRS provides a Safety Officer that is responsible for on scene safety and oversight. As required by General Order 100.04, Position Requirements, Licenses, Certifications, Training, and Education Prerequisites, and General Order 120.02, Volunteer Officer Requirements, by January 2018 all newly promoted career officers and volunteer officers at the rank of Lieutenant and above are Pro Board certified as Safety Officers. In July 2008, Special Order 2008.52 Field Safety Officer established the Shift Safety Officer position. The Shift Safety Officer is responsible for responding to all box alarms, working rescue assignments, and any other incident for which the officer decides that scene safety oversight is necessary. Additionally, there is an on-call Safety Officer available for response although this position has recently been merged with the on-call battalion chief. In the current on call program, one Battalion Chief covers both responsibilities for the on-call Safety Officer and on call Battalion Chief

Along with an on-scene Safety Officer, General Order 300.02 Personnel Accountability requires the Howard County Communications Center to transmit alert tones every 15 minutes after the

[66] Howard County Dept. of Fire and Rescue Services, General Order 150.09 Respiratory Protection (2000).
[67] Howard County Dept. of Fire and Rescue Services, General Order 120.02 Volunteer Officer Requirements (2016).
[68] Howard County Dept. of Fire and Rescue Services, General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines (2002).

first unit arrives on the scene of an incident through the time the Incident Commander transmits the "fire out" benchmark.

General Order 150.09 Respiratory Protection provides the department standards for respiratory protection, stating that the department is to comply with federal regulation 29 CFR 1910.134, which requires a medical certification of being able to use a breathing apparatus and fit testing to the apparatus. Under this federal requirement, all responding personnel working within IDLH atmosphere must use SCBA respiratory protective equipment. Under the Maryland Occupational Safety and Health (MOSH) standard adopted by HCDFRS, both career and volunteer firefighters working within an IDLH environment must use respiratory protective equipment.

Although there is no HCDFRS standard policy for rehabilitation, General Order 150.02 DFRS Extreme Weather Advisories explicitly requires a formal incident rehabilitation area established if personnel are engaged in outdoor activity for more than one (1) hour in extreme weather conditions.

Woodscape Drive Incident Health and Safety Overview: Health and Safety

Fireground Health and Safety

The first EMS crew on site, Paramedic 56, donned their PPE on arrival. The driver of Paramedic 56 began IRIC duties while the provider of Paramedic 56 reported to assist the driver from Engine 51 to secure a water supply from the pool at the back of the property. This fragmented IRIC was supported by other responding units, with the Incident Commander assigning RIC duties to Truck 7 and later augmented by Engine 71.

The on-duty shift Safety Officer during the incident was a twenty-nine (29) year veteran Captain who exceeded the minimum safety officer qualifications under NFPA 1521 Standard for Fire Department Safety Officer Professional Qualifications. Arriving at the incident scene at 02:14:04 the Incident Safety Officer donned his PPE and then began a 360-degree assessment of the fireground. Before the Incident Safety Officer completed their 360-degree assessment a MAYDAY was called on the scene, only six minutes after the Safety Officer arrived on scene.

Upon the receipt of the MAYDAY the RIC team comprised of Truck 7, Engine 71, and Paramedic 56 Driver deployed to assist. As additional units arrived on-scene, a second RIC team was formed with Engine 61 and Engine 91. There was a RIC established and maintained while units operated in the Immediately Dangerous to Life or Health (IDLH) environment.

On-scene rehabilitation for responding personnel was established late in the incident, even with the outdoor conditions of heat and humidity of late July. Although the Communications Center requested a canteen at 02:22 and then again at 04:10, the requests were unmet. The rehabilitation area was only supplied with drinking fluid from the suppression apparatus and ran out quickly. Personnel from Howard County Department of Police were able to purchase more supplies—water, sports drinks, and snacks—from a convenience store at approximately 05:00 and deliver them to the incident scene.

Upon the dispatch of the second alarm, The HCDFRS Chaplain was dispatched to the scene to provide psychological first aid. The HCDFRS Chaplain met with Bureau Chief 2 at the scene and was updated on FF Flynn's status. The Chaplain then went to the hospital to offer support to FF Flynn's family and the crews at the hospital. Seeking additional CISM support for the department, the Chaplain contacted the current Health and Wellness Coordinator to have him begin mobilizing CISM/PST efforts.

General Incident-Related Personnel Health and Safety

Throughout the course of the incident at 7005 Woodscape Drive, approximately fifty (50) fire fighters were on the fireground. While the majority of these firefighters were career HCDFRS personnel, there were also four (4) volunteer firefighters and two (2) volunteer chief officers on the fireground during the evaluated time period. Of those personnel, five (5) HCDFRS personnel did not have current fit testing of their SCBA, four (4) of whom operated their SCBA in an IDLH environment. Additionally, of the four individuals that operated SCBA in the IDLH environment without a current fit test, two (2) of them were not medically certified to wear a respirator.

Findings and Recommendations: Health and Safety

The Internal Safety Review Board (ISRB), after reviewing the available information regarding the 7005 Woodscape Drive Fire Incident, identified the following occupational health and safety issues during the incident. The ISRB reviewed fireground personnel work schedule and response volume prior to this incident and determined that responding personnel complied with HCDFRS work-rest cycle policy,[69] and so fatigue was likely not a factor. Additionally, the ISRB examined existing health and safety programs within Howard County Department of Fire and Rescue Services and identified areas for improving its existing efforts to promote the health and safety of Howard County fire fighters. These findings and associated recommendations are divided into two areas: Fireground Related and Department Related.

Fireground Related

Although not directly related to FF Flynn's MAYDAY or injuries, the ISRB noted several concerning safety issues on the fireground. First, at least five (5) members on scene did not meet minimum safety regulations for Respiratory Protective Equipment (RPE). Federal regulation 29 CFR 1910.134 requires RPE to be provided to any employee that is operating in an environment where they may be exposed to elements that are Immediately Dangerous to Life or Health (IDLH). By definition, this includes entry into a structure with a working fire, meaning that all personnel entering such a structure must be properly outfitted with RPE. Under General Order 150.09 Respiratory Protection, these requirements are established equally to both career and volunteer firefighters in Howard County, which include annual fit testing of a SCBA and medical certification that an individual is medically qualified to wear a SCBA. During this incident, five (5) individuals operated on scene without current fit testing, four (4) of whom were in an IDLH environment. Additionally, two (2) of those individuals were not medically certified to operate SCBA at the time of the incident.

Second, there was a Rapid Intervention Crew (RIC) established and maintained throughout the time-period evaluated by the ISRB. At the time of the MAYDAY the RIC comprised of Truck 7, Engine 71, and Paramedic 56 Driver responded commendably. Although there was a RIC throughout the incident, the establishment of the RIC did not conform to the existing General Orders. As required by General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, Paramedic 56 Driver assumed the duties of Initial Rapid Intervention Crew (IRIC); however, its response was fragmented when the Provider from Paramedic 56 assisted Engine 51 in non-IRIC duties after donning their PPE. Additionally, under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines Engine 111 should have assumed RIC responsibilities as the fourth due engine. Instead, the Incident Commander assigned Truck 7 to be the RIC with Engine 71 providing support. More detail on RIC operations are covered in Section III.C.

Third, the Incident Safety Officer (ISO) was established and maintained during the incident as required by Department Special Order 2008.52 Field Safety Officer. The ISO arrived on-scene

[69] Howard Co. Dep't of Fire and Rescue Serv., General Order 110.04: Overtime Assignment (2015).

only minutes before the MAYDAY call, not even having time to fully assess the fireground before the MAYDAY incident began. The ISO, recognizing the complexity, risk profile, and sheer size of the structure requested an assistant safety officer from the Incident Commander to assist in their duties. The Incident Commander, who stated that no other safety officers were available on scene to assign, denied these requests.

Fourth the Communications Center properly notified the Incident Commander of the first fifteen (15) minute interval at 02:19:10, as required by General Order 300.02 Personnel Accountability. However, the Communications Center ceased providing further fifteen (15) minute mark announcements after the MAYDAY, only activating a channel marker on Bravo 1 as required by General Order 300.04 MAYDAY Situations. This is a standard practice, with the markers activated at 02:21:13 and continued until 02:47:00 at which point FF Flynn had been removed from the dwelling. From that point on, neither a channel marker nor a transmission at the fifteen (15) minute intervals were completed. This was out of line with General Order 300.02 Personnel Accountability, which requires markers until "fire out." The Incident Commander declared "Fire Out" at 11:59 hours.

Fifth, related to the fifteen (15) minute interval communications, General Order 300.02 Personnel Accountability requires the Incident Commander (or designated Accountability Manager) shall direct division, group, and unit supervisors operating within the Hazard Zone to provide a PAR for personnel under their command. The Incident Commander acknowledged the fifteen (15) minute notification at 02:19:10 and received various other face-to-face communications in quick succession. The MAYDAY call occurred a minute after the Communication Center's fifteen (15) minute notification.

Sixth, the fireground never established a formal rehabilitation area. Although some rehabilitative efforts occurred late in the incident, there was no formal process to medically monitor personnel or ensure that they were properly hydrated, fed, and rested before returning to the structure. No documentation exists of crew rotation on the fireground. The Incident Commander did attempt to procure fluid and snacks for crewmembers early in the incident, however it took 2.5 hours before any additional fluid or snacks were brought to the scene. These items only appeared with the assistance of the Howard County Department of Police after two requests for canteen support were unanswered.

Department Related

In addition to safety concerns on the fireground, the ISRB noted several systemic issues in HCDFRS that could implicate the occupational health and safety of its members. First, volunteer personnel are not required to complete annual physicals even though it is recommended by both NFPA 1582 and the MOSH standard. HCDFRS strongly encourages volunteers to use their preplacement and annual physical program, however few have complied. Additionally, a 2014 NIOSH report[70] following the cardiac arrest of a HCDFRS fire fighter recommended required

[70] NIOSH HEALTH HAZARD EVALUATION REPORT HHE2015-0033 (2015) (available on file at HCDFRS).

annual medical evaluations for all fire fighters, including volunteers. During this incident at least four (4) members did not have a current—or in some cases any—physical completed. At this point in time, volunteers are not required to complete medical evaluations.

Relatedly, echoing NIOSH's 2014 recommendations, corporate volunteer fire fighters should be required to pass a Candidate Physical Ability Test in alignment with NFPA 1500. An annual physical ability test should be phased-in for all HCDFRS fire fighters.

Second, HCDFRS does not have a mandatory, non-punitive, confidential fitness assessment program as recommended by national consensus standards. Both national firefighting organizations and scientific research support the notion that maintaining a healthy and active lifestyle is linked to effective firefighting. From preventing disease and injury to improving performance on the fireground, it is important that members maintain proper nutrition and fitness. This recommendation was also included in the NIOSH Report.

Third, HCDFRS's current behavioral health program is underfunded, understaffed, and does not meet the needs of the department. Additionally, the Employee Assistance Program (EAP) is seldom used and is unavailable to volunteer firefighters. General Order 100.19 Critical Incident Stress Management (CISM) outlines the current behavioral health program, however many components of the program are non-existent or unfunded, including the behavioral health specialist and on-call peer support team coordinator. There is a volunteer chaplain, Chaplain Stone, that supports HCDFRS as he is able. However, there is not a formalized process to request his aid or dispatch a team to support the behavioral health on the scene.

Fourth, although it was not related directly to this incident, the ISRB noted that the HCDFRS program to inspect PPE is ineffective. The department requires annual inspection of PPE by a company officer, but there is no formal training program on how to conduct proper PPE inspection. There is no requirement to have the gear serviced and receive advanced cleaning by the quartermaster and contractor. General Order 150.18, Carcinogen Exposure Reduction Plan, does not clearly define when or how often the PPE should be sent out for cleaning. This allows the employee and company officer extreme amounts of latitude in carrying out the intent of the order. Further, PPE inspection reports retained by the department are inconsistent and difficult, at best, to locate and reproduce documenting the life and care of PPE.

Lastly, HCDFRS does not have an operating Occupational Safety and Health Committee as recommended by NFPA 1500 4.5.1 and General Order 150.05, Safety Committee. Although the committee has been established in the past, it is not currently operational due to budget constraints and individuals who have been involved in the committee feel like its work has been unsupported by the Office of the Fire Chief.

Findings	Recommendations
J.1 Not all personnel on the fireground had an up-to-date physical.	J.1.1 General Order 120.02 Volunteer Officer Requirements should be amended to require all volunteer fire fighters obtain a yearly NFPA 1582 physical, including certification of their ability to safely operate an SCBA. J.1.2 HCDFRS should fully enforce 29 CFR 1910.134, mandating that any and all members on the fireground must be properly fit tested and medically certified to use SCBA. J.1.3 HCDFRS should develop a records management system that accurately accounts for all operational department members and their medical certification status and annual fit testing.
J.2 Several members on scene operated within an IDLH environment with SCBA without the appropriate fit testing or medical certification, which is non-compliant to 29 CFR 1910.134. All four (4) of the individuals who operated in the IDLH environment without these certifications were volunteer firefighters.	See Recommendations [J.1.1 & 1.2]
J.3 There was no formal rehabilitation process or area established for members on the fireground to recharge and be evaluated for continued fitness of duty.	J.3.1 Develop a rehabilitation general order consistent with the intent of NFPA 1584. J.3.2 Develop a mechanism to ensure that one of the volunteer operated canteen units is available to respond to an incident request in a timely and consistent matter.
J.4 With the complexity of this incident and size of the structure, it was unreasonable to only have one safety officer on the fireground. Although there was not another safety officer on the fireground, a second safety	J.4.1. Expand the response plan for the Field Safety Officer to include responding on all local box alarms to provide on scene safety oversight. Having on scene safety oversight is critical on incidents where

Findings	Recommendations
officer could have been requested and filled by a Company Officer, Chief Officer, or mutual aid Officer.	an IDLH or active hot zone may be present. J.4.2. Deploy a second full time field Safety Officer. J.4.3. Establish a department order outlining procedures for preserving and documenting evidence at the scene of an employee injury, accident, or near miss.
J.5 The change to HCDFRS on-call matrix, which occurred sometime after 2013, merged the on-call Safety Officer and on-call Battalion Chief into a single position. During this incident, that individual became the Incident Commander (relieving the initial Incident Commander) making it impossible for him to fulfill the duties of Safety Officer.	J.5.1. Re-establish a dedicated, on-call Safety Officer. J.5.2. Deploy a second full time field Safety Officer.
J.6 The Communications Center did not transmit periodic single extended alert tones at fifteen (15) minute intervals, as required by General Order 300.02 Personnel Accountability.	J.6.1. Amend HCDFRS General Orders to be consistent with NFPA 1500 8.2.5.1 to provide for 10-minute status updates from the Communication Center to the Incident Commander and provide the Communications Center with the associated training to implement the changed order.
J.7 Although an IRIC and RIC were established, it did not comply with the General Orders governing those areas.	J.7.1. Amend HCDFRS orders (310.01 Single Family and Townhouse Structure Fire Operational Guidelines, 300.11 Rapid Intervention and IDLH Initial Entry Teams) to clearly define which response unit(s) shall be the IRIC and RIC units. J.7.2. Amend applicable orders and response pattern to provide for an additional dedicated RIC engine on all Local Box and greater assignments.

Findings	Recommendations
	i. Amend applicable General Orders to reflect that an IRIC and/or RIC shall be established at the point of entry into the IDLH environment prior to entry, unless a known life hazard exists. ii. Amend General Order 410.01 Communications to require that prior to entry into an IDLH environment, the crew leader shall verbally report their entry location, intended actions upon entry, and staffing level to the Incident Commander. The Incident Commander should confirm and approve the actions prior to entry.
J.8 HCDFRS does not fully fund or maintain a robust behavioral health program.	J.8.1. Develop and implement a structured behavioral health program.
J.9 HCDFRS provides minimal wellness or fitness support falling short of recommendations by national consensus standards.	J.9.1 Implement a mandatory, non-punitive, confidential fitness assessment program. This can be done independent of the annual physical, or incorporated into the annual physical, and done by the contracted Occupational Health provider. J.9.2 Develop a health education component to department training. J.9.3 Re-establish a functional Occupational Safety and Health Committee that is funded, respected, and utilized by senior administration. J.9.4 Develop, by training and administrative support, a culture of safety

Findings	Recommendations
	that transcends the organization. The culture must be supported by Administration and include continuous training for Safety Officers. Staffing in BOSH needs to be increased to meet the growing demands of the new culture and expanding workforce. J.9.5 Conduct annual fire station safety inspection program consistent with NFPA and MOSH standards.
J.10 HCDFRS current efforts to inspect and maintain PPE are inadequate to ensure that PPE is fully safe and functional for personnel.	J.10.1 Develop a PPE inspection, cleaning, and training program that effectively cleans PPE after exposure to contaminates and documents PPE maintenance across the garment lifespan.

Table 1 - Merged Fireground and Department Related Findings and Recommendations. NOTE: This table does not correspond with the paragraph order, this is intentional for this specific table.


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K. Treatment

General Overview: Treatment

The State of Maryland has established "The Maryland Medical Protocols for Emergency Medical Services Providers" to standardize the emergency patient care that EMS providers, through medical consultation, deliver at the scene of illness or injury and while transporting the patient to the closest appropriate hospital. Chapter III Treatment Protocols, Section I number 4 outlines the algorithm for an Adult Asystole Patient. In addition, Chapter III, Section FF discusses Carbon Monoxide/Smoke Inhalation and referrers to Cyanide Poisoning in Chapter V Jurisdictional Optional Supplemental Programs/Protocols Section A Cyanide Poisoning.

The National Fire Protection Association (NFPA), under NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments, and more specifically Section 5.3 Emergency Medical Services (EMS) the Authority Having Jurisdiction (AHJ) shall provide standards for the delivery of EMS by the department.

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Treatment

The Howard County Department of Fire and Rescue Services (HCDFRS) under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines, establishes that two transport units be dispatched on box alarm assignments. Additionally, HCDFRS has General Order 320.08 Medical Duty Officer that establishes operational supervision and quality assurance in all areas of Emergency Medical Services.

Woodscape Drive Incident Overview: Treatment

On the morning of July 23, 2018, Howard County Fire and Rescue (HCDFRS) Paramedic 56 was the first Advanced Life Support (ALS) transport unit dispatched on box alarm 5-62 at 7005 Woodscape Drive in Clarksville, Maryland for smoke in the house after a lightning strike. Paramedic 56D assumed the role of Initial Rapid Intervention Crew (IRIC) for the incident.

The second transport unit, HCDFRS Paramedic 105 also responded and positioned outside of the immediate area in order to allow suppression vehicles access to the scene. Reporting to the front yard of the home, the crew of Paramedic 105 observed the conditions and surroundings of the incident. Upon hearing the MAYDAY activation, the crew of Paramedic 105 immediately retrieved the stretcher and oxygen bag from the unit and positioned near the corner of Side A and Side D of the structure. The crew of Paramedic 105 then reported to lower level Side C, waiting for the removal of FF Flynn from the building.

When rescue crews removed FF Flynn from the basement, P105A assumed the role of lead provider. To remove FF Flynn's turnout gear, P105A immediately positioned FF Flynn's breathing apparatus between his legs and then removed the regulator from FF Flynn's face-piece. Then, with the aid of Tower 10D, P105A removed FF Flynn's face-piece. After removing FF Flynn's face-piece, P105A shouted FF Flynn's name but found him unresponsive. P105A then checked for a carotid pulse, discovering that FF Flynn did not have a detectable pulse. P105A then directed nearby personnel to provide FF Flynn high performance Cardio-Pulmonary Resuscitation while he administered two mouth-to-mouth ventilations prior to FF Flynn being ventilated with a Bag Valve Mask with high flow oxygen. While P105A directed the removal of turn-out gear and patient care, P105D moved the stretcher to lower level Side C and repositioned Paramedic 105 to the end of the driveway. Once the remainder of the turn-out gear was removed, FF Flynn was transferred to the stretcher and moved to Paramedic 105 while receiving bag valve ventilations and Cardio-Pulmonary Resuscitation.

After FF Flynn was loaded into the transport unit, P115A and EMS-1 continued ALS care while P 105A proceeded to intubate FF Flynn. During the procedure P105A reported that FF Flynn's airway was clear of any soot, debris, or burns, additionally there was no swelling or abnormalities that would hinder intubation. Concurrent with intubation, FF Flynn was connected to a cardiac monitor and a rhythm check was conducted, with the results interpreted as asystole.

P115A secured two interosseous access points in FF Flynn's lower extremities, one for medication and fluid challenge administration and one for the Cyanokit®. All care provided to FF Flynn followed Maryland Medical Protocols and Advanced Cardiac Life Support (ACLS) guidelines. Howard County General Hospital was notified of a medical transport via local radio channels. During the transport, ALS and Basic Life Support (BLS) care was continued until arrival at Howard County General Hospital, where FF Flynn's care was transferred to the Emergency Room physician. HCDFRS personnel continued assisting in FF Flynn's care under the direction of hospital staff. Treatment of FF Flynn continued at Howard County General Hospital until the

physician determined that all efforts of resuscitation had been exhausted. An HCFDRS Chaplain offered prayer and FF Flynn's body was draped with the American Flag.

Through the process of removing FF Flynn's turn-out gear and during treatment, the following injuries were noted by EMS providers:

- FF Flynn's skin appeared red in color, similar to a First-degree burn, over a majority of his body
- Both of FF Flynn's arms--from approximately mid forearm distally to the fingers— were covered with Second degree burns.
- FF Flynn's hands had almost all skin removed.
- FF Flynn's left arm was positioned outwardly and unable to be positioned to his side.

Findings and Recommendations: Treatment

In reviewing the entire incident, the ISRB reached the following findings and recommendations. Although there were injuries reported during the incident beyond FF Flynn's, these additional injuries did not contribute to FF Flynn's Line of Duty Death and are not discussed in this report.

First, several personnel reported difficulty in removing FF Flynn's turnout gear while continuing treatment and some turn out gear was transported with FF Flynn. It was noted during the investigation that HCDFRS has neither a policy nor training on how personnel can remove PPE from an incapacitated firefighter. Training on the best procedures to remove PPE from a firefighter unable to do so themselves would greatly increase the speed in which medical aid could be administered to an injured firefighter.

Second, although General Order 310.01 does not pre-assign EMS-1 a function unless they are the First Arriving Chief or Command Officer, EMS-1 followed best practices in preparing for any medical needs. EMS-1 staged along Woodscape Drive, retrieved the Cyanokit, and made his way to the area of the command post. EMS-1 assisted with getting E101A away from the structure and then returned to assist with treatment of FF Flynn.

Third, EMS-1 operated on the incorrect channel during the incident at 7005 Woodscape Drive. EMS-1 transmitted on Bravo 4 during the initial stages of the incident and then switched over to Alpha 4 (HCGH Adult Notification Channel) to contact Howard County General Hospital to advise them of a transport. While it is not believed to have any contributing factor on the treatment of FF Flynn, EMS-1 did request additional ALS personnel at 02:46 and attempted to reach command at 02:49 on Bravo 4, of which both transmissions on Bravo 4 went unheard.

Fourth, Emergency Medical Services Providers followed the Maryland Medical Protocols for Adult Asystole Patients. FF Flynn's patient care report and interviews with responding personnel confirmed minimally interrupted high-performance Cardio Pulmonary Resuscitation (CPR) was completed for the duration of FF Flynn's treatment. Crews treating FF Flynn considered and treated for causes of cardiac arrest. Additionally, all medications administered were consistent with the Adult Asystolic Algorithm.

Fifth, crews were able to provide additional care in accordance with Howard County's Jurisdictional Optional Protocol Supplement. HCDFRS requested from the Maryland Institute for Emergency Medical Services System (MIEMSS) to participate in the optional protocol for Cyanide Poisoning. Cyanide can enter the body through inhalation, ingestion, or absorption. Based upon signs and symptoms it was determined that FF Flynn met the criteria for the administration of Hydroxocobalamin (Cyanokit®) from a possible smoke inhalation after a rescue from a fire. The administration was in accordance with all protocols and completed during transport to the hospital.

Sixth, the Medical Duty Officer completed a Quality Assurance Review of FF Flynn's care in accordance with General Order 320.08 Medical Duty Officer. EMS-1 worked with the HCDFRS Medical Director and completed a Quality Assurance review of the care provided by HCDFRS

personnel. These findings determined that all protocols and treatment provided to FF Flynn were in accordance with Maryland Medical Protocols and ACLS guidelines. Additionally, an external Quality Assurance review was completed by the Medical Director of Anne Arundel County Fire Department.

Lastly, the EMS unit that transported FF Flynn from the scene was the only transport unit on scene at the time. When FF Flynn was transported, there was no longer a transport unit on the scene despite over 50 HCDFRS personnel on the incident, with many working in an IDLH environment. HCDFRS should ensure that there are additional EMS units on the scene, proportionate to the number of personnel on the scene.

Findings	**Recommendations**
K.1 Several personnel reported difficulty in removing FF Flynn's turnout gear while continuing treatment and some turn out gear was transported with FF Flynn.	K.1.1 A standardized process for removal of turnout gear of a downed fire fighter in breathing apparatus, as well as a process to initiate and secure a chain of custody of the gear, must be developed. This process needs to be in the form of a policy with an associated department-wide training completed to ensure competency.
K.2 Although General Order 310.01 does not pre-assign EMS-1 a function unless they are the First Arriving Chief or Command Officer, EMS-1 followed best practices in preparing for any medical needs.	K.2.1 HCDFRS must revise General Order 310.01 and assign EMS-1 and/or EMS-2 functional duties for preparing EMS and rehabilitation early into an incident. K.2.2 Should EMS-1 be used as command staff, HCDFRS must alert EMS-2 to fulfill the EMS supervisory functions. K.2.3 HCDFRS must have an on-call EMS officer.
K.3 Although the Medical Duty Officer was able to complete the Quality Assurance review, there is not a process for any external review of an incident.	K.3.1 HCDFRS must develop a policy that allows for and has a predetermined flow path for external QA.
K.4 The transport of FF Flynn used the only dedicated EMS transport unit.	K.4.1 Add an additional transport unit per alarm to ensure quick and effective treatment of civilian and fire service personnel.

TAB HERE

L. Training

General Background: Training

The level of performance demonstrated by a fire department is usually a good indication of the type, quantity, and quality of the training provided. HCDFRS has a state-of-the-art training center and a full-time training staff. HCDFRS not only provides continuing in-service training conducted daily by company officers, but also provides scheduled training for officer development and specialty training for drivers, apparatus operators and specialty teams.

The minimum goal of any fire department training program should be to teach each person in the department to operate at acceptable and safe performance levels for his or her rank and assignment. Although national and state consensus standards for firefighter training is certainly taken into account, the specific requisite training for a firefighter is determined by their Authority Having Jurisdiction (AHJ). In other words, each fire department establishes the qualifications and training one must have to become a fire fighter and are responsible for establishing their own training programs.

The National Fire Protection Association (NFPA) develops voluntary consensus standards for fire departments. These standards provide guidance, rules, best practices and other items to which fire departments can voluntarily adhere. NFPA establishes standards for training, education, and professional development of personnel within a fire department. NFPA 1561 provides Incident Management System and Command Safety training requirements for responders. [71]

In addition to the NFPA standards, the Maryland Occupational Safety and Health (MOSH) established the Maryland Fire Service Health and Safety Consensus Standard for fire departments within the state. [72] Under the MOSH Consensus Standard, agencies with a duty to respond to an emergency incident, "must provide training and resources to responders commensurate with the duties required at those incidents. (Maryland Department of Labor, Licensing and Regulation, 2002)"

Relatedly, the MOSH Consensus Standard also addresses what qualifications or training makes an individual qualified to perform a certain function. Under the standard, pre-emergency responder's training is to be "determined by the AHJ, based on the level of anticipated response. (Maryland Department of Labor, Licensing and Regulation, 2002)"

The Consensus Standard for firefighters and fire officers is to be determined by the AHJ (AHJ is provided wide authority). However, for personnel classified as "First Responder, Emergency Medical Technician Basic (EMTB), Emergency Medical Technician Paramedic (EMTP) and Cardiac

[71] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY 1561 (2014).
[72] MD. OCC. SAFETY. AND HEALTH: MARYLAND FIRE SERVICE HEALTH AND SAFETY CONSENSUS STANDARD (MD. DEPT. LABOR, LICENSING, AND REG. 2002).

Rescue Technician (CRT)" the individual must obtain the appropriate license or certification from the Maryland Emergency Medical Services Board (Maryland Department of Labor, Licensing and Regulation, 2002). Because both NFPA and MOSH standards are voluntary, Maryland fire departments are provided the flexibility of establishing their own training standards and programs.

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Training

HCDFRS Career recruit training is a twenty-six-week, formal program that includes the following: 1) Maryland Emergency Medical Technician – Basic, Emergency Vehicle Operators Course (EVOC), and 2) Firefighter I and II, Hazardous Materials – Operations, and Technical Rescue training courses (i.e. Vehicle and Machinery Extrication, Site Operations, etc.). Included in the syllabus are firefighter survival and rescue training, as well as Incident Command System (ICS) and safety training. Most of this training corresponds directly with the National and State Industry Consensus Training Standards.[73]

Incumbent personnel receive formal and informal training through a variety of sources including but not limited to in- station, multi-company, quarterly officer training, regional, and conference and/or seminar attendance opportunities. Additionally, the HCDFRS holds Battalion level training as needed. In 2017, safety training included a safety stand-down period where the focus was on rapid intervention and MAYDAY situations. (A practical drill was planned however due to budget restraints never implemented).[74] In 2018, Rapid Intervention Crew/MAYDAY training focused on integrating ICS at the Battalion and Company level for firefighter rescue deployment after a MAYDAY declaration during Highrise operations. [75]Additionally, training in Modern Fire Dynamics focused on the complexity of the modern fire environment (i.e. faster fire propagation, unanticipated events, and more rapidly occurring dynamic fire situations) based on recent changes in the construction industry. Recent quarterly officer training held (Feb – March 2018) specifically highlighted Rapid Intervention Crew/MAYDAY (RIC/MAYDAY) and general training in Modern Fire Dynamics.[76]

In the HCDFRS, there are three broad categories of fire rescue service responders. Each of the following groups have different minimum training requirements:

1. career members,
2. county volunteer members (assigned to career staffed stations by the Assistant Chief of the Emergency Services Bureau (ESB)), and
3. corporate volunteer members (members of corporate volunteer fire departments that operate in coordination with HCDFRS administration).

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[73] Howard County Dept. of Fire and Rescue Services, General Order 100.04 Position Requirements- Licenses, Certifications, Experience, and Education (LEADS) Prerequisites (1984).
[74] Howard County Dept. of Fire and Rescue Services, Special Order 2017.23 Safety Stand Down (2017).
[75] Howard County Dept. of Fire and Rescue Services, Special Order Quarterly Officer Training- Winter 2018- RIC/ MAYDAY Training (2018).
[76] Howard County Dept. of Fire and Rescue Services, Special Order 2018.20 Modern Fire Dynamics Training Integration (2018).

Baseline training and experience levels for each career-uniformed position of HCDFRS are detailed in General Order 100.04 Position Requirements. General Order 100.04 Position Requirements officially incorporates the HCDFRS LEAD (Leadership, Education, Assessment, and Development) Program into promotional requirements for career firefighter and officer positions.[77] The program establishes the minimum requirements for each position and provides guidelines for training, education, and experience necessary for advancement within the Department.

Volunteer firefighters and officers are required to meet different training standards. The minimum training standards and qualifications for County Volunteer Firefighters are established in General Order 120.01 County Volunteer Firefighter/EMS Program. [78] Corporate volunteers must meet the minimum requirements set out in General Order 120.03 Operational Standards for Volunteer Personnel[79] and General Order 120.01 Volunteer Officer Requirements[80]

These requirements are described in the tables below:

Fire Fighter Minimum Qualifications

	Career	County Volunteer	Corporate Volunteer
Certificates and Licenses			
Maryland Class C Driver's License (or equivalent)	X		
Maryland Cardiac Rescue Technician/ Maryland Paramedic/ Maryland EMT License or Certification	X	X	X

[77] Howard County Dept. of Fire and Rescue Services, General Order 100.04 Position Requirements-Licenses, Certifications, Experience, and Education Prerequisites (1984).
9 Howard County Dept. of Fire and Rescue Services, General Order 120.01 County Volunteer Firefighter/ EMS Program (1995).
10 Howard County Dept. of Fire and Rescue Services, General Order 120.02 Volunteer Officer Requirements (1995).
11 Howard County Dept. of Fire and Rescue Services, General Order 120.03 Operational Standards for Volunteer Personnel (1997).

	Career	County Volunteer	Corporate Volunteer
Responder to Hazardous Materials/WMD Incidents-Operations Certificate	X		
Vehicle Technical Rescuer I & II Certificate	X	X	
AED Certification			X
First Responder			X
HCDFRS Courses			
Structural Collapse Awareness Seminar	X		
Swift Water Rescue Awareness seminar	X	X	
Trench Rescue Awareness Seminar	X	X	
Training Academy Physical Fitness	X		
Active Assailant—Warm Zone Ops (Initial)	X		
Wellness, Nutrition, Fitness (starting 1/1/19)	X		
Infectious Control		X	
MFRI Courses			
Firefighter I	X	X	X
Firefighter II	X		
Hazardous Materials Operations	X	X	
Rescue Technician: Site Operations	X		
Rescue Technician: Vehicle and Machinery Extrication	X		
Rescue Technician, Confined Space	X		
Emergency Vehicle Driver Operator	X		
Courage to be Safe	X	X	
Firefighter Survival and Rescue	X	X	
Active Assailant Awareness	X		
Weapons of Mass Destruction		X	
Thumper			X
FEMA Courses			
IS 100.b Introduction to Incident Command System (ICS)	X	X	

	Career	County Volunteer	Corporate Volunteer
IS 200.b ICS Single Resource and Initial Action Incidents	X	X	
IS 700.a National Incident Management System (NIMS)	X	X	
IS 800.b National Response Framework		X	

Lieutenant Minimum Qualifications

	Career	Corporate Volunteer
Pre-Requisites		
All Firefighter rank requirements	X	X
Age		21+ years old
Experience	4 years as HCDFRS Firefighter OR 3 years as HCDFRS Firefighter and Operational Paramedic	3 years operational fire service experience above minimum operational standards and 1 year service in Howard County
Education	HS Diploma AND 3 semesters of college credits (at least 39 credits)	
Certificates and Licenses		
Incident Safety Officer – Fire Suppression	X	X
Incident Safety Officer – Technical Rescue	X	
Fire Apparatus Driver Operator – Pumps	X	
Fire Service Instructor I	X	
Fire Officer I	X	X
EMS Officer I	X	
Fire Inspector I	X	
Vehicle Technical Rescuer I & II		X
Maryland EMT Certification or higher		X
MFRI Courses		
IS 300 Intermediate ICS for Expanding Incidents for Operational First Responders	X	
Aerial Apparatus Driver Operator	X	
Leadership in Supervision: Creating Environments for Professional Growth	X	
FEMA Courses		
Principles of Building Construction	X	
IS 800.b National Response Framework	X	

Captain Minimum Qualifications

	Career	Corporate Volunteer
Pre-Requisites		
Age		21+ years old
Experience	2 years as HCDFRS Firefighter Lieutenant OR 1 year as HCDFRS Fire Lieutenant + Bachelor's Degree	5 years operational fire service experience AND 2+ years volunteer services with Howard County
Education	HS diploma + 3 semesters of college (at least 45 credits)	
Certificates and Licenses		
Health and Safety Officer	X	
Fire Service Instructor II	X	
Fire Officer II	X	X
MFRI Courses		
Decision Making for Initial Company Operations	X	
Preparation for Initial Company Operations	X	
Strategy and Tactics for Initial Company Operations	X	
Leadership in Supervision: Perspectives in Thinking	X	
FEMA Courses		
IS 400 Advanced ICS for Command and General Staff, Complex Incidents, and MACS	X	
IS 702.a NIMS Public Information Systems	X	
IS 703.a NIMS Resource Management	X	
Principles of Building Construction	X	

Battalion Chief Minimum Qualifications (HCDFRS Career Only)

	Career
Pre-Requisites	
Age	
Experience	2 years as HCDFRS Fire Captain OR 1 year as HCDFRS Fire Captain AND a Master's Degree
Education	75 semester-based credits
Certificates and Licenses	
Fire Officer III	X
MFRI Courses	
Leadership in Supervision: Frameworks for Success	X

Assistant Chief Qualifications

	Career	Corporate Volunteer
Pre-Requisites		
Age		24+ years old
Experience	5 years as HCDFRS Fire Captain and/or HCDFRS Battalion Chief; OR 4 years as HDCFRS Captain and /or HCDFRS Battalion Chief AND a master's degree	8 years or more operational fire experience, 4 years in Howard County, AND 1 year as a Volunteer Officer in Howard County
Education	105 semester-based college credits	
Certificates and Licenses		
Fire Officer III		X
Fire Officer IV	X	

Findings and Recommendations: Training

The HCDFRS has an extensive training program, as outlined in General Order 100.04 Position Requirements in the Leadership, Education, Assessment, and Development (LEAD) Program.[81] Despite this extensive program, the actions of HCDFRS personnel during this incident indicate that current training and leadership programs have been inadequate in fostering the necessary skills for practical application. This conclusion comes from a variety of factors, including the extensive experience of personnel on the fireground, verifying personnel training records, and a review of the incident for what contributed to FF Flynn's death.

During the incident, HCDFRS personnel met the minimum training standards for their rank. Although crewmembers on the scene prior to the sudden hazardous event had an average of 15.7 years of HCDFRS experience, errors were made. Most of these errors occurred from the loss of situation awareness that affected the application of sound tactical decisions.[82] This was especially apparent between the different units working on the fireground. These tactical errors contributed to Engines 51 and 101 entering a structure on the level above a working basement fire. Many of these errors could have been mitigated or prevented if more training had been conducted in a realistic environment on a continuous basis to assist with learning the concept of situation awareness and its impact in Rapid Decision Making.[83]

First, although all HCFRS personnel train on the Incident Command System (ICS) neither the current General Orders nor the current training program establish a clear philosophy of Incident Command for divisions, groups and unit operations.[84] There are two philosophies for Incident Command to convey strategy and tactics to personnel operating on the fireground: Befehlstaktik (order-based tactics) and Auftragstatik (mission-based tactics). Befehlstaktik is a centralized command and control structure in which the command chain prescribes why, when, and how operations will be conducted. For example, some HCDFRS officers are trained in the Blue Card method which employs order-based tactic philosophy. Auftragstaktik is less regimented, with the Incident Commander providing instruction on the why and when of operations (commander's intent) but delegates how operations are executed to lower level leaders. This command philosophy is often employed by the Marine Corps, however HCDFRS officers do not receive explicit training in this command philosophy. Both command philosophies are woven

[81] Howard County Dept. of Fire and Rescue Services, General Order 100.04 Position Requirements-Licenses, Certifications, Experience, and Education Prerequisites (1984).

[82] Mica R. Endsley, D. G. (2012). Designing for Situational Awareness: An Approach to User-Centered Design. Boca Raton: CRC Press.

[83] Gary A. Klein, R. C.-C. (1988). Rapid Decision Making on the Fire Ground. Alexandria: U.S. Army Research Institute for the Behavioral and Social Sciences.

[84] Krulak, G. C. (1996). Fleet Marine Force Manual 6 Command and Control. Washington: Headquarters United States Marine Corps.

throughout HCDFRS General Orders and neither are explicitly supported by department training. This results in confusion among HCDFRS personnel, hindering team cohesion.

A strong example of HCDFRS' mixed command philosophy is HCDFRS General Order 300.07, Incident Command System, which outlines three Modes of Command: Investigation, Tactical, and Strategic. Investigation Command Mode is typically conducted by the first arriving company officer or firefighter, with the goal of conducting the incident size-up and investigating any unidentified hazard. Tactical Command Mode occurs when "a company officer that is performing all the responsibilities of Command while on-foot and from within the tactical environment."[85] Despite operating within the tactical environment, but outside of an IDLH environment, the Incident Commander in Tactical Command Mode is expected to conduct all Command responsibilities, including establishing incident objectives, overall incident strategy, evaluating the need for additional resources, and directing and assigning responding resources. Lastly, Strategic Command Mode involves the Incident Commander establishing a Command Post within an environment that facilitates and enhances Command functions, but outside of the tactical environment (typically from within a designated command vehicle).

From the three Command Modes established in General Order 300.07, Incident Command, none establish a clear command philosophy. Investigation Command, functionally describes sensemaking of a potential incident scene with a notional decision maker on site. It does not provide any clear philosophy of either order based or mission-based tactics, presumably allowing the Investigation Incident Commander to use their personal command philosophy. Although this may empower individual commanders, responding units will need to have a pre-existing relationship with the commander to know whether they are expected to operate in a mission-based or order-based environment. Even more confusing are the Tactical Command Mode and Strategic Command Mode, which requires the Incident Commander to establish the overall incident strategy, establish objectives, evaluate the need for additional resources, as well as direct and assign responding resources upon arrival. These requirements blend both command philosophies, having the Incident Commander establish the strategy and objectives (mission-based) as well as directly manage assets and resources (order-based). The notable difference between Tactical Command and Strategic Command is the location of the commander (within the Hazard Zone or outside the Hazard Zone), which changes the environment of the incident commander but provides no guidance on command philosophy for the department.

Without clear command philosophy within the department, it is impossible to provide the adequate training necessary for HCDFRS personnel to cohere as a firefighting force optimally on the fireground. Currently, HCDFRS permits each Incident Commander to employ various command philosophies established by the Department, which results in inconsistent expectations for arriving units dependent solely on which officer establishes command.

Additionally, the command philosophy employed during an incident can change mid-incident either by the passing of Command to another officer or because the Incident Commander changes how they interact with crews on the Fireground. For example, during the 7005 Woodscape Drive Incident, the Incident Commander provided commands under both command philosophies. The Incident Commander's method to establish water supply employed the order-based philosophy while the commander's establishment of Fire Attack employed a mission-based philosophy. HCDFRS officers seldom receive adequate practical training in establishing Incident Command philosophies for typical structure fire incidents, in addition to rapid decision-making training with application in realistic conditions.

Determining and reinforcing a department-wide command philosophy and implementing regular and realistic rapid decision-making training will set the necessary foundation for all department operations to prevent future issues. As described in the Strategy and Tactics section, a mission-oriented command philosophy will best serve fireground operations. This command philosophy "encourages individual initiative, skill, and creativity" of lower-ranked personnel (group supervisors, groups and units) while still providing the Incident Commander command and control over the incident management strategy.[86]

Second, the current HCDFRS training program is primarily focused on personnel classroom course hours (didactic) rather than a representation of the practical skills they have acquired for their position. While the training material covered in the current LEADS document and standards is undisputedly valuable, the department does not verify that personnel can apply the material learned in courses to their position (with the exception of the paramedic specialization). Additionally, the LEADS document establishes the required training courses for officers but has not developed officer core competencies. For example, the LEADS document identifies mentorship as a core skill officers should employ, but there is no competency-based mentorship. Without this verification of fundamental practical skills, or continuing certification of basic practical skills, it is unclear whether all personnel maintain a baseline readiness for a true response.

For example, during the 7005 Woodscape Drive incident crews entered the residential structure on the level above a working fire despite acknowledging situational cues and patterns that indicate a basement fire. To address this, HCDFRS should reform its continuing training and exercise program to incorporate drills and exercises that demonstrate that all personnel possess and maintain core practical competencies for fire and rescue operations. This would include fireground Situation Awareness, Pattern Recognition and Rapid Decision Making. [87]

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[86] Krulak, G. C. (1996). Fleet Marine Force Manual 6 Command and Control. Washington: Headquarters United States Marine Corps.

[87] Mica R. Endsley, D. G. (2012). Designing for Situational Awareness: An Approach to User-Centered Design. Boca Raton: CRC Press and Gary A. Klein, R. C.-C. (1988). Rapid Decision Making on the Fire Ground. Alexandria: U.S. Army Research Institute for the Behavioral and Social Sciences.

Third, drills and training exercises should occur in realistic conditions. During an active fire, personnel within the hazard area often must operate under arduous conditions (stress, friction, uncertainty and ambiguity)[88] that will likely impact the decisions, tasks, and situational awareness of fireground personnel. By simulating core actions in as realistic of an environment as possible, personnel will be better prepared to respond to real-life incidents.

Fourth, HCDFRS personnel are highly trained in RIC and MAYDAY procedures. While these procedures are undeniably important, there is little practical training on error prevention and error trapping to prevent a MAYDAY situation from occurring.[89] Although error prevention is best, error trapping can avoid a negative outcome after an error is made. Error trapping is when an error is quickly recognized and actions are taken to mitigate or remove the error before a negative outcome occurs. For example, at the 7005 Woodscape Drive Incident Engine 51 and Tower 10 entered into the structure on the first floor and observed indications of a possible basement fire. After noticing those conditions, they exited the structure—effectively trapping their error. Training developed for firefighters should incorporate scenarios based on error prevention and error trapping before error mitigation practices come in to play such as a MAYDAY. Firefighter(s) can better utilize these practices by understanding Safety Red Flags such as zero visibility, encountering high heat, reports of "we can't find the fire," and so forth.

Fifth, in reviewing communications and actions on the Fireground, the ISRB identified several critical instances where actions were taken but not communicated with Command or among other crew members. Also, different forms of communications terminology were used which may have led to an erroneous mental model. For example, During the early stages of fire communications between the Incident Commander and members operating in the Fire Attack Group there was confusion. One possible reason for this is that crew members did not use the multi-story numbering convention outlined in HCDFRS General Order 300.07: Incident Command Systems.[90] Instead, there were different terms used to describe similar areas of the structure, referencing "basement," "ground level," "first level," "floor number one" and "lower section" all within the first 28 minutes of the incident to communicate geographical information to the Incident Commander. This lack of common terminology created a misunderstanding between operating crews and the Incident Commander which contributed to an erroneous mental model. HCDFRS should incorporate the multi-story numbering convention from HCDFRS General Order 300.07 Incident Command Systems into a hands-on training simulation, ideally one that practices an incident size-up.

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[88] Gray, G. A. (1997). Fleet Marine Force Manual 1 Warfighting. Washington: Headquarters United States Marine Corps.

[89] Helmreich RL, Klinect JR, Wilhelm JA. Proceedings of the tenth international symposium on aviation psychology. Columbus: Ohio State University; 1999. Models of threat, error, and CRM in flight operations; pp. 677–682.

[90] Howard County Dept. of Fire and Rescue Services, General Order 300.07 Incident Command System (2005).

Sixth, although many HCDFRS members have been trained on the Blue Card communication method, which uses the communications order model, personnel on the fireground did not effectively implement the communications order model. During the 7005 Woodscape Drive incident crews left communications loops open and not closed as required in the model. For example, Incident Command asked Engine 101A to clarify to which quadrant her crew was deploying. Before Engine 101A was able to respond to that request, Tower 10A interjected with additional information before Engine 101A's communication loop was closed. By failing to close the communication loop, it remained unclear whether the communication was effectively received or correctly interpreted. HCDFRS should employ department-wide, practical hands-on training on closed-loop communication and HCDFRS officers should ensure that closed-loop communication is used consistently in the field.[91]

Seventh, HCDFRS has deployed equipment into the field without adequate training on the equipment. For example, the department training prior to the deployment of the Motorola APX8000XE portable radio was provided on a department e-mail slideshow of how to operate the radio but fell short of any "hands-on" practice. The Motorola APX8000XE portable radio is a complex piece of life safety equipment, requiring specific training to operate appropriately that can only be effectively achieved through "hands-on" practice. Similarly, HCDFRS deployed new Thermal Imaging Cameras into the field the same week as the 7005 Woodscape Drive incident and did not provide any prior hands-on training. Before any future equipment field deployment, HCDFRS must facilitate hands-on, competency-based training in realistic scenarios for all personnel on the equipment.

Eighth, after a review of the HCDFRS training General Orders the ISRB recognized a discrepancy between the minimum training requirements for Career HCDFRS and Corporate Volunteer officers. As a combination department, a Corporate Volunteer has the same duties and expectations as HCDFRS Career personnel. Because the positions are treated equally in the field, all personnel of the same rank should have the same minimum training to assure consistency and team cohesion.

Findings	**Recommendations**
L.1 Although all HCFRS personnel train on the Incident Command System (ICS) neither the current General Orders nor the current training program establish a clear philosophy of Incident Command for divisions, groups and unit operations.	L.1.1 HCDFRS policies and training for the ICS must emphasize a mission-oriented philosophy of command.

[91] Department of Homeland Security Administration, U. F. (2016). Voice Radio Communications Guide for the Fire Service. Washington: U.S..

Findings	Recommendations
L.2 Current HCDFRS training rarely provides realistic, practical, hands-on scenarios for personnel to master fireground fundamentals. Particularly noteworthy in this incident was the inability for fireground personnel to properly identify situational cues that there was an active basement fire. This aspect alone should have indicated that entry on the first floor was unsafe and caused personnel to alter their tactics for fire attack.	L.2.1 HCDFRS training must be conducted in realistic practical environments that contain the elements of stress and friction. L.2.2 HCDFRS must develop a competency-based mentorship and training program to address effective rapid decision making and situational awareness on the fireground. Said program should include evaluative mechanisms for measuring an officer's core skills of proficiency for their position.
L.3 HCDFRS personnel are trained in MAYDAY and RIC protocols and best practices.	L.3.1 HCDFRS must implement practical, realistic training on preventing and trapping errors on the fireground.
L.4 HCDFRS MAYDAY training does not incorporate error prevention or error trapping on the fireground.	See Recommendation L.3.1
L.5 Although many HCDFRS members have been trained on the Blue Card communication method, which uses the communications order model, personnel on the fireground did not effectively implement the communications order model.	L.5.1 HCDFRS needs to define the terminology conventions for geographic locations used on the fire scene. Training needs to include the terminology as well as practicing the proper functions in the communications order model.
L.6 HCDFRS has deployed equipment into the field without adequate training on the equipment (Thermal Imagine Cameras and Motorola APX8000XE portable radios).	L.6.1 Before any future equipment field deployment, HCDFRS must facilitate hands-on, competency-based training in realistic scenarios for all personnel on the equipment. L.6.2 HCDFRS needs to develop a training program that incorporates NFPA 1408, Standard for Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers.
L.7 After a review of the HCDFRS training General Orders the ISRB recognized a discrepancy between the minimum training requirements for Career	L.7.1 All HCDFRS personnel, career and corporate volunteer, of the same rank should have the same minimum training

Findings	Recommendations
HCDFRS and Corporate Volunteer officers.	to assure consistency and team cohesion.

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M. Personal Protective Equipment

General Background: PPE

Firefighting is an inherently dangerous profession, with personnel routinely exposed to environments that pose an immediate risk to an individual's health and safety (IDLH environments). In 1970, the United States Congress enacted the Occupational Safety and Health Act to provide "for the development and promulgation of occupational safety and health standards."[92] Federal regulations regarding Personal Protective Equipment (PPE) can be found in 29 CFR § 1910.132, which outlines employer and employee obligations for providing and utilizing PPE in hazardous environments. Notably, these regulations are relatively broad, requiring that "all personal protective equipment shall be of safe design and construction for the work to be performed."[93] In other words, the federal regulations support industry standards for personal protective equipment. Additionally, 29 CFR 1910.134 covers Respiratory PPE, such as a firefighter's Self-Contained Breathing Apparatus (SCBA) This regulation requires an employer to conduct a medical evaluation to determine whether an employee is medically qualified to use a respirator and conduct a fit test.

The National Fire Protection Association (NFPA) provides national consensus standards for the firefighting industry. NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, provides "minimum design, performance, testing, and certification requirements for proximity firefighting protective ensembles and ensemble elements that include coats, trousers, coveralls, helmets, gloves, footwear, and interface components."[94]

NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting provides a national standard for maintaining personal protective ensembles, including standards for selecting, inspecting, cleaning, and repairing protective clothing and equipment.[95] Several key provisions of NFPA 1851 include section 6.3.3, which establishes that "[a]dvanced inspections of all protective ensemble elements that are issued shall be conducted at a minimum of every 12 months, or whenever, routine inspections indicate that a problem could exist." Additionally, section 7.3.2 establishes that "[e]nsemble and ensemble elements that are soiled should receive advanced cleaning prior to reuse" and section 7.3.3 establishes that "[e]nsemble and ensemble elements shall receive advanced cleaning at the time of advanced inspection if not subjected to advanced cleaning within the preceding 12 months." Beyond cleaning, Section 10.1.2 requires that "[s]tructural firefighting ensembles and

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[92] 29 U.S.C.A. § 651 (West)

[93] 29 C.F.R. § 1910.132(c) (West)

[94] National Fire Protection Association 1971 Standard on Protective ensembles for Structural Fire Fighting and Proximity Fire Fighting 1.1.2 (2018).

[95] National Fire Protection Association 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting (2014).

ensemble elements shall be retired in accordance with 10.2.1 or 10.2.2, no more than 10 years from the date the ensembles or ensemble elements were manufactured."

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: PPE

HCDFRS General Order 530.02 Personal Protective Equipment establishes the minimum requirements for HCDFRS personnel's personal protective equipment. This order requires that "Personal Protective Equipment (PPE) shall meet NFPA guidelines as well as require DFRS approval."[96] While all of the PPE ensemble is provided by HCDFRS, individual personnel are empowered to purchase leather helmets and leather boots for use on the fireground as long as the equipment meets the applicable NFPA standard. In addition to outlining the minimum PPE personnel are to have, it establishes procedures for replacing equipment as well as general guidance for when and where PPE should be worn.

In regards to maintenance of PPE, Howard County Department of Fire and Rescue Services Special Order 2004-42, Protective Equipment Cleaning, requires that "[e]very 12 months, at a minimum, departmental issued and approved personally owned protective equipment currently in-service and soiled shall be sent for cleaning."

General Order 150.18, Carcinogen Exposure Reduction Plan addresses how to clean PPE, but it does not address a regular/mandatory schedule or period for advanced cleaning or inspection.[97] Furthermore, this is addressed strictly from the perspective of carcinogen reduction and not overall safety and performance of the gear.

[96] Howard County Department of Fire and Rescue Services General Order 530.02 Personal Protective Equipment (2009).
[97] Howard County Department of Fire and Rescue Services General Order 150.18 Carcinogen Exposure Reduction Plan (2018).

Woodscape Drive Incident Overview: Personal Protective Equipment: PPE

During the fire incident at 7005 Woodscape Drive, personnel operating within the hazard zone donned the appropriate personal protective equipment. This included FF Flynn, who donned his entire PPE ensemble prior to making entry into the structure. Part of FF Flynn's ensemble included personally purchased leather helmet. Additionally, FF Flynn was outfitted with and using HCDFRS MSA G1 self-contained breathing apparatus (SCBA).

From the review of FF Flynn's PPE, there were some minor variances from proper PPE donning, such as securing the protective hood with snaps between his coat's inner lining and outer shell. All components of FF Flynn's SCBA, while some were damaged, were intact and in place at the time of his rescue.

Findings and Recommendations: PPE

Personal Protective Clothing

An independent, third-party examination of FF Flynn's personal protective clothing and equipment established that FF Flynn's protective clothing and equipment operated as designed and there were no issues that could be considered as contributing factors to FF Flynn's injuries. The report verified that most of FF Flynn's personal protective clothing met the relevant NFPA 1971 standard at the time of manufacture. Although the report found no issues in FF Flynn's personal protective equipment to have contributed to his injuries, the report did include findings that could benefit the overall safety of personnel in future incidents. The examination report is attached as Appendix D. Additionally, the Internal Safety Review Board (ISRB) identified several best practices to enhance personnel safety in regard to Personal Protective Equipment that should be incorporated into HCDFRS practices.

First, FF Flynn's personal protective clothing had not received advanced inspection or cleaning within the twelve (12) months prior to the incident at 7005 Woodscape Drive. Under the current HCDFRS Special Order 2004-42 Protective Equipment Cleaning, personal protective clothing is to be cleaned at minimum every twelve (12) months if it is soiled. Because the Special Order specifically states that "soiled" equipment must be cleaned every twelve (12) months, non-soiled gear is not mandated to be inspected or cleaned every twelve (12) months. For example, a member's gear that has been stored, but not used, would not be sent out for periodic advanced inspection since it is not soiled. Additionally, the special order allows for the interpretation of "soiled" as an indicator for PPE to receive advanced cleaning, thereby negating advanced inspection if not considered to be "soiled."

Attached to Special Order 2004-42 is the DFRS Inspection/Repair/Decon Checklist form, also referred to as the DFRS Protective Ensemble Check List.[98] This form is the only Howard County Department of Fire & Rescue Services (HCDFRS) document that identifies this ten (10) year period as a condition of removal from service as established in NFPA 1851. It was also noted that, while Special Order 2004-42, issued July 6, 2004, is still in effect, the first provision within this order states, "[t]his special order is a temporary order . . ." and that "[a] General Order will be issued to identify the inspection, cleaning, repair and decon procedures of all protective equipment in the near future." At the time of the Woodscape incident, no General Order existed pertaining to advanced inspection of PPE.

Second, although FF Flynn's turnout coat had his name displayed on the rear tail, some personnel on the fireground did not have their names displayed on the rear of their coats. When wearing the appropriate personal protective clothing and equipment on the fireground, personnel appear similar and it is difficult to readily identify individuals. Names clearly displayed on the tails of turnout coats provides a quick visual identification of personnel, which enhances

[98] Howard County Department of Fire and Rescue Services Special Order 2004-42 Protective Equipment Cleaning (2004).



Figure 31 FF Flynn's Personal Helmet

personnel accountability. During this particular incident, there was a period immediately following the MAYDAY call in which the whereabouts and wellbeing of several personnel were unknown. The ability to readily identify personnel was important to determine if additional personnel were in need of rescue. Providing and assuring standardized name identification on the tail of turnout coats is one component that will enhance personnel safety and accountability on the fireground.

Third, FF Flynn's firefighting boots and personally owned helmet were greater than ten (10) years from manufacture date. Additionally, it was not possible to verify whether FF Flynn's protective hood was within ten (10) years of its manufacture date since there was no manufacture label. Under the NFPA Standard 1971, firefighter personal protective ensembles should be no more than ten (10) years past the manufacture date. While FF Flynn's helmet and firefighting boots should have been retired and replaced, there is no indication that the age of his equipment contributed to his injuries.



Figure 32 FF Flynn's Boot

Fourth, the examination of FF Flynn's protective hood revealed holes in the rear bib that matched the size and spacing of the snaps used to attach the coat liner to the outer shell of the turnout coat and collar. Based on this observation, it is likely that FF Flynn had fastened the liner of his coat to the coat shell through the hood, a practice that has been noted among some HCDFRS personnel. Securing the hood in such a way is not recommended because it restricts the hood from effectively moving in concert with the head of the wearer. When a portion of the hood is stationary, wearer movement can result in gapping that compromises encapsulation and thermal protection. Additionally, this practice creates holes in the hood, voiding the NFPA certification of the garment.

Fifth, the independent examiner indicated that FF Flynn's turnout coat collar was not in a raised and secured position. A raised turnout coat collar provides protection for the neck area, closing the gap between the ear flaps and the coat. This item was not a contributing factor to FF Flynn's injuries. However, proper donning of the ensemble does include raising the turnout coat collar, which could affect personnel safety during structural firefighting.



Figure 33 FF Flynn's Protective Hood

Lastly, it was noted that FF Flynn was wearing reissued personal protective equipment and not gear that had been manufactured to his specifications. Although individually tailored personal protective equipment is best to ensure maximum safety for a firefighter, the quartermaster may reissue gear that is still serviceable to a department member that has a similar build and fit.
Whenever serviceable gear is reissued, it is checked against the individual's measurements to assure it matches the individual. The quartermaster also has the individual try on the gear to insure proper fit and proper overlap. There is no indication that FF Flynn's use of re-issued gear had any impact on its effectiveness.

Findings	**Recommendations**
M.1 FF Flynn's personal protective clothing had not received advanced inspection or cleaning within the twelve (12) months prior to the incident.	M.1.1 The Howard County Department of Fire and Rescue Services should consider incorporating guidance from Special Order 2004-42 into a newly issued General Order that aligns with NFPA 1851. This order should mandate yearly advanced inspection and cleaning of all personal protective equipment, regardless of soiled condition, to assure that this equipment is in safe and serviceable condition.
M.2 Although FF Flynn's turnout coat had his name displayed on the	M.2.1 General Order 530.02 should be revised to require all turnout coats

Findings	Recommendations
rear tail, some personnel on the fireground did not have their names displayed on the rear of their coats.	to have the member's last name affixed to the rear tail of the coat. Should multiple members have the same last name, additional lettering would be used to further differentiate those individuals. M.2.2 HCDFRS should assure all personnel have their name affixed to the rear tail of their turnout coats and request name panels for personnel, as necessary.
M.3 FF Flynn's firefighting boots and helmet were older than ten (10) years from manufacture date.	M.3.1 General Order 530.02, Personal Protective Equipment, should be revised to align with NFPA Standard 1971. These revisions should include: o An explicit prohibition of any modifications to equipment that would compromise or void its NFPA 1971 certification. o Allowable length of service parameters for all personal protective clothing and equipment items.
M.4 The examination of FF Flynn's protective hood revealed holes in the rear bib that matched the size and spacing of the snaps used to attach the coat liner to the outer shell of the turnout coat and collar.	See Recommendation M.3.1

Findings	Recommendations
M.5 The independent examiner indicated that FF Flynn's turnout coat collar was not in a raised and secured position.	M.5.1 Instruction and training for personal protective equipment should focus on proper donning of the entire safety ensemble, including the importance of utilizing and securing all components for maximum safety and protection (i.e. collars up, snaps fastened, etc.). M.5.2 Personnel should ensure that all clothing is fully and properly donned during any structural firefighting event for their safety.
M.6 It was noted that FF Flynn was wearing reissued personal protective equipment and not gear that had been manufactured to his specifications.	M.6.1 HCDFRS Quartermaster should continue their existing process of assuring gear is properly sized when re-issuing serviceable gear.

Self-Contained Breathing Apparatus

HCDFRS outfitted all apparatus with MSA G1 self-contained breathing apparatus (SCBA) in November 2016. FF Flynn's SCBA and facepiece were evaluated at the NIOSH National Personal Protective Technology Laboratory (NPPTL) in Morgantown, WV. In addition to the NIOSH evaluation, department SCBA practices and SCBA monitoring software were reviewed. The findings from that evaluation are detailed below.

First, at the time of this incident, FF Flynn was wearing and using department provided MSA G1 SCBA. All components of FF Flynn's SCBA were intact and in place at the time of his rescue. There was air remaining in FF Flynn's SCBA air cylinder when he was rescued and the SCBA that was utilized by FF Flynn did not contribute to his death. Data downloaded from FF Flynn's SCBA indicated that the pressure in his SCBA was 2705 psi at 02:43:39 hours, at which time he had been rescued and was outside of the structure. FF Flynn's SCBA and facepiece were evaluated by NIOSH and per the associated report, "[n]o evidence was identified to suggest that the SCBA unit inspected and evaluated contributed to the fatality." The details of this evaluation are contained in the NIOSH PPE Case report found in Appendix D.

Second, data downloaded from FF Flynn's SCBA integrated motion sensor component indicated that motion stopped at 02:28 hours, was reinitiated at 02:39 hours, and continued until the SCBA was shut-down at 02:45 hours. Based on the information available, FF Flynn's motion stopped at 02:28 hours and the reinitiated motion at 02:39 hours was when the RIC located FF Flynn and initiated his rescue.

Third, FF Flynn used an SCBA with the identifier (E101C) that did not correspond with his riding position and assignment (E101B). This mismatch could lead to confusion on the fireground if the Battalion Chief and Medical Duty Officers are using software available to them that receives signals from SCBA equipment, including distress signals. FF Flynn was assigned to the "B" position at the time of this incident and was seated in the "B" seat of Engine 101 (behind officer) while responding to this incident. SCBA on field apparatus are identified by a visible label on the backplate and digitally within the control module with an identifier that corresponds with the SCBA's position on the apparatus.

The SCBA can transmit various statuses to the MSA A2 software, which is available on the Mobile Data Terminal (MDT) installed in the Battalion Chief and Medical Duty Officer vehicles. These statuses include PASS (Personal Alert Safety System) device activation, air supply, and temperature alarms. The MSA A2 software displays the SCBA's apparatus position identification (i.e. E101A, E101B, etc.) as the means to identify the unit to the individual monitoring the A2 software. Additionally, the "B" SCBA on fire engines has an integrated thermal imaging camera (TIC) in the control module. If the MSA A2 software was used, it would have indicated E101C's PASS device activation instead of FF Flynn's assigned position E101B. Because of this mismatch, personnel may have either not realized that the "B" position firefighter was in trouble or interpreted that there was an additional firefighter in trouble.

This situation also creates confusion when the identifier on a firefighter's SCBA does not match the identifier they transmit verbally or electronically via their portable radio. A transmission received with one identifier and SCBA data received with a different identifier would make it difficult for a monitoring individual to appropriately identify the information as coming from a single firefighter. Through interviews, it was determined that the E101B SCBA had been sent out for maintenance and had not been placed back on the apparatus. When the E101B SCBA was sent out, SCBA on E101 was rearranged, instead of placing a reserve SCBA in the "B" seat of E101.

Fourth, although the Howard County Department of Fire and Rescue Services owns MSA A2 SCBA monitoring software, the software has not been adopted for use on the fireground. The ability to monitor SCBA data on the fireground is a critical asset to the safety of personnel operating on incidents. When HCDFRS obtained MSA G1 SCBA in 2015, they also obtained MSA A2 software. This software provides the ability to remotely and wirelessly monitor individual SCBA statuses, to include PASS device activation and air supply. The MSA A2 software product key was obtained in December 2016. As of May 30, 2017, this software had been installed on the MDTs in the Battalion Chief, Medical Duty Officer, and Safety Officer Vehicles, however, the use of the software has not been adopted by the department.

There is no written plan for implementing and monitoring the software and use of the MSA A2 software on the fireground is voluntary. Based on user interviews, distance and physical objects (i.e. some building construction components) may interfere with the wireless data transmissions from the SCBA, however, there were no identified factors or issues indicating that monitoring the software would be detrimental to personnel operating on the fireground. It was identified that an implementation plan would need to designate who should be responsible for monitoring the software during incidents. The monitoring software requires an individual's focused attention and would likely overextend the Incident Commander if this task were added to their responsibilities. While this is a safety related item, the Safety Officer position is not conducive for monitoring the MSA A2 software because the Safety Officer needs to be mobile on the scene and must be focused on crew operations and actively evolving hazards. One consideration would be to assign this task to the accountability officer, as it is closely related to the accountability officer's responsibilities.

Fifth, some SCBA unit control modules do not have an accurate date and time saved. In the process of downloading data from the control modules of SCBA that were utilized on this incident, it was realized that some units did not have accurate date and time data. FF Flynn's SCBA and E101A's SCBA were accurate while some other units were not. For example, some units were saving current event data as dates in the years 1969 and 1970. The department Breathing Apparatus Technician advised that date inaccuracy is likely related to extremely low or dead internal clock batteries in the power module of the affected SCBA. The SCBA internal clock battery maintains the date and time during periods when the main battery module is removed.

As with any battery, the internal battery has a life span and at some time the battery will be depleted. Because of the low or dead internal clock batteries, there were multiple SCBA that did not have accurate date and time information. This presents difficulty in determining when an event occurred and impedes the ability to accurately obtain valuable data. The process to determine the correct date and time from the affected units is cumbersome, requiring calculating the date from a known or controlled event date and time. While this internal battery issue does not present a safety issue to the wearer, it does affect the ability to track data that, as in this case, is valuable in analyzing events and breathing apparatus operation that are related to firefighter safety.

It was also identified through this process that the limited staff assigned to the Breathing Apparatus Shop ("BA Shop") is a contributing factor in prioritizing SCBA maintenance tasks and how quickly tasks can be completed. There is only one full-time employee assigned to the BA Shop which limits the number of tasks that can be accomplished over any given period of time.

Sixth, FF Flynn's SCBA PASS alarm activated at full alarm at 02:28 hours, which assisted the rapid intervention crew (RIC) in locating FF Flynn. Data downloaded from FF Flynn's SCBA (E101C) indicated that an activation of the manual initiating component of the PASS occurred at 02:28 hours. The sound of FF Flynn's PASS alarm was heard by RIC personnel when they arrived at the area of the steps that lead into the basement crawlspace. The PASS alarm sound assisted the RIC personnel in locating FF Flynn and it was still activating when the RIC contacted Flynn.

Seventh, FF Flynn was wearing his assigned SCBA facepiece, which passed his most recent SCBA facepiece fit test on March 27, 2018. In accordance with 29 CFR 1910.134 and NFPA 1500, section 7.13, HCDFRS personnel are fit tested annually to assure they are utilizing the proper size SCBA facepiece to achieve an effective seal.

Findings	**Recommendations**
M.7 FF Flynn used an SCBA with the identifier (E101C) that did not correspond with his riding position and assignment (E101B).	M.7.1 Create or update a General Order to institutionalize cultural practice of associating SCBA with riding positions. M.7.2 Educate personnel on the important current practice of keeping SCBA in the riding position for which it is identified. Whenever an SCBA is removed from apparatus for maintenance, a spare SCBA is to be placed in the vacant position. M.7.3 Make available a spare SCBA with the same functional capabilities (i.e. thermal imaging camera) as the SCBA removed from service.

Findings	Recommendations
	M.7.4 Remind personnel to assure that their SCBA and portable radio identifiers match. (The only exception being when utilizing a spare SCBA due to SCBA being out for maintenance.)
M.8 Although the Howard County Department of Fire and Rescue Services owns MSA A2 SCBA monitoring software, the software has not been adopted for use on the fireground.	M.8.1 Develop a plan for the use of MSA A2 SCBA monitoring software, to include identifying who is responsible for monitoring the software on an incident and begin utilizing this software on incidents.
M.9 Some SCBA unit control modules do not have an accurate date and time saved.	M.9.1 Evaluate all department SCBA for low or dead internal clock batteries and replace affected power modules, utilizing warranty provisions whenever possible. M.9.2 Evaluate BA Shop staffing options to provide for more efficient and timelier SCBA maintenance.

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N. Apparatus and Equipment

General Background: Apparatus and Equipment

All Fire and Rescue Departments require effective equipment to fulfill their mission of protecting life and property. With many different types of apparatus and equipment available in the general marketplace, the National Fire Protection Association (NFPA) have established consensus standards for equipment and the staff qualifications to operate such equipment.

NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications, outline "the minimum job performance requirements" for operating a fire apparatus.[99] A key skill fire apparatus operators should have is "the ability to use hand tools, **recognize system problems,** and correct any deficiency noted according to policies and procedures."[100] Similarly, NFPA 1071 Standard for Emergency Vehicle Technician Professional Qualifications establishes the General Skill Requirements for Emergency Vehicle Technician I and an Emergency Vehicle Technician II in inspecting emergency vehicle operation based on department standard operating procedures, manufacturer specifications.[101]

In addition to the operator and technician standards, NFPA has standards for the vehicle and equipment inspection and maintenance. NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles, provides standards for routine vehicle inspection and criteria for placing apparatus out of service. For example, under Section 6.4.1. (2) an emergency vehicle will be taken out of service if the engine system "has Class 3 leakage of oil."[102] A Class 3 liquid leakage is one that is "great enough to cause drops to fall from the item being inspected."[103] For routine inspection, NFPA 1911 requires "[a] visual and operational check of the apparatus⋯within 24 hours of a run or at least weekly."[104] The standard also calls for maintaining a record of the visual and operational check.[105] Additionally, NFPA 1911 Chapter 21 provides standards for pump testing.[106]

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[99] National Fire Protection Association 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (2017).
[100] National Fire Protection Association 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications Section 4.2.1(B) (2017)(emphasis added).
[101] National Fire Protection Association 1071 Standard for Emergency Vehicle Technician Professional Qualifications (2016).
[102] NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles 6.4.1 (2017).
[103] NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles 3.3.74 (2017).
[104] NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles 7.1 (2017).
[105] NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles 7.4.1 (2017).
[106] NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles 21 (2017).

Similarly, NFPA Standard 1962 Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose Couplings, Nozzles, and Fire Hose Appliances outlines the testing and maintenance of all fire hose. Under this standard, in-service hose should have been manufactured after July 1987 and verified for serviceability by the service tests specified in NFPA 1961 Standard on Fire Hose Section 4.8.[107] Records associated with hose service tests should be established and maintained.[108] To best track hose serviceability, the standard calls for each length of hose to have an identifying number to use in recording its service life.[109] When a hose is removed from service, either for repair or because it has been condemned, it is to be distinctively tagged with the reason for removal noted on the tag.[110] Additionally, NFPA 1962 requires that each hose nozzle be tested at least as frequently as the hose itself.[111]

Many departments also use Thermal Imaging devices to aid in fire and rescue operations. NFPA Standard 1801 Standard on Thermal Imagers for the Fire Service specified "the design, performance, testing, and certification requirements for thermal imagers used by fire service personnel during emergency incident operations."[112] Standards for training personnel and building competency in thermal imaging operations is outlined in NFPA 1408 Standard for Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers.[113]

[107] NFPA 1962 Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances (2018).
[108] NFPA 1962 Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances 4.11.1.1 (2018).
[109] NFPA 1962 Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances 4.11.1.2 (2018).
[110] NFPA 1962 Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances 4.11.3.6 (2018).
[111] NFPA 1962 Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances 5.3 (2018).
[112] NFPA 1801 Standard on Thermal Imagers for the Fire Service 1.1.1 (2018).
[113] NFPA 1408 Standard for Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers (2015).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Apparatus and Equipment

Howard County Department of Fire and Rescue Services General Order 500.01 Annual Service Testing and Inspection sets the minimum standards for equipment testing and inspection. Under Section 2 of General Order 500.01 Annual Service Testing and Inspection, Section 2, firehose inspection is to be conducted in accordance with NFPA 1962, Chapter 5. This requirement is further enforced through Special Order 2018.30 Annual Hose Testing, which states that "all fire hose shall be tested annually, and records updated" as recommended by NFPA 1962. As dictated by the Special Order, testing was to be accomplished by July 01, 2018, with completed test records sent to the Bureau of Logistics via inter-office mail on or before that date. Should a hose fail inspection it is to be placed out-of-service immediately, the couplings cut off, and an "Equipment Help Desk" request submitted for pick-up of the damaged hose.[114] Additionally, Special Order 2018.30 Annual Hose Testing includes a Nozzle Inspection check-list and Special Order 2017.36 Pump Testing aligns with NFPA 1911 standard for annual pump testing of all apparatus and equipment that include a fire pump.

Vehicle maintenance and repair policy for the Howard County Department of Fire and Rescue Services is established by General Order 510.03 Vehicle Maintenance and Repair. General Order 510.03 Vehicle Maintenance and Repair requires daily and weekly status checks by a vehicle's assigned driver/operator in accordance with state and federal safety regulations. To aid this process, the Howard County Department of Fire and Rescue Services has created a check sheet for inspections, located in attachments A through C to General Order 510.03 Vehicle Maintenance and Repair.

These checks are to be recorded by personnel in the station where the apparatus is currently housed with proper records maintained for all county-owned apparatus.[115] Records for vehicles assigned to the field shall be maintained and updated by the company captain or their designee.[116] A file shall be maintained for each vehicle, including the vehicle specifications, purchasing information and maintenance and repair records. Specifically, maintenance records consist of:

- All daily and weekly check sheets for the past year.
- All damage reports and completed requests for repairs.
- Completed Maintenance and Repair Requests.
- Down time in one quarter days for the unit.

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[114] Howard County Department of Fire and Rescue Services, Special Order 2018.30 Annual Hose Testing, Appendix A (May 25, 2018).
[115] Howard County Department of Fire and Rescue Services, General Order 510.03 Vehicle Maintenance and Repair 5.1 (March 7, 2002).
[116] Howard County Department of Fire and Rescue Services, General Order 510.03 Vehicle Maintenance and Repair 5.3 (March 7, 2002).

- Monthly mileage on the vehicle.

Lastly, any work completed on a vehicle will be checked off by shop personnel and the associated form returned with the apparatus.

Howard County has twelve (12) Fire Stations: five (5) Career Stations and seven (7) combination career/volunteer stations. All career staffed apparatus is owned by the Howard County. A majority of the county owned apparatus is maintained by the county maintenance shop, located at 8800 Ridge Road Ellicott City, Maryland 21043. Apparatus that is unable to be repaired at the shop or under warranty is sent to the appropriate vendor for repairs. The Volunteer Fire Companies are responsible for the maintenance and repairs of apparatus owned by the Volunteer Companies. The Volunteer Fire Companies have the discretion to choose the vendor of choice, to include the Ridge Road Fire Shop (RRFS), when maintenance and repairs are needed. The Fifth District Volunteer Fire Department (FDVFD) employs a part-time certified mechanic to maintain and coordinate repairs on apparatus and assigned to the FDVFD.

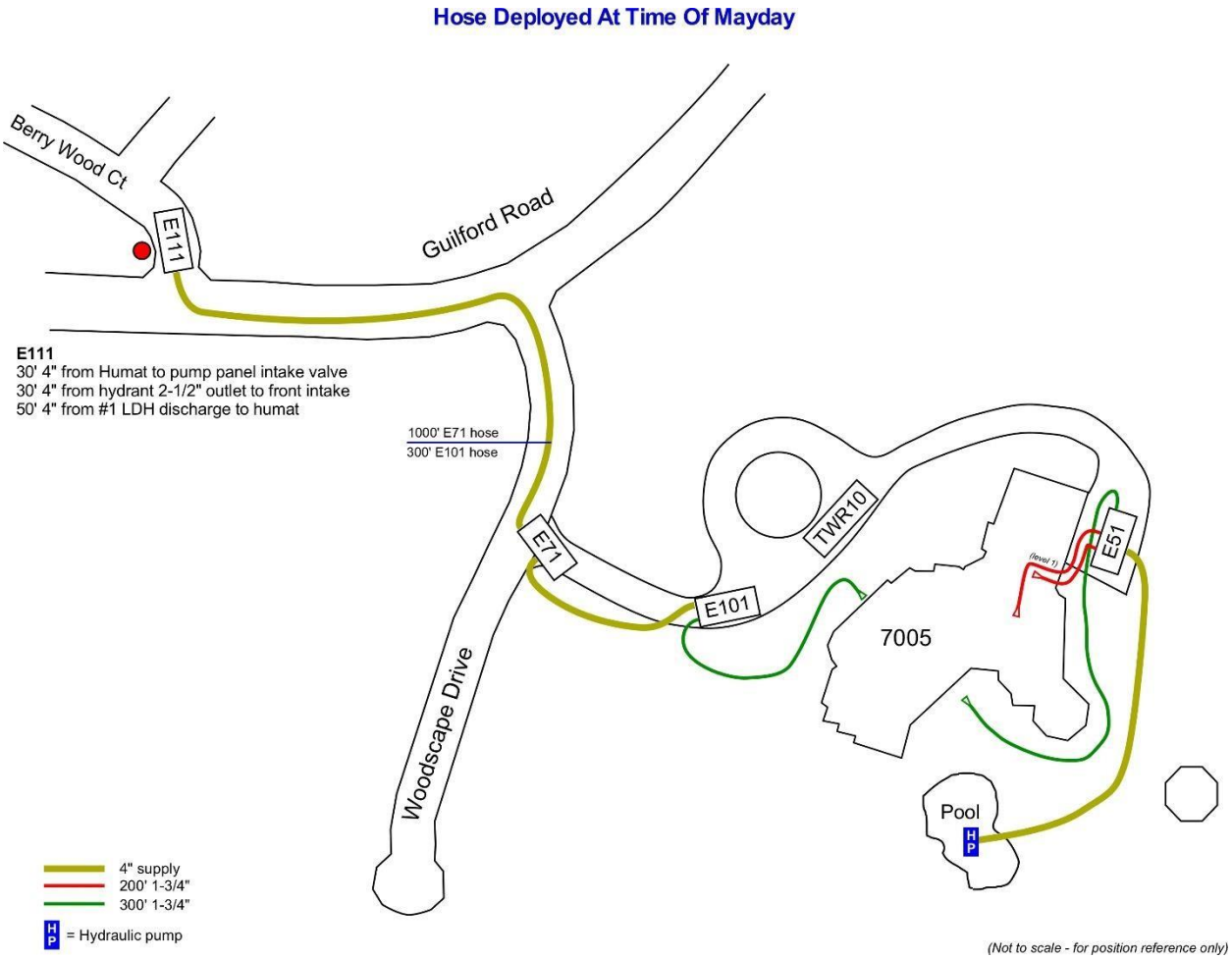
Howard County Department of Fire and Rescue (HCDFRS) has uniformed and contingent employees assigned to the Ground Support Unit (GSU). The GSU is a division of the Bureau of Logistics. The GSU is responsible for apparatus maintenance and repairs. There is one uniformed employee at the rank of firefighter assigned to operate out of the RRFS. This firefighter is responsible for the scheduling and coordination of apparatus maintenance and repairs. The additional uniformed and contingent employees assigned to the GSU assist with additional apparatus responsibilities.

Howard County Government employs civilian mechanics to operate at the RRFS. The mechanics that work on the apparatus are certified Emergency Vehicle Technician (EVT) and Automotive Service Excellence (ASE) technicians. The uniformed and civilian employees at the RRFS work together to ensure maintenance and repairs are made.

The FDVFD employs an ASE certified Master Diesel Technician as a part-time mechanic to maintain the county and volunteer owned apparatus at the FDVFD. He is available the majority of the time twenty-four (24) hours a day, seven (7) days a week.

Woodscape Drive Incident Overview: Apparatus and Equipment: Apparatus and Equipment

During the incident at 7005 Woodscape Drive there were seven (7) engines, four (4) aerial apparatus, two (2) ambulances, and one Special Service unit on scene during the evaluated time period. Most units operated without issue, however three units had notable issues—Engine 51, Engine 22, and Engine 101—which are detailed below.



Shortly after arrival at 7005 Woodscape Drive, Engine 51 repositioned to Side C from Side A. Battalion Chief 1 recommended to Engine 51's Officer to use the swimming pool on Side C for a water supply. Engine 51's driver repositioned the apparatus to Side C and attempted to deploy the hydraulic pump to the pool. The apparatus mounted main hydraulic hose came up short of the pool. The 25-foot extension lines were retrieved from Engine 51 to extend the hoses. The extension hoses were unable to connect to the main hydraulic hose due to corrosion on the couplings of the extension hoses. The HVO had to shut down pump operations to the fireground and move the Engine forward, closer to the pool. This caused a delay in water supply from the pool to Engine 51.

Additionally, Engine 51's driver noticed an odor of burning rubber coming from the engine compartment while engaged in pump operations. This resulted in Chief 5A calling FDVFD's mechanic at approximately 03:30 hours on July 23, 2018 via his cellular phone. Chief 5A advised the mechanic that Engine 51 was having a mechanical failure and requested that he respond to the scene. The mechanical failures will be discussed further in this chapter.

During this incident Reserve Engine 178—a 2006 Pierce Dash capable of carrying 750 gallons of water—was in-service at Fire Station 2 running as Engine 22. Reserve Engine 178 will be referred to as Engine 22 for the remainder of this section. E22 arrived on location and parked on Guilford Road near Woodscape Drive. Engine 22's crew, to include the driver, abandoned the apparatus and went to the fire scene at the direction of the Incident Commander. Engine 22's crew was assigned to augment the first RIC. The motor was left running once abandoned.

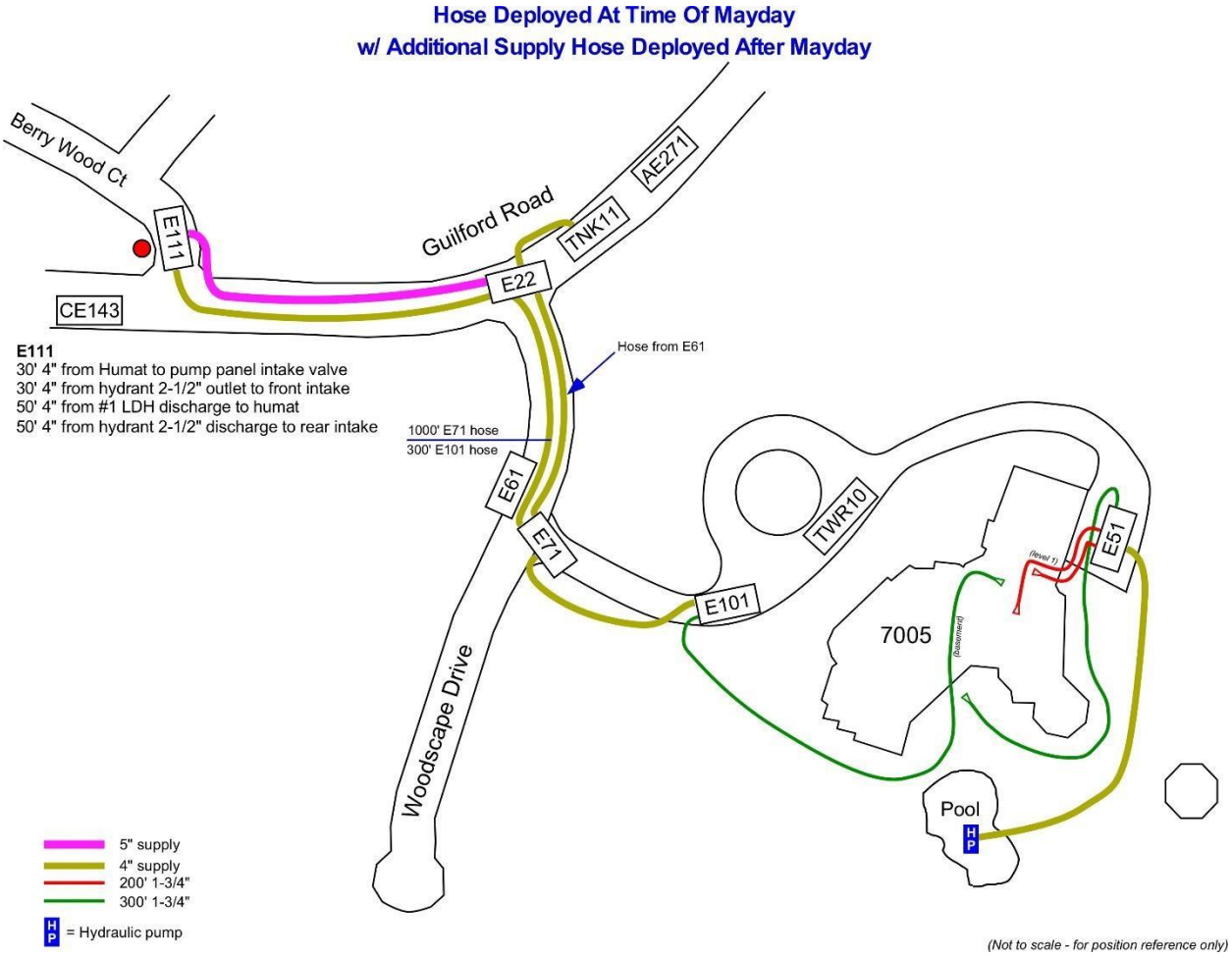


Figure 34 - Hose Deployed at time of MAYDAY and after MAYDAY

At an undetermined time and once RIC operations were completed, Engine 111's officer gave orders to Engine 111's firefighter to retrieve Engine 22 and place it between Engine 111 and Engine 71 as a relay pumper. Engine 111 was located on Berry Wood Court at the hydrant supplying the fireground. Engine 71 was located at the fireground supplying Engine 101. Engine

22 was placed in the water supply as a relay pumper to ensure maximum flow was delivered to the scene. Engine 22 was positioned in the relay at the intersection of Guilford Road and Woodscape Drive.

Sometime after 08:00 hours, Engine 22 shut down due to a malfunctioning coolant sensor. The mechanic from FDVFD, still on the location, evaluated Engine 22 and made temporary repairs allowing Engine 22 to resume relay operations. Engine 22 was placed out-of-service following the incident and sent to the Ridge Road Fire Shop to have repairs made.

A hose-line was deployed from Engine 101 around Side D to Side C, stretching the line to the first-floor deck and over the railing. At some point during operations the hose-line ruptured, causing the line to be shut down while the damaged section of hose was replaced. Engine 101 carries a standard 5-foot Clemens Pack containing two, 75-foot sections of lightweight hose. An engine crew deployed 100 feet of 3-inch hose as a leader line and connected 150-foot, 1¾-inch hose from the Clemens Pack.

Findings and Recommendations: Apparatus and Equipment

In evaluating apparatus and equipment used in the incident, the ISRB sent certain items out for independent review. One of these items was the nozzle of the hose line FF Flynn was operating on when he fell into the crawlspace. Additionally, a review of Mercury Associates, Inc. 'Optimal Vehicle Replacement Cycle Analyses,' which assessed nine asset classes of the Howard County Central Fleet, provides recommendations for equipment and apparatus replacement over the lifespan of the items.

First, the nozzle on the hose line FF Flynn was operating on when he fell through the crawlspace was an Elkhart Brass Chief Fixed Flow Combination Fog Nozzle Tip Model 4000-24. This nozzle was affixed to a model B-275A ball shutoff with a 1 3/8- inch waterway. Based on the independent testing the Nozzle was rated for 200 gpm at 75 psi. Nozzle was flow tested with results of output flow of 227 gpm at 75 psi exceeding the rated flow of the nozzle. The nozzle moved freely from straight stream to full fog and into the flush position without difficulty. The shutoff moved freely, and no leaks were observed when the nozzle was in the closed position with full pressure behind it. In short, the nozzle was fully functional and exceeded its rated capacity on a flow test. All components of the nozzle operated as designed.



Figure 35 – Nozzle FF Flynn had in hand just prior to falling into the crawlspace

Second, the Optimal Vehicle Replacement Cycle Analyses provided by Mercury Associates, Inc. provided recommendations for how long equipment should be retained. Reviewing the current apparatus in use by Howard County Department of Fire and Rescue Services the ISRB found that a quarter of all fire engines and more than half of all reserve engines in the Howard County Department of Fire and Rescue Services exceed the recommended fourteen (14) year lifespan. All reserve aerial apparatus exceed the twelve (12) year lifespan as recommended by the Mercury Report. Thirty-eight (38) percent of the ambulance fleet exceed the eleven (11) year lifespan as recommended by the Mercury Report and all reserve ambulances except for one

exceed the lifespan. The only HCDFRS vehicle asset that largely meets the recommended replacement cycle is staff vehicles. Most of those vehicles are support and administrative staff and do not have a routine emergency response role in the department.

Third, the couplings on Engine 51's 25-foot hydraulic extension hoses were corroded, resulting in a delay in accessing water supply from the pool. Engine 51 is equipped with a hydraulic submersible pump that can be used to supply apparatus or hose appliances with a continuous water supply. The hydraulic pump on Engine 51 is capable of flowing 650 gallons per minute (GPM) as long as the water source can support the demand. The pump is powered by an onboard hydraulic pump and a 165-foot apparatus mounted hydraulic hose line. Engine 51 is also equipped with two 25-foot extension hoses to extend the main hydraulic hose. The pump has a 4-inch storz coupling on the discharge of the pump. The hydraulic pump can be placed in a static water source and operated by the driver of the apparatus. A similar hydraulic pump and components are equipped on Engine 52, Squad 5, Engine 31 and Water Supply 3.



Figure 36 - Top view of corroded hydraulic coupling

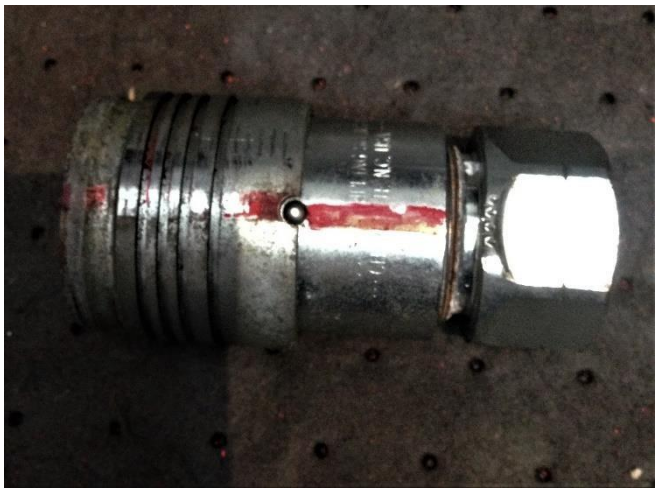


Figure 37 - Side view of corroded hydraulic coupling

Prior to this incident, the hydraulic pump, main hydraulic line, and the 25-foot hydraulic extension lines where not a part of the HCDFRS daily/weekly check sheets. HCDFRS General Order 510.03 Vehicle Maintenance and Repair, Section 1.1, states "[d]aily and weekly checks shall be performed by the vehicle's assigned driver/operator in accordance with the DOT and COMAR inspection standard and then recorded on the appropriate DFRS check sheet." To prevent interrupted water flow at future incidents, HCDFRS should revise its daily and weekly check sheets to include assessment of the hydraulic pump, its lines, and its 25-foot line extensions. The inspection of the hydraulic line extensions should include lubricating and exercising the couplings.

Fourth, Engine 51 also experienced mechanical problems during fireground operations and was only able to continue pump operations due to the arrival of FDVFD's mechanic. While Engine 51

was engaged in pump operations its driver noticed an odor of burning rubber emitting from the engine compartment. Notifying Chief 5A of the unusual odor the Chief contacted FDVFD's mechanic requesting him to respond to the scene. On inspection of the unit, the mechanic found that Engine 51's air conditioning compressor had locked up, causing it to overheat. Because the air condition belt operates other portions of the unit, this mechanical issue threatened pump operations.

Fortunately, the mechanic was able to repair Engine 51 without any interruption to pump operations. To do so, the mechanic first attempted to raise the cab of Engine 51 and disconnect the coil to free the compressor. After this attempt proved unsuccessful, he manually bent the clutch plate away from the flywheel to free the compressor. This temporarily fixed the mechanical problem and allowed Engine 51 to remain in service.



Figure 40 - Engine 51 after on-scene repair

Because FDVFD leadership had the availability of an on-call mechanic to respond to the scene, pump operations continued without interruption. Had Engine 51 been placed out-of-service for mechanical failure, the water supply from the swimming pool would have been lost and another engine driver would have had to pump through Engine 51 adding complexity to an already challenging incident. To avoid such an outcome at future incidents, HCDFRS should consider placing a Logistics representative and mechanic from the County Maintenance Facility to the on-call availability. Additionally, all HCDFRS apparatus purchases should be designed in a fashion so that critical apparatus functions run independently from internal climate control.

Fifth, on review of Engine 22's maintenance log the unit should have been placed out of service due to a persistent oil pressure and coolant sensor issue. Engine 22 shut down during water supply operations due to a malfunctioning coolant sensor. Fortunately, the mechanic from FDVFD was still on location and was able to make temporary repairs, allowing Engine 22 to resume relay operations. Engine 22 was placed out-of-service following the incident and sent to the Ridge Road Fire Shop to have repairs made.

On review of Engine 22's (E178) Fleet Help Desk Report the unit had the following maintenance reports sent between May 2018 and July 2018:

- May 3, 2018 – "When E178 started audible alarm sounding and yellow check engine light is on. Alarms for 30 seconds then goes away…. Vehicle performed normally." Engine 178 went to the Ridge Road Fire Shop on May 7, 2018.
- May 10, 2018 – "Check engine light/audible coming on when vehicle is started. Will turn off after 1 minute on own…Was repaired at shop yesterday for protentional problem." Ridge Road Shop
- July 10, 2018 – "…Leaking oil above the power steering pump. Leaving a big oil spot on the floor every day. Check engine light and verbal alarm are constantly going off while driving. Drove to Ridge Road Shop to check alarm, could not find the problem. Mechanics think it is the anti-freeze sensor. Will repair it next time in shop.
- July 13, 2018 – Oil leak above the steering pump on driver's front of motor. Leaking oil every day. Anti-freeze sensor is producing a check engine light to come on. Added 2 quarts on Tuesday, shop looked at it this past Tuesday and they are aware of it. Fluctuating oil pressure while driving…"

Through the investigation and review process, the ISRB discovered that there was no county-owned apparatus available to replace E22 at the time. Although there was an equivalent volunteer apparatus available, E22 was not able to use that apparatus as a temporary replacement apparatus for E22 due to cultural practice. Mechanics assured the drivers and officers of E22 that the coolant sensor issue would not impact the operation of the unit.

Sixth, a portion of 1 ¾-inch hose-line ruptured during the incident, temporarily shutting down the attack line while the damaged hose was replaced. After the incident, the hose was returned to Station 10. The damaged section of hose was disposed of in the dumpster following the incident, however the proper paperwork and HELP Desk was not submitted. Additionally, there is no record of Station 10's testing either of the 75-foot sections of the Clemens pack. For future operations, all sections of fire-hose should be assigned an identification number and logged into a database to enable easy tracking of hose testing. Should a section of hose be taken out of service it should be accompanied by a Help Desk Submission and database note detailing the reason the hose is taken out of service.

Seventh, the ISRB determined that not all Howard County Fire Rescue- Vehicle Check Sheets were completed and/or recorded as stated in Howard County Department of Fire and Rescue Services General Order 510.03 Vehicle Maintenance and Repair. The daily and weekly vehicle check-off sheets should be custom to the apparatus and completely filled out following inspection. A designee assigned by the station Captain should maintain the apparatus check sheets, repair receipts, and maintenance logs of apparatus housed in the station.

Eighth, although Howard County Department of Fire and Rescue Services adopted NFPA 1962 standards for nozzle inspections and testing, the standard is not reflected in the Nozzle and Appliance check sheet. Specifically, the check-sheet is missing verification that each nozzle is tested at least as frequently as the hose with which it is used and that each nozzle with a shutoff mechanism is hydrostatically tested as specified in the NFPA standard. This check-list should be revised to reflect the NFPA nozzle testing standard.

Lastly, HCDFRS owns several models of Bullard hand held thermal imagers but has not trained personnel on how best to operate the equipment. All HCDFRS County owned Engines and Special Services have Bullard hand held thermal imagers, either model T3, T4, or Eclipse. The Volunteer Fire Companies can purchase any make or model thermal imager at their discretion. Since there are no parameters set for the purchasing of thermal imagers, there are inconsistencies of thermal imagers throughout the County. Within 2018, the County had added integrated thermal imagers to the MSA G1 Self Contained Breathing Apparatus (SCBA). Each engine company, both career and volunteer, have 1 SCBA with integrated thermal imagers and each special service has two SCBA with integrated thermal imagers.

There were no reports of mechanical failure of any thermal imagers on scene. Tower 10A did, however, advise that he was unfamiliar with the current model of imager that he was using on Tower 10 due to being placed on the unit within days of incident. The HCDFRS Ground Support Unit delivered five new imagers to five different companies during the first and second week of July 2018. The older models they replaced were taken off the units at the same time for trade-in value. A user manual was given to Company officer, after a short class on the operations of the unit. Training would be the responsibility of each shift officer at the station. Currently HCDFRS does not have an order on operations or training of thermal imagers although NFPA 1408 specifies the design, performance, testing, and certification requirements for thermal imagers used by fire service personnel during emergency incident operations. Moving forward, HCDFRS should train personnel on the appropriate use of thermal imaging equipment before it is placed in service.

Findings	**Recommendations**
N.1. The age of many HCDFRS apparatus exceeds the recommended lifespan from the Optimal Vehicle	N.1.1 HCDFRS shall replace apparatus that exceeds the recommended lifespan from the Mercury Associates report.

Findings	Recommendations
Replacement Cycle Analyses conducted by Mercury Associates Inc.	
N.2. Engine 51's 25-foot hydraulic extension hose couplings were corroded.	N.2.1 HCDFRS must revise its Vehicle Check Sheet to include the Hydraulic pump, hydraulic lines, and the 25-foot hydraulic line extensions to the Weekly Check Sheet, including lubrication and exercise of the couplings.
N.3. Engine 51's air conditioning compressor locked up on the fireground, threatening pump operations. Operations were only able to continue thanks to FDVFD's mechanic responding to the scene and temporarily fixing the mechanical issue.	N.3.1 A Ground Support representative and a mechanic from the County Maintenance Facility must be added to the on-call availability. N.3.2 All HCDFRS apparatus purchases should be designed in a fashion so that critical apparatus functions run independently from internal climate control.
N.4. Engine 22 (Reserve Engine 178) experienced mechanical failure during the incident, placing the unit out of service.	N.4.1 All completed repairs and maintenance must be documented, with a copy of the documentation returned with the apparatus. N.4.2 Units must be placed out of service if there are persistent mechanical issues that may impact critical apparatus functions.
N.5. Engine 22 should have been placed out of service prior to the incident due to recurrent issues--regarding the coolant sensor, oil pressure and an oil leak—that met the NFPA 1911 standard for taking a unit out of service.	See Recommendations N.4.1 & 4.2
N.6. The 75-foot, 1 ¾-inch hose from Engine 101's Clemens Pack failed during the incident. There is no record of the hose being inspected, as required by Special Order 2018.30, and no record of the damaged hose's disposal.	N.6.1 Each section of hose must be assigned an identification number in accordance with NFPA 1962 4.11.1.2 and logged into a database, so it can be easily tracked for hose testing and out of service documentation. A section of hose that is taken out of service should be followed

Findings	Recommendations
	up with a Help Desk submission and entered in to the database with its reason for being taking out of service.
N.7. Not all Howard County Fire Rescue-Vehicle Check Sheets were completed and/or recorded as required by General Order 510.03.	N.7.1 Apparatus Daily and Weekly check off sheets must be custom to that piece of Apparatus. N.7.2 Each check off sheet must be filled out to include the date, unit number, and FAICS number. N.7.3 A designee assigned by the station Captain must maintain the apparatus check sheets, repair receipts and maintenance logs. N.7.4 HCDFRS should evaluate technology solutions to aid in maintenance, inspection, and inventory check sheets. Ideally, this electronic system will be compatible with smartphones and station computers.
N.8. HCDFRS has adopted NFPA 1962 standards for nozzle testing, but not all tests from the standard are reflected in inspection checklists.	N.8.1 HCDFRS Nozzle and Appliance Inspection Checklist, found in Appendix B of Special Order 2018.30, should be amended to include service testing of Nozzles as recommended by NFPA 1962 5.3.
N.9. HCDFRS has neither standardized thermal imaging devices deployed in the field, nor established training for thermal imaging devices.	N.9.1 Prior to placing thermal imagers in service, training shall be implemented. Including, but not limited to, operation, application, use, and limitations as stated in NFPA 1408. All training shall be documented and placed in the training log.

TAB HERE

Appendix A: Human Factors Analysis of 7005 Woodscape Drive Incident

General Background

A thorough Human Factors Analysis is absolutely necessary to determine the cascading events causal to a mishap, and to recommend corrective actions to prevent recurrence. Human error continues to plague both the fire service and civilian mishaps. Analysis indicates that human error is identified as a causal factor in 80 to 90 percent of mishaps and is present but not causal in another 50 to 60 percent of all mishaps, and is the single greatest mishap hazard[117]. Yet, simply writing off mishaps to firefighter error is a simplistic, if not naïve, approach to mishap causation and hazard identification. Further, it is well established that mishaps are rarely attributed to a single cause, or in most instances, even a single individual[118]. Rather, mishaps are the end result of myriad latent failures or conditions that precede active failures. The goal of a mishap or event investigation is to identify these failures and conditions in order to understand why the mishap occurred and how it might be prevented from happening again.

As described by Reason[119], active failures are the actions or inactions of operators that are believed to cause the mishap. Traditionally referred to as error, they are the last acts committed by individuals, often with immediate and tragic consequences. In contrast, latent failures or conditions are errors that exist within the organization or elsewhere in the supervisory chain of command that effect the tragic sequence of events characteristic of a mishap. Viewed from this perspective then, the actions of individuals are the end result of a chain of factors originating in other parts, often the upper echelons, of the organization. The problem is that these latent failures or conditions may lie dormant or undetected for some period of time prior to their manifestation as a mishap. The question for mishap investigators and analysts alike is how to identify and mitigate these active and latent failures or conditions. One approach is the Domino Theory which promotes the idea that, like dominoes stacked in sequence, mishaps are the end result of a series of errors made throughout the chain of command.

A modernized version of the domino theory is Reason's Swiss Cheese model that describes the levels at which active failures, latent failures and conditions may occur within complex operations (see Figure 1). Working backward from the mishap, the first level of Reason's model depicts those Unsafe Acts of Operators that lead to a mishap. Traditionally, this is where most mishap investigations have focused their examination of human error, and consequently where most causal factors are uncovered. After all, it is typically the actions or inactions of individuals that can be directly linked to the mishap. Still, to stop the investigation here only uncovers part of the story. What makes Reason's model particularly useful in mishap investigation is that it forces investigators to address latent failures and conditions within the causal sequence of

[117] Naval Safety Center. (2007). DoD Human Factors Analysis and Classification System (HFACS).
[118] Reason, J. (1997). Managing the risk of organizational accidents. Burlington, VT: Ashgate.
[119] Reason, J. (1990). Human Error. Oakleigh, Victoria: Press Syndicate of the University of Cambridge.

events. For instance, latent failures or conditions such as fatigue, complacency, illness, physical and technological environment all affect performance but can be overlooked by investigators with even the best of intentions. These particular latent failures and conditions are described within the context of Reason's model as Preconditions for Unsafe Acts. Likewise, Supervision can promote unsafe conditions of firefighters and ultimately unsafe acts will occur. For example, if a Command Officer were to pair a below average Company Officer with a very junior and inexperienced crew, the result is increased risk of mission failure. Regardless, whenever a mishap does occur, the crew naturally bears a part of the responsibility and accountability. However, latent failures or conditions at the supervisory level are often equally responsible for poor hazard analysis and subsequent increased mission risk and may ultimately cause the mishap. In this particular example, the crew was set up for the opportunity for failure.

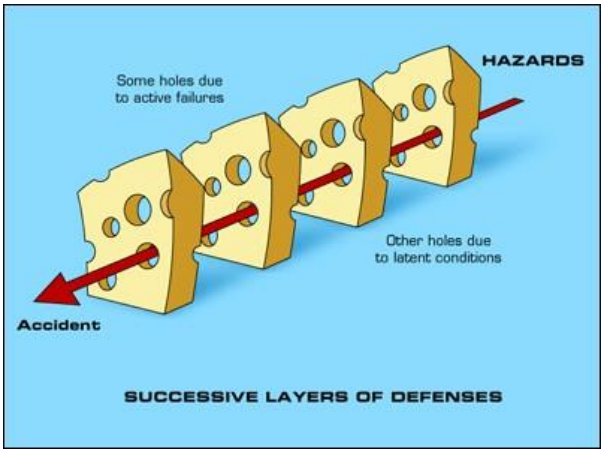


Figure 1 Cheese Layers to an Accident

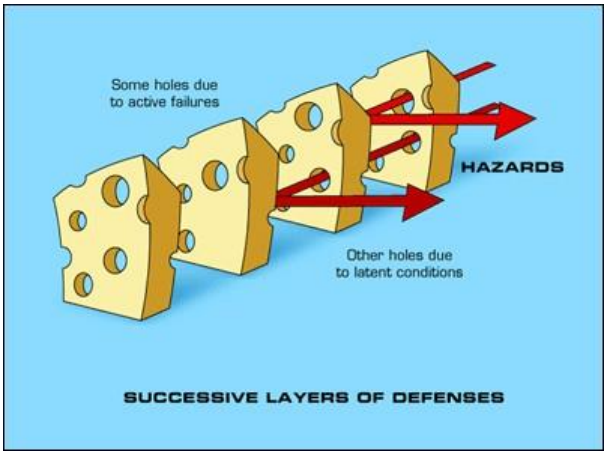
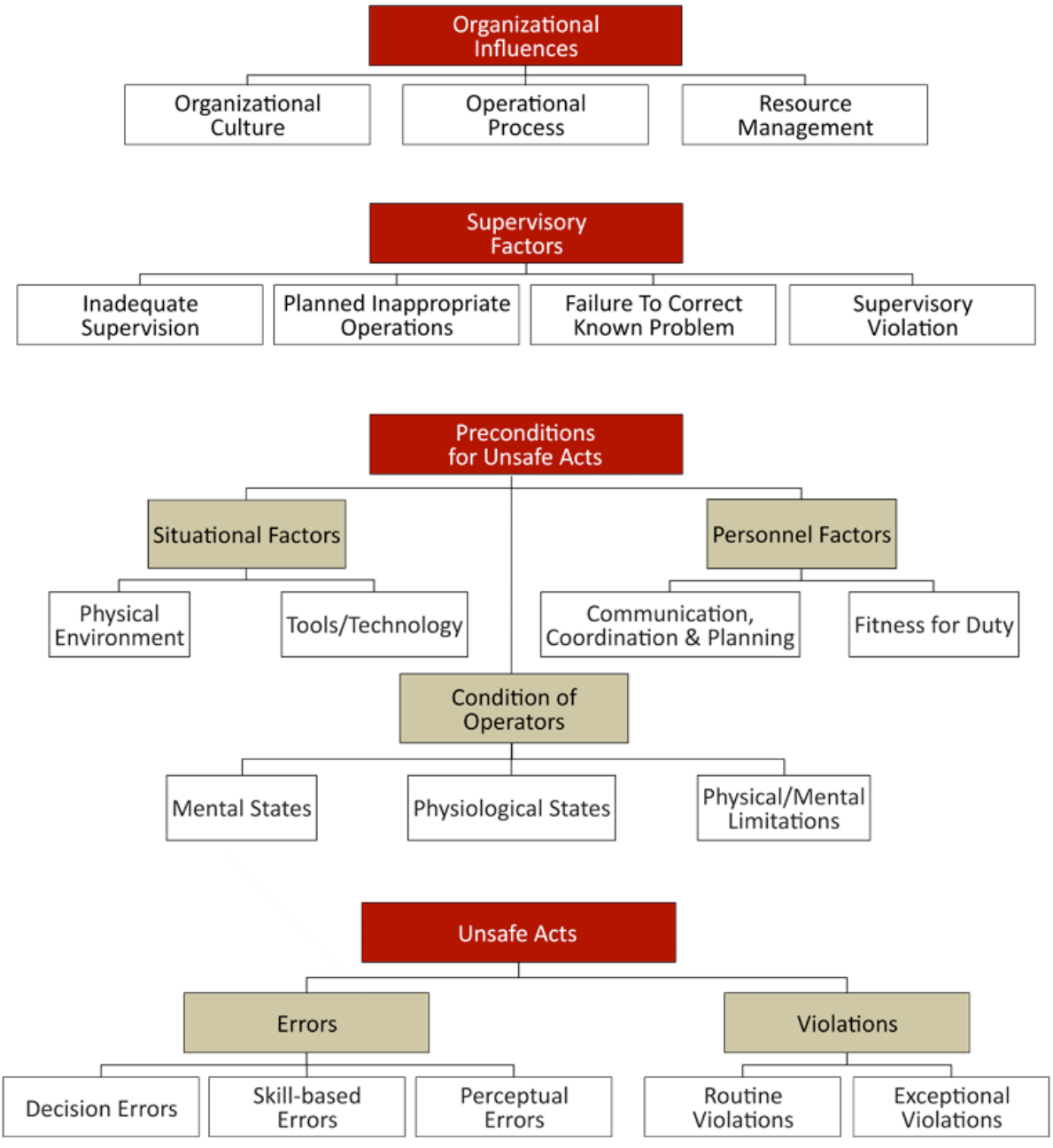


Figure 2 Supervision Stopping an Accident

Reason's model does not stop at supervision; it also considers Organizational Influences that can impact performance at all levels. For instance, in times of fiscal constraints, funding may be short and may lead to limited training opportunities. Supervisors are sometimes pressed to task non-proficient crews with complex missions. Not surprisingly, unintended and unrecognized errors may appear, and mission performance will consequently suffer. As such, hazards and risks at all levels must be addressed if any mishap investigation process is going to be effective. The investigation process then endeavors to detect and identify the holes (hazards) in the cheese (see Figure 1). So how do we identify these hazards? Well, it turns out that each mishap is not unique from its predecessors. In fact, most mishaps have very similar causes. They are due to the same holes in the cheese, so to speak. The hazards identified in each new mishap are not unique to that mishap. Therefore, if you know what these system failures and hazards or holes are, you can better identify their roles in mishaps -- or better yet, detect their presence and develop a risk mitigation strategy correcting them before a mishap occurs.

Drawing upon Reason's[120] and Wiegmann and Shappell's[121] concept of active failures, latent failures and conditions, a taxonomy was developed to identify hazards and risks called the Human Factors Analysis and Classification System (HFACS). HFACS describes four main tiers of failures and conditions: 1) Acts, 2) Preconditions, 3) Supervision, and 4) Organizational Influences (Figure 3).



[120] Reason, J. (1990). Human Error. Oakleigh, Victoria: Press Syndicate of the University of Cambridge.
[121] Shappell, S.A., & Wiegmann, D.A. (2001) Applying Reason: The Human Factors Analysis and Classification System (HFACS). Human Factors and Aerospace Safety, 1(1), 59-86.

General Analysis

Doctrine is a body of teachings, instructions, taught principles, or positions that represents the framework within the organization. One might think of doctrine more directly as what the organization chooses to teach and an element of organizational culture. Fire service organizations commonly use doctrine, both written and unwritten, to describe established procedures as they apply to complex operations on the fireground. It also provides a philosophy for leading firefighters in firefighting operations, a mandate for professionalism, and a common language. It establishes the way we practice our profession. Doctrine is transmitted through training to the organization.

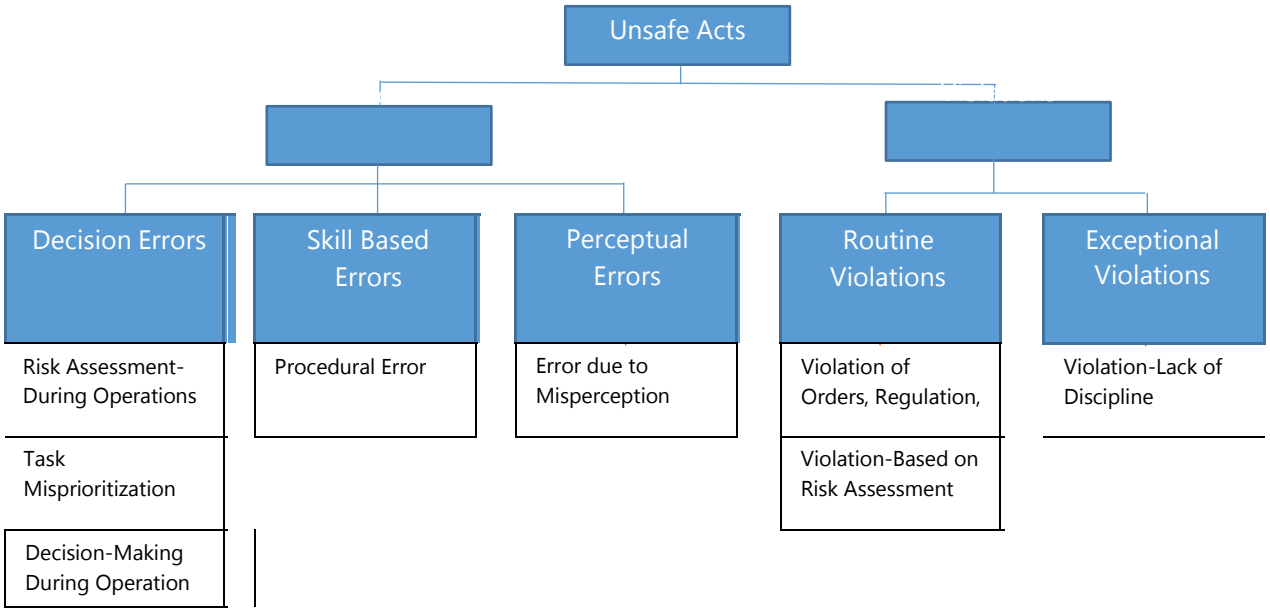
Howard County Department of Fire and Rescue Services doctrine functions on an industrial-age paradigm with respect to staffing, training, equipping and operating. The natural consequence of a system of this design is a focus on a baseline tactical effectiveness, on interchangeability of personnel, and on speed of production; members that are good enough to make the broader system work, rather than optimal or excellent at the level of their operation. Where excellence or significant innovation does occur, it is often achieved in spite of the HCDFRS doctrinal structural impediments. The influence of doctrine is inversely proportional to the importance attached to other factors. Operational advice and requests concerning field operations personnel structure, logistic procurement, and operational unit deployment are often ignored, overruled, or modified because of economic and political factors that assume overwhelming importance.

In particular, the ISRB examined HCDFRS' doctrine by analyzing the doctrine's classification system through the four main tiers of human error. The tiers are organizational influences, supervisory factors, preconditions for unsafe acts, and unsafe acts as they relate to the command and control of operational units. The Woodscape Drive incident was included as a specific incident in this analysis.

The ISRB's conclusions are stated within each section of this Analysis. In general, the ISRB identified various failure points which the ISRB believes are directly connected to the line-of-duty death of Fire Fighter Flynn. These failure points now identified, can be addressed by the HCDFRS to prevent future injuries or deaths and improve the doctrine of the HCDFRS. By addressing these failure points the HCDFRS honors the sacrifice of Fire Fighter Flynn.

1. Unsafe Acts

Unsafe Acts are those factors that are most closely tied to the mishap and can be described as active failures or actions committed by the operator that result in human error or unsafe situation. We have identified these active failures or actions as Errors and Violations.



Judgement and Decision-Making Errors: Judgement and decision-making errors are factors in a mishap when behavior or actions of the individual proceed as intended yet the chosen plan proves inadequate to achieve the desired end state and results in an unsafe situation.

Risk Assessment- During Operation: Is a factor when the individual fails to adequately evaluate the risks associated with a particular course of action and this faulty evaluation leads to inappropriate decision and subsequent unsafe situation. This failure occurs in real-time when formal risk assessment procedures are not possible.

1. Incident Command did not reevaluate risk assessment after receiving an all clear from the occupants of the structure.
2. There is evidence that unit officers lacked full comprehension of their tactical choices.
    a. Initial failure to establish water supply by first two arriving engines had an outsized effect on subsequent incident strategies and tactics.
    b. Crew's recognized, but did not comprehend, that there was fire in the basement.
    c. Engine 51's initial entry into the structure was unreported, keeping critical information from the Incident Commander regarding condition with the structure.
    d. Crews failed to communicate.
3. Engine 101 and Fire Attack Group made entry into the first level into the Hazard Zone without express authorization from Command.

Task Misprioritization: Is a factor when the individual does not organize, based on accepted prioritization techniques, the tasks needed to manage the immediate situation.

1. Fire Attack Group and Engine 101 redeployed from the basement entrance back to the first-floor entrance.

Decision Making- During Operations: Is a factor when the individual through faulty logic selects the wrong course of action in a time constrained environment.

1. There is evidence that unit officers lacked full comprehension of their tactical choices.
    a. Initial failure to establish water supply by first two arriving engines had an outsized effect on subsequent incident strategies and tactics.
    b. Crew's recognized, but did not comprehend, that there was fire in the basement.
    c. Engine 51's initial entry into the structure was unreported, keeping critical information from the Incident Commander regarding condition with the structure.
    d. Crews failed to communicate.
2. Engine 101 and Fire Attack Group made entry into the first level into the Hazard Zone without express authorization from Command.
3. FF Flynn acted on implied orders and Engine 101A's acceptance to FF Flynn's actions were command negation.
4. There were immediate efforts to rescue FF Flynn after the MAYDAY emergency, however there were no tactical orders targeted at locating and extinguishing the fire until after RIC operations were completed, there was no attempt to extinguish the fire in the crawlspace from above.
5. Numerous situational cues to a working basement fire were recognized and crews still entered on the floor above.

Skill based Errors: Skill based errors are factors in a mishap when errors occur in the operator's execution of a routine, highly practiced task relating to procedure, training and proficiency and result in an unsafe situation. Skill based errors are unintended behaviors.

Procedural Error: is a factor when a procedure is accomplished in the wrong sequence or using the wrong technique.

1. Responding units lacked Level I accountability established under HCDFRS General Order 300.02 Personnel Accountability because of inconsistent and organization of Personnel Accountability Tags.
2. Engine 51 and Engine 101 did not lay a supply line under HCDFRS General Order 310.01 as the first and second arriving engine companies.
    a. Crews failed to comprehend the time and complexity to establish a sustained water supply from a static source.
3. Responding crews did not follow the standard naming of floors as specified in General Order 300.07.

Misperception Errors: Misperception errors are factors in a mishap when misperception of an object, threat or situation from cognitive or attention failures that results in human error.

1. Fire Attack Group and Engine 101 working on the floor above a basement fire.
    a. Engine 101A failed to recognize that the fire noted on Floor 1 originated from the crawlspace and had burned through the floor on Floor 1 when Engine 101A made her radio transmission at 0215 hours.
2. Engine 51 and Engine 101 did not lay a supply line under HCDFRS General Order 310.01 as the first and second arriving engine companies.
    a. Crews failed to comprehend the time and complexity to establish a sustained water supply from a static source.
3. The Incident Commander did not have a strong mental model of the incident, likely because HCDFRS practice of Incident Commanders relying on aides to complete a 360-degree assessment of the incident instead of conducting it themselves.
    a. Responding crews did not follow the standard naming of floors as specified in General Order 300.07.

Violations: Violations are factors in a mishap when the actions of the operator represent willful disregard for rules and instructions and lead to an unsafe situation.

Routine Violations-Violation of Orders, Regulations, or SOP's: Is a factor when a procedure or policy violation is systemic in a unit/ setting and not based on a risk assessment for a specific situation. It needlessly commits the individual, team, or crew to an unsafe course-of-action.

1. Fire Attack Group and Engine 101 working on the floor above a basement fire.
2. IRIC did not function as a team, with the two members in separate physical locations completing tasks.
3. Initial failure to establish water supply by first two arriving engines had an outsized effect on subsequent incident strategies and tactics.
    a. The failure of Engine 51 and Engine 101 to establish water supply proved to be a distraction to the incident commander because it caused him to focus his attention on establishing a sustainable water supply for the fireground.
4. Engine 51's initial entry into the structure was unreported, keeping critical information from the Incident Commander regarding conditions within the structure.
5. Crews failed to communicate, conditions, actions, needs and PAR to the Incident Commander.
6. Engine 101 made entry into the first level into the Hazard Zone without express authorization from Command.
7. Crews did not initiate common terminology when referencing occupancies in all communications, to maintain a shared mental model. In particular, when referencing floors of a structure in conjunction with basement, attic and roof as specified in General Order 300.07.

Routine Violation- Based on Risk Assessment: Is a factor when the consequences of violating published procedures are recognized, consciously assessed and honestly determined by the individual, crew or team to be the best course of action.

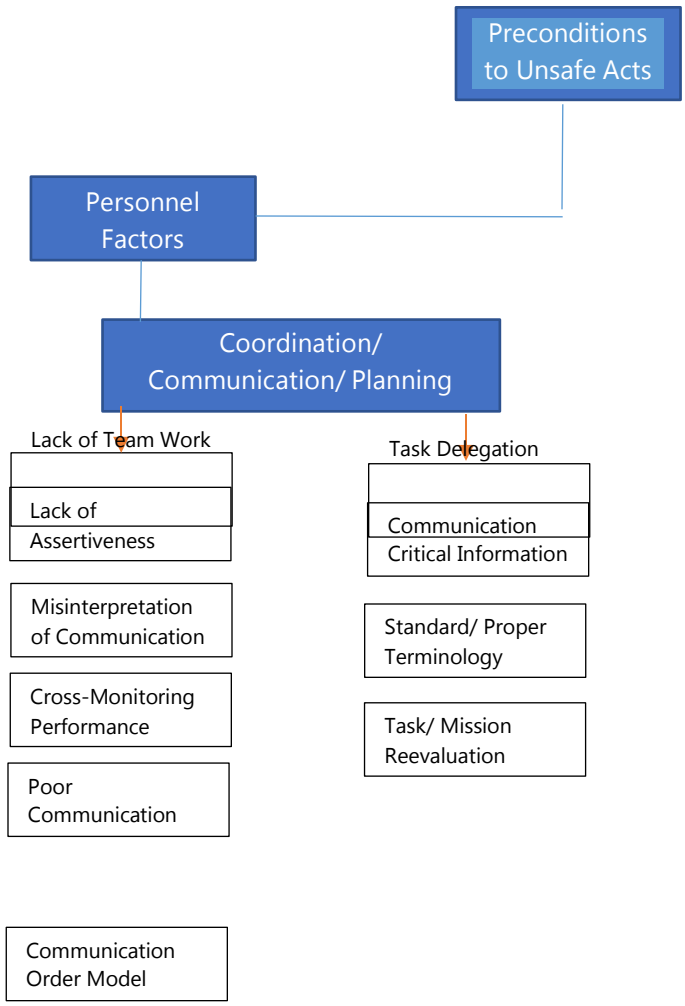
1. Fire Attack Group and Engine 101 working on the floor above a basement fire.
2. The common practice on A Shift at Station 5 for the IRIC to divide to accomplish water supply tasks.

Exceptional Violations: Lack of discipline is a factor when an individual, crew or team intentionally violates procedures or policies without cause or need. These violations are unusual or isolated to specific individuals rather than large groups.

1. Initial failure to establish water supply by first two arriving engines had an outsized effect on subsequent incident strategies and tactics.
2. Engine 111's failure to assume RIC as dictated in General Order 310.01 did not impact RIC operations during the incident because the Incident Commander assigned RIC duties to Truck 7 prior to the Mayday and Engine 71 immediately after the Mayday. Even though Engine 111's action did not directly impact RIC, Engine 111's action did cause the incident command to assign another engine company to cover the RIC assignment with Truck 7 and thus negated the ability of the Incident Commander from assigning Engine 71 to fire suppression or other related duty.
    a. Engine 111A self-directed to assist in water supply rather than assume RIC as specified in General Order 310.01.
3. The Fire Attack Group and Engine 101 reentering floor 1 above the fire.

2. Preconditions to unsafe Acts

Preconditions are factors in a mishap if active and latent preconditions of the operators, environmental or personal factors affect practices, conditions or actions of individuals and result in human error or an unsafe situation.



Coordination/ Communication/ Planning Factors: Refers to interactions among individuals, crews, and teams involved with the preparation and execution of an assignment that resulted in human error or an unsafe situation.

Lack of Team Leadership: Is a factor when the crew and team leadership techniques failed to facilitate a proper crew climate, to include establishing and maintaining an accurate and shared understanding of the evolving assignment and plan on the part of all crew and team members.

1. The Incident Commander's understanding of crew location and deployment did not match the actual location of the crew(s).
2. Fire Attack Group and Engine 101 did not maintain an accurate shared understanding with the Incident Commander and each other. Which lead to a breakdown in crew integrity and continuity.

Lack of Assertiveness: Is a factor when individuals fail to state critical information or solutions with appropriate persistence.

1. The Incident Commander's tone of voice did not impart the urgent nature of Engine 101A's decision to redeploy to the first floor instead of directing them to flow water from an exterior position.
2. Tower 10A attempted to state the location change to the Incident Commander, from the basement level to the first floor, of the Fire Attack Group and Engine 101 but cut-off the communication loop between the Incident Commander and Engine 101A.
    a. Tower 10A and Engine 51B both identified that the incident involved a basement fire and that crews were entering the structure above the fire but failed to stress such information to the Incident Commander to clarify the Incident Commander's understanding of crew position.

Misinterpreted Communication: Is a factor when correctly communicated information is misunderstood, misinterpreted, or disregarded.

1. Fireground communications were ineffective at relaying critical information among fire crews and Command.
2. When referencing the structure crews did not initiate common terminology in all communications, to maintain a shared mental model. In particular, when referencing floors of a structure in conjunction with basement, attic and roof as specified in General Order 300.07.
    a. Engine 101A's communication at 0216 hours is misinterpreted by the Incident Commander as the Incident Commander understood Engine 101A as repositioning the attack line to an adjacent entry at the same level (basement).

Cross-Monitoring Performance: Is a factor when crew and team members fail to monitor, assist and back-up or challenge each other's actions and decisions.

1. Incident Commander did not question for clarification or understanding the purpose of Engine 101A's decision to redeploy to the first floor and stop said redeployment after Engine 101A was questioned by the Incident Commander concerning flowing water from the exterior.
2. Fire Attack Group Supervisor, Engine 51A, did not challenge Engine 101A's decision to redeploy to the first floor.
3. Tower 10A did not challenge Engine 51A or Engine 101A's decision to redeploy to the first floor.
4. Engine 101A did not stop FF Flynn's action of redeploying to the first floor.
5. FF Flynn did not challenge Engine 101A's order to redeploy to the first floor.

Communication Order Model: Is a factor when communications did not include supportive feedback or acknowledgement to ensure personnel correctly understood announcements or directives.

1. Responding crews left communication loops open, failing to use the Communication Order Model. This led to responding crews interrupting and cross-talking on the operational radio channel.
    a. Tower 10A attempted to state the location change to the Incident Commander, from the basement level to the first floor, of the Fire Attack Group and Engine 101 but cut-off the communication loop between the Incident Commander and Engine 101A.
        i. Tower 10A and Engine 51B both identified that the incident involved a basement fire and that crews were entering the structure above the fire but failed to stress such information to the Incident Commander to clarify the Incident Commander's understanding of crew positioning.

Task Delegation: Is a factor when the crew and team members fail to actively manage the distribution of mission tasks to prevent the overloading of any crew member.

1. Incident Commander instituted the Fire Attack Group which gave the crews the responsibility of all areas inside the structure. Because of limited initial units, the Incident Commander was unable to assign divisions and was limited to assigning fire suppression duties to a group which did not have geographical boundaries.
2. Charlie Division Supervisor was given the geographical assignment without assigning companies to the Charlie Division.

Communication Critical Information: Is a factor when known critical information was not provided to appropriate individuals in an accurate or timely manner.

1. Fireground Communications were ineffective at relaying critical information among fire crews and to Command.
    a. Engine 51's initial entry into the structure was unreported, keeping critical information from the Incident Commander regarding conditions within the structure.
    b. Fire Attack Group did not relay their Thermal Imager Camera findings to the Incident Commander indicating a basement fire.
    c. Crews failed to communicate conditions, actions, and needs and PAR to the Incident Commander.

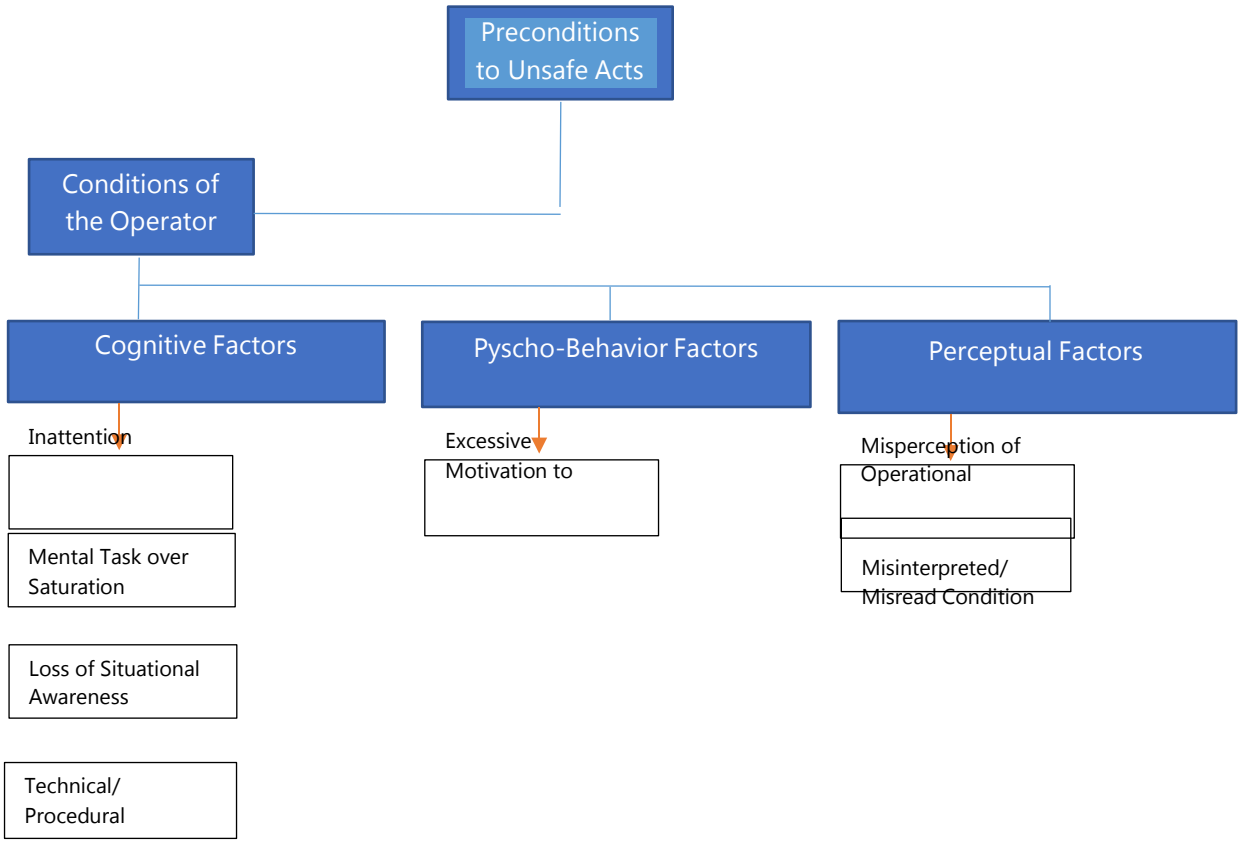
Standard and Proper Terminology: Is a factor when clear and concise terms, phrases, per service standards and training were not used.

1. Fireground Communications were ineffective at relaying critical information among fire crews and to Command.
2. Crews did not initiate common terminology when referencing occupancies in all communications, to maintain a shared mental model. In particular, when referencing floors of a structure in conjunction with basement, attic and roof as specified in General Order 300.07.

Task Mission Reevaluation: Is a factor when crew and team members fail to adequately reassess changes in their dynamic environment during mission execution and change their mission plan accordingly to ensure adequate management of risk.

1. Incident Commander did not reevaluate the risk after receiving an all clear from the occupants.
2. Fire Attack Group, Engine 101A and FF Flynn did not reevaluate the risk of redeploying from the basement to the first floor.

Condition of the Operator: Condition of the operators are factors in a mishap if cognitive, psycho-behavioral, adverse physical state, or physical and mental limitations affect practices, conditions or actions of the operators and result in human error or an unsafe situation.



Cognitive factors: are factors in a mishap if cognitive or attention management conditions affect the perception or performance of individuals and result in human error or an unsafe situation.

Inattention: is a factor when the individual has a state of reduced conscious attention due a sense of security, self-confidence, boredom, lack of a state of alertness or readiness to process

immediately available information, or a perceived absence of threat from the environment which degrades crew performance.

1. Fire Attack Group and Engine 101A and FF Flynn did not process the situational cues of a basement fire as evidenced by their redeploying from the basement to the first floor.

Mental Task Oversaturation: is a factor when the quantity of information an individual must process exceeds their cognitive or mental resources in the amount of time available to process information.

1. During and after the MAYDAY emergency, crews not involved in the RIC efforts showed no consideration to continue activities to locate, confine, and extinguish the fire.
2. Charlie Division Supervisor's radio transmission at 0230 hours identifying his lack of understanding of crews assigned and operating within his Division.
3. The Incident Commanders oversaturation with directing company level tasks which included establishing a sustainable water supply while commanding a fire in a large dwelling with limited crews.

Loss of Situational Awareness: is a factor when the individual is focusing all conscious attention on a limited number of environment cues to the exclusion of others of a subjectively equal or higher or more immediate priority, leading to an unsafe situation. It may be described as a tight focus of attention that leads to the exclusion of comprehensive situational information.

1. The Incident Commander did not have a strong mental model of the incident, likely because of current HCDFRS practices of Incident Commanders relying on aides to complete a 360-degree assessment of the incident instead of conducting it themselves.
2. Crews recognized, but didn't comprehend, that there was a fire in the basement.
3. The Incident Commanders understanding of crew location and deployment did not match the actual locations of the crew.

Psycho-Behavioral Factors: are factors when an operator's personality traits, psychosocial problems, psychological disorders or inappropriate motivation creates an unsafe situation.

Excessive Motivation to Succeed: is a factor when the individual is preoccupied with success to the exclusion of other mission factors leading to an unsafe situation.

1. Based on interview statements, FF Flynn quickly redeployed from the basement level to the first floor, extending a third hose line from Engine 51 through the first-floor laundry room to the recessed area of the living room.

Perceptual Factors: are factors in a mishap when misperception of an object, threat or situation creates an unsafe situation.

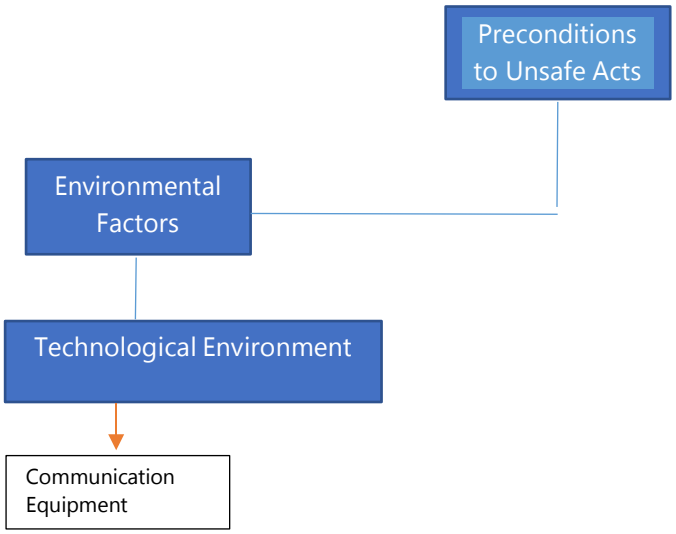
Misperception of Operational Conditions: is a factor when an individual misperceives or misjudges location with the performance envelope or other operational conditions and this leads to an unsafe situation.

1. Crews recognized, but didn't comprehend, that there was fire in the basement.

Misinterpreted/ Misread Conditions: is a factor when the individual is presented with situational cues but its significance is not recognized, it is misread or is misinterpreted.

1. Crews recognized, but didn't comprehend, that there was fire in the basement.
2. Crews failed to recognize or read the smoke conditions presented to them as they related to a fire in a structure which was substantially larger than other dwellings they normally encounter.

Environmental Factors: are factors in a mishap if physical or technological factors affect practices, conditions and actions of individual and result in human error or an unsafe situation.



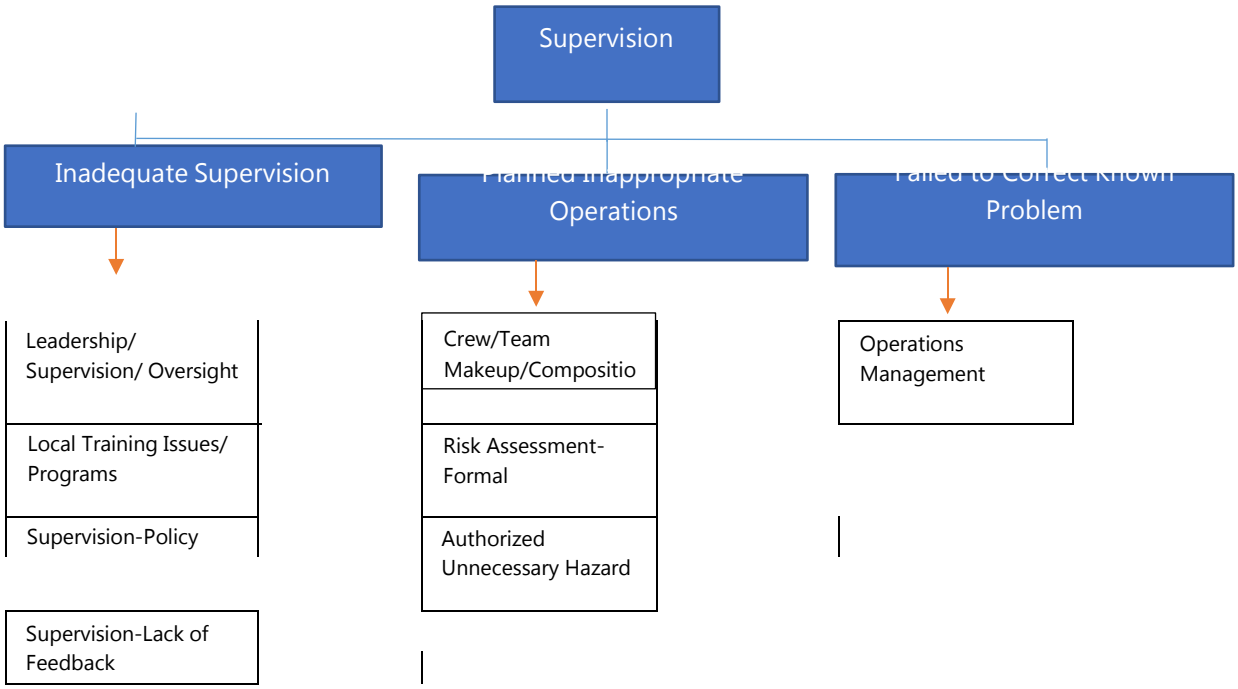
Technological Environment: are factors in a mishap when design factors or automation affect the actions of individuals and result in human error or an unsafe situation.

Communication Equipment: is a factor when communication equipment is inadequate or unavailable to support mission demands. This includes electronically or physically blocked transmissions.

1. FF Flynn transmitted a MAYDAY call, but it was unheard by the fireground personnel and Communications Center because it was on the unmonitored Bravo 2 talk group.

3. Supervision

Is a factor in the methods, decisions or policies of the supervisory chain of command directly affect practices, conditions, or actions of individual and result in human error or an unsafe situation.



Inadequate Supervision: is a factor in a mishap when supervision proves inappropriate or improper and fails to identify hazard, recognize and control risk, provide guidance, training and oversight and results in human error or an unsafe situation.

> **Leadership/ Supervision/ Oversight Inadequate**: is a factor when the availability, competency, quality or timeliness of leadership, supervision or oversight does not meet task demands and creates an unsafe situation.

1. FF Flynn acted on implied orders and Engine 101A's acceptance to FF Flynn's actions was command negation.
2. During and after the MAYDAY emergency, crews not involved in the RIC efforts showed no consideration to continue activities to locate, confine, and extinguish the fire.
3. There were immediate efforts to rescue FF Flynn after the MAYDAY emergency, however there were no tactical orders targeted at locating and extinguishing the fire until after RIC operations were completed, there was no attempt to extinguish the fire in the crawlspace from above.
4. Dispatchers lack readily accessible job aids to assist during critical events. This led to inefficiencies in accessing mutual aid as well as deviations from protocols established in General Orders.

Local Training Issues/ Programs: are a factor when one-time or recurrent training programs, upgrade programs, transition programs or any other local training is inadequate or unavailable and this creates an unsafe situation.

1. Dispatchers lack readily accessible job aids to assist during critical events. This led to inefficiencies in accessing mutual aid as well as deviations from protocols established in General Orders.
2. Declaring an offensive or defensive strategy during the initial radio report is insufficient since it does not allow the Incident Commander to gain a firm sense of the incident before declaring a strategy.
    a. General Order 310.01 articulates two strategies employed on the fireground limiting the Incident Commander's strategic alternatives.

Supervision-Policy: is a factor when the policy or guidance or lack of a policy or guidance leads to an unsafe situation.

1. Declaring an offensive or defensive strategy during the initial radio report is insufficient since it does not allow the Incident Commander to gain a firm sense of the incident before declaring a strategy.

Supervision-Lack of Feedback: is a factor when information critical to a potential safety issue had been provided to supervisory or management personnel without feedback to the source; failure to close the loop.

1. Incident Commander did not question for clarification or understanding the purpose of Engine 101A's decision to redeploy to the first floor and stop said redeployment after Engine 101A was questioned by the Incident Commander concerning flowing water from the exterior.

Planned Inappropriate Operations: is a factor in a mishap when supervisors fail to adequately assess the hazards associated with an operation and allows for unnecessary risk. It is also a factor when supervisors allow non-proficient or inexperienced personnel to attempt missions beyond their capability or when crew or team makeup is inappropriate for the task or mission.

Crew/Team Makeup/ Composition: is a factor when the makeup of the crew or team should have reasonably raised obvious safety concerns in the minds of crewmembers involved in the mission, or in any other individual directly related to the scheduling of this mission.

1. Lack of team cohesion from officer and crew instability secondary to the loss of interpersonal respect, trust, and confidence from the constant changing of personnel assignments. Current HCDFRS's staffing matrix emphasis administrative efficiency over team cohesion and unit/battalion proficiency. The effect being pooled interdependence.

Risk Assessment-Formal: is a factor when supervision does not adequately evaluate the risk associated with a mission or when pre-mission risk assessment tools or risk assessment programs are inadequate.

1. Engine 101 maintained physical crew integrity, but not complete crew integrity because FF Flynn acted on implied orders and Engine 101A's acceptance to FF Flynn's actions was command negation.

Authorized Unnecessary Hazard: is a factor when supervision authorizes a mission or mission element that is unnecessarily hazardous without sufficient cause or need.

1. Engine 101 maintained physical crew integrity, but not complete crew integrity because FF Flynn acted on implied orders and Engine 101A's acceptance to FF Flynn's actions was command negation.

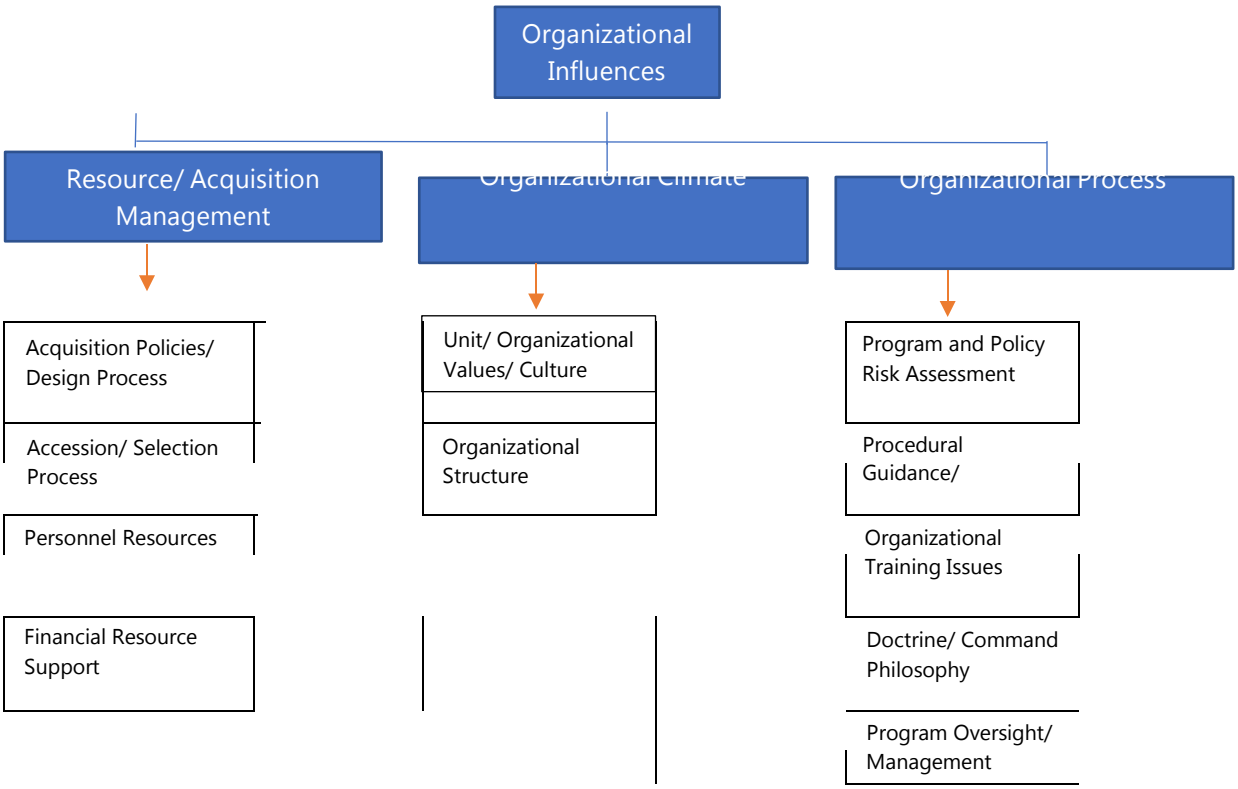
Failure to Correct Known Problems: is a factor in a mishap when supervision fails to correct known deficiencies in documents, processes or procedures, or fails to correct inappropriate or unsafe actions of individuals, and this lack of supervisory action creates unsafe situation.

Operations Management: is a factor when a supervisor fails to correct known hazardous practices, conditions or guidance that allows for hazardous practices within the scope of his/ her command.

1. Engine 101 maintained physical crew integrity, but not complete crew integrity because FF Flynn acted on implied orders and Engine 101A's acceptance to FF Flynn's actions was command negation.

4.Organizational Influences

Fallible decisions of upper level management directly affect supervisory practices, as well as conditions and actions of operators. These latent conditions generally involve issues related to Resource/Acquisition Management, Organizational Climate, and Organizational Processes.



Resource/ Acquisition Management: is a factor in a mishap if resources management and acquisition processes or policies, directly or indirectly, influence system safety and results in poor error management or creates an unsafe situation.

Acquisition Policies/ Design Processes: is a factor when the processes through which vehicle equipment or logistical support are acquired allows inadequacies or when design deficiencies allow inadequacies in the acquisition and the inadequacies create an unsafe situation.

1. The transmission of FF Flynn's MAYDAY and emergency identifier on Bravo 2 likely had no impact on the survivability of FF Flynn as the RIC had already deployed and was gaining access to FF Flynn at the time of the activation.
2. Activation of an emergency button (via manual depression or man-down feature) sounds on the radio channel that the radio is set to operate on.
3. The Motorola APX8000XE radio programming was suboptimal for features such as the Emergency Identifier.
4. Engine 51's 25-foot hydraulic extension hose couplings were corroded.
5. HCDFRS has neither standardized thermal imaging devices deployed in the field, nor established training for thermal imaging devices.

Accession/ Selection Policies: is a factor when the process through which individuals are screened, brought into the service or placed into specialties is inadequate and creates an unsafe situation.

1. Current HCDFRS training rarely provides realistic, practical, hands-on scenarios for personnel mastery of fireground fundamentals. Particularly noteworthy was the inability for fireground personnel to properly identify situational cues that there was an active basement fire. This aspect alone should have indicated that entry on the floor 1 was unsafe and caused personnel to alter their tactics for fire attack.

Personnel Resources: is a factor when the process through which manning, staffing or personnel placement or manning resource allocations are inadequate for mission demands and the inadequacy causes an unsafe situation.

1. Communications Center Fire Operations staffing levels limit the ability to expand operations for multiple incidents while maintaining focus on critical tasks and transmissions. This includes the absence of a 24/7 Operations supervisor from a HCDFRS officer.
2. With the complexity of this incident and size of the structure, it was unreasonable to only have one safety officer on the fireground, a second safety officer should have been requested and filled by a Company Officer, Chief Officer, or mutual aid Officer.
3. Operational Staffing Directives have created a pooled interdependence system among personnel secondary to administrative efficiencies. This has systemically broken down operational cohesiveness.

Financial Resource/ Support: is a factor when an organization or operation does not receive the financial resources to complete its assigned mission and this deficiency creates an unsafe situation.

1. Lack of financial resources to support realistic fireground training.
2. Lack of financial resources to develop and sustain a competency-based officer mentorship program.
3. Lack of financial resources to support the on-call program for additional safety officers, battalion chiefs, EMS Officers.
    a. Without a single person being on-call for more than one type of position. As an example, on the Woodscape Drive incident, a Battalion Chief was the on-call Safety Officer and Battalion Chief.
4. Lack of financial resources to support and adequately staff Fire Operations in the Communications Center.
5. Lack of financial resources for additional personnel.
6. Lack of financial resources to support fleet maintenance and a pool of available reserve equipment.

Organizational Climate: is a factor in a mishap if organizational variables including environment, structure, policies, and culture influence individual actions and results in human error or an unsafe situation.

Unit/Organizational Values/ Culture: is a factor when explicit/ implicit actions, statements or attitudes or unit leadership set unit/ organizational values that allow an environment where unsafe mission demands or pressure exits.

1. A lack of trust, by the rank and file, of the HCDFRS command staff, concerning the command staff's transparency and concern for the benefit its' members has affected the cohesiveness of the Department. Which has distorted the shared common core values of the Department and negatively affected its' operational efficiencies.

Organizational Structure: is a factor when the chain of command of an individual or structure of an organization is confusing, non-standard or inadequate and this creates an unsafe situation.

1. Operational Staffing Directives have created a pooled interdependence personnel system to support financial administrative efficiencies. This has systemically broken down operational cohesiveness.
2. Inconsistencies with operational policies that involve high-risk hazards and low frequency events.
3. Fire Station staffing is not standard throughout the Department.
4. HCDFRS engine companies are not standard with four personnel throughout the Department.

Organizational Processes: is a factor in a mishap if organizational processes such as operations, procedures, operational risk management and oversight negatively influence individual, supervisory, and organizational performance and results in unrecognized hazards and uncontrolled risk that leads to human error or an unsafe situation.

Program Policy and Risk Assessment: is a factor when the potential risks of a large program, operation, acquisition or process are not adequately assessed and this inadequacy leads to an unsafe situation.

1. Response assignment initially dispatched to manage this incident was consistent with HCDFRS policies in place at the time of the incident. But through analysis the response policy has been determined to be inadequate and require revision.
2. 7005 Woodscape Drive was an 8,400 square foot residential structure. However initial responders treated it similarly to a smaller single-family home. Responders failed to adapt staffing, strategy and tactics for the unique size, scale and design of the residence.

Procedural Guidance/ Publications: is a factor when written direction, checklists, graphic depictions, tables, charts or other published guidance is inadequate, misleading or inappropriate and this creates an unsafe situation.

1. The HCDFRS General Order 300.02 Personal Accountability does not reflect current fireground operations.
2. The current system for accountability using verbal PAR reports is time consuming and requires significant radio communications.
3. There are multiple areas where General Order 300.07 *Incident Command System* and the General Order 310.01 *Single Family and Townhouse Structure Fire Operational Guidelines*, when read together, do not run parallel and could confuse the reader. There are multiple

areas where a lack of clarity will hamper accountability and the presence of confusion is detrimental to operational consistency.

4. The current HCDFRS policy permitting the first arriving unit may forgo establishing command, when a chief, command officer, is arriving nearly simultaneously and takes Command is flawed. The first arriving unit must assume command regardless of circumstance, so that there is always clear command and control of the scene. The formal announcement of command does not add anything to the exercise of the command.
5. Declaring an offensive or defensive strategy during the initial radio report is insufficient since it does not allow the incident commander to gain a firm sense of the incident before declaring a strategy.
6. The Incident Commander did not have a strong mental model of the incident, likely because of current HCDFRS practice of Incident Commanders relying on aides to complete a 360-degree assessment of the incident instead of conducting it themselves.
7. General Order 410.01 Communications, does not reflect current operational practices for HCDFS or industry consensus standards.

Organizational Training: are a factor when one-time or initial training programs, upgrade programs, transition programs or other training that is conducted out the local unit is inadequate or unavailable and this creates an unsafe situation.

1. The Motorola APX8000XE radio is a complex piece of life safety equipment, requiring specific training to operate appropriately. As detailed in the training section of this Report, the department training for operation of this radio system prior to its wide deployment in the field was inadequate to ensure that all crew members could effectively operate the new equipment. A major shortcoming of the training was that it provided only an emailed slideshow of how to operate the radio and did not provide any hands-on practice to ensure that personnel could effectively operate the radio.
2. HCDFRS MAYDAY training does not incorporate error prevention or error trapping on the fireground.
3. Although all HCDFRS personnel train on the Incident Command System neither the current General Order nor the current training program establish a clear philosophy of Incident Command for divisions, groups, and unit operators.
4. Current HCDFRS training rarely provides realistic, practical, hands-on scenarios for personnel to master fireground fundamentals. Particularly noteworthy in this incident was the inability for fireground personnel to properly identify situational cues that there was an active basement fire. This aspect alone should have indicated that entry on the floor 1 was unsafe and caused personnel to alter their tactics for fire attack.
5. HCDFRS deployed equipment into the field without adequate training on the equipment (Thermal Imaging Cameras and Motorola APX8000XE portable radios).
6. Although many HCDFRS members have been trained on the Blue Card communication method, which uses the communication order model, personnel on the fireground did not effectively implement the communications order model.

Doctrine: is a factor when the doctrine, philosophy or concept of operations in an organization is flawed or accepts unnecessary risk and this flaw or risk acceptance leads to an unsafe situation or uncontrolled hazard.

1. HCDFRS does not have a clear philosophy of command, which limits an Incident Commanders effectiveness in executing strategies and tactics.

Program Oversight: is a factor when programs are implemented without sufficient support, oversight or planning and this leads to an unsafe situation.

1. Although the HCDFRS owns MSA A2 SCBA monitoring software, the software has not been adopted for use on the fireground.

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Appendix B: Recommendation Matrix

The ISRB believes that all recommendations in this report must be implemented by HCDFRS, but recognizes that some recommendations are of a higher criticality. As such, the recommendations have been assigned a priority ranking to denote the time period in which the recommendation should be implemented. The priorities are as follows:

- Priority 1: Implementation within 0-6 months
- Priority 2: Implementation within 7-12 months
- Priority 3: Implementation within 12-24 months

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
Incident Command				
A.1 The current HCDFRS policy permitting the first arriving unit officer may forgo establishing command when, "A chief, command officer, or other company officer is arriving nearly simultaneously and takes Command" is flawed. The first arriving unit must assume command regardless of circumstance, so that there is always clear command and control of the scene. The formal announcement of command does not add anything to the exercise of the command.	A.1.1 HCDFRS General Order 300.07 and General Order 310.01 should be amended to clearly establish the first arriving unit officer as the Incident Commander, eliminating the circumstances when Command may be passed. Instead, the unit officer as Incident Commander may transition to a Command level staff once the Command officer reaches the incident scene.	Operations Command	**1**	
A.2 Declaring an offensive or defensive strategy during the initial radio report is insufficient since it does not allow the Incident Commander to gain a firm sense of the incident before declaring a strategy.	A.2.1 The Initial Radio Report protocol should be amended, removing the requirement that the Incident Commander declare an offensive or defensive strategy.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
A.3 The Incident Commander did not have a strong mental model of the incident, likely because of current HCDFRS practice of Incident Commanders relying on aides to complete a 360-degree assessment of the incident instead of conducting it themselves.	A.3.1 The Incident Commander should complete their own 360-degree assessment of the incident to establish their mental model.	Operations Command	**1**	
A.4 The Incident Commander maintained a calm demeanor during the MAYDAY.				
Strategy and Tactics				
B.1 HCDFRS does not have a clear philosophy of command, which limits an Incident Commander's effectiveness in executing strategies and tactics.	B.1.1. HCDFRS must clarify its philosophy of Incident Command, with a recommendation for adopting a mission-based expression of strategy where lower level officers (unit officers) are empowered to make tactical decisions to carry out the overall incident strategy. This philosophy of Command should	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	then be reflected in all General Orders and supported by training. B.1.2. General Order 310.01:Single Family Townhome and Structure Fire Operational Guidelines must be revised to more clearly articulate strategy employed on the fireground, modernizing the current binary "offensive"/"defensive" strategy to more dynamic strategy declarations.			
B.2 Group supervisors and unit officers failed to give proper direction and orders on the fireground.	See Recommendations B.1.1 and B.1.2.	Operations Command	**1**	
B.3 The Incident Commander established a strategy for the incident according to HCDFRS policy, but that strategy was announced before the Incident Commander established a clear mental model of the incident.	B.3.1. The Incident Commander should complete a 360-degree survey and situational assessment of the fireground before declaring a strategy.	Operations Command	**1**	
B.4 Strategies and tactics deployed during this incident were hindered	B.4.1. HCDFRS must implement hands-on, competency-based training	Operations Command;	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
by a lack of cohesiveness among the crews.	in realistic conditions that reinforces fundamental skills and teamwork necessary for success on the fireground.	Support Services		
B.5 Based on the situational cues crews should have known that the fire was in the basement.	See Recommendation B.4.1.	Operations Command; Support Services	**1**	
B.6 Tactical decision making by crews on the fireground was compromised by their frustration to locate the fire.	See Recommendation B.4.1.	Operations Command; Support Services	**1**	
B.7 Crews failed to report critical information to the Incident Commander and other crews on the fireground, hindering overall strategy and tactics used during the incident.	B.7.1. HCDFRS leadership must hold crews accountable for failing to execute actions dictated by the General Order without informing the Incident Commander. B.7.2. HCDFRS must integrate reporting of location into existing CAN reports (LCAN).	Operations Command	**1**	
B.8 Engine 101 made entry into the first level into the Hazard Zone without express authorization from Command	See Recommendations B.7.1 and B.7.2.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
B.9 This incident was dispatched as a Metro Box, although 7005 Woodscape Drive is along a street without fire hydrants.	B.9.1. HCDFRS must modify this policy of what qualifies as a metro box or rural box based on clear distance from a water source to the incident site.	Operations Command	**1**	
B.10 During and after the MAYDAY emergency, crews not involved in the RIC efforts did not continue activities to locate, confine, and extinguish the fire.	B.10.1. HCDFRS personnel must be trained to: • Complete a rescue attempt from an upper level floor. • Continue suppression efforts while RIC operations are underway. B.10.2. Incident Commanders must be trained on managing RIC operations. B.10.3. Crews should continue to use restraint in ventilating structures.	Operations Command; Support Services	**1**	
Communications				
Communications—Fireground Related				
C.5 Fireground Communications were ineffective at relaying critical information among fire crews and to Command.	C.5.1 All crew members would greatly benefit from additional training on appropriate and effective fireground communications. This includes: o (C.5.1) Effectively communicating reports to	Operations Command & Support Services	**1**	
C.6 Responding crews failed to follow protocol in communicating which units are responding and with what				

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
staffing level is included in the response. C.7 Responding crews failed to verify that all crewmembers were operating on the same Talk Group before engaging the fire and a critical communication was transmitted over Bravo 2, an unmonitored channel. C.8 Responding crews left communication loops open, failing to use the Order Method. This led to responding crews interrupting and cross-talking on the operational radio channel.	crew leaders and group/division supervisors by providing clear and concise status reports. ○ (C.5.2) HCDFRS should incorporate standard naming convention for structure floors and train all personnel to use common terminology on the fireground. ○ (C.6.1) Properly announcing responding apparatus with staffing level as ordered in General Order 410.01 Communications. ○ (C.7.1) Tactical radio communications when entering and exiting an incident hot zone. ○ (C.7.2) Crew selecting and verifying the appropriate tactical channel for fireground operations. ○ (C.7.3) HCDFRS should train all personnel to follow closed-loop communication best			

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	practices during fireground operations. For example, implementing the recommended complete loop communication recommended by FEMA in 1999. This process has been effectively executed among other fire departments to enhance crew and command understanding during active incidents. ○ (C.8.1) HCDFRS should develop protocols for verifying that all personnel responding to and operating on an incident scene have their mobile and portable radios selected to the correct tactical radio channel. This could be actualized by requiring crew officers to announce when their crew is entering a hot zone which will ensure that the officer			

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	is on the correct tactical radio channel, accounts for the crew's entry time, and provides accountability of the unit for the Incident Commander.			
Communications— Equipment Related				
C.9 The transmission of FF Flynn's MAYDAY and emergency identifier on Bravo 2 likely had no impact on the survivability of FF Flynn as the RIC had already been deployed and was rapidly gaining access to FF Flynn at the time of the activation. C.10 The Motorola APX8000XE portable radio assigned and worn by FF Flynn functioned as designed and programmed. C.11 Activation of an emergency button (via manual depression or man-down feature) sounds on the radio channel the radio is set to operate on.	C.9.1 Current configuration of the radio broadcasts the emergency identifier on the radio channel on which the radio is currently operating. To mitigate human error of a crew member operating on a channel that is unmonitored, an emergency identifier activation on the Bravo, Charlie, and Delta Talk Groups should revert the member to a channel that is always monitored by the Communications Center and the Incident Commander.	Fire Chief	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
C.12 The Motorola APX8000XE radio is a complex piece of life safety equipment, requiring specific training to operate appropriately. As detailed in the Training Section of this report, the department training for operation of this radio system prior to its wide deployment in the field was inadequate to ensure that all crew members could effectively operate the new equipment. A major shortcoming of the training was that it provided only an emailed slideshow of how to operate the radio and did not provide any "hands-on" practice to ensure that personnel could effectively operate the radio.	C.12.1 Because of the complexities of operating the Motorola APX8000XE radio, more extensive training prior to its deployment in the field should have been established to ensure that crews can operate the radio appropriately. A thorough training program, as detailed in Section III.J, that includes a didactic portion, practical evolutions, and a competency-based evaluation is appropriate for a piece of equipment so vital to hazard zone operations as the portable radio.	Operations Command and Support Services	**1**	
C.13 The Motorola APX8000XE radio programming was suboptimal for features such as the Emergency Identifier.	C.13.1 HCDFRS should convene a work group to evaluate all programming and accessory options in the Motorola	Operations Command and Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	APX8000XE radio to optimize the safety, efficiency, and technology of the equipment.			
MAYDAY				
D.1 FF Flynn transmitted a MAYDAY call, but it was unheard by the fireground personnel and Communications Center because it was on the unmonitored Bravo 2 talk group.	D.1.1 Prior to entering an IDLH environment, firefighters must verify that they are operating on the appropriate talk group. D.1.2 HCDFRS must reprogram its radios to have the emergency identifier button revert the firefighter experiencing a MAYDAY to the monitored talk group (e.g. Bravo 1). This should prompt the Communications Center to monitor all transmissions in the monitored talk group. D.1.3 HCDFRS must require Incident Commanders to confirm the operational channel with the individual calling the MAYDAY. The Incident Commander shall advise the individual to visually check their portable radio, if possible. Additionally, the Communications Center or	Operations Command & Support Services	2	Radios Reprogrammed 15 FEB 2019

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	Incident Commander on Bravo 7 should instruct a firefighter experiencing a MAYDAY emergency to press their emergency identifier.			
D.2 Engine 101A's MAYDAY transmission was partially unintelligible, with the Incident Commander unable to ascertain who, what, where portions of the transmission.	D.2.1 Personnel must have consistent training on how to clearly make a MAYDAY transmission for themselves or others. This training should be done while the individual is in a high-stress environment and tasked with this responsibility.	Operations Command & Support Services	2	
D.3 The Incident Commander attempted to ascertain the necessary MAYDAY details, but due to a number of factors was not able to identify FF Flynn's distress and location until 02:24:05, at least four (4) minutes after FF Flynn fell through the floor.	D.3.1 Incident Commanders and officers must train on ways to clarify unclear MAYDAY transmissions, providing reassurance to individuals as appropriate. This training should also include processes for the Incident Commander to work with the Communications Center. This process includes having the Communication Center send emergency tones and announcing that a MAYDAY has been declared. The Incident Commander shall notify all personnel operating on the	perations Command & Support Services	2	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	incident Who is calling the MAYDAY, What the problem is, and Where the emergency is located.			
D.4 A verbal evacuation was ordered by the Incident Commander, but no evacuation tone was utilized in the Woodscape Drive Incident.	D.4.1 HCDFRS must use separate tones for an emergency tone and an evacuation tone. These separate tones shall be easily differentiable, with personnel able to easily identify the tone and understand what is required of them when the tones are activated.	Operations Command & Support Services	2	
D.5 There is evidence that FF Flynn attempted to self-extricate while awaiting RIC support.	D.5.1 HCDFRS must conduct training on MAYDAY emergencies on a regular basis. This training should include a review HCDFRS General Order 300.04 MAYDAY Situations and practical evaluations. Practical evaluations shall give personnel the opportunity to transmit and receive a MAYDAY emergency while operating under simulated emergency conditions.	Operations Command & Support Services	**1**	
Structure Evacuation				
E.1. The Incident Commander's evacuation order at 02:42:34 was	E.1.1 HCDFRS must revise General Orders to include a process for	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
an "exit" under General Order 410.01 Communications.	reentering a structure following an evacuation order. Currently the General Orders do not address the resumption of interior operations following an emergency evacuation order. Once an emergency evacuation has occurred, the incident commander should conduct size-up of the structure and evaluate fire conditions to determine an appropriate mode of operation. The proposed language should include a continuous reevaluation process of the incident. E.1.2 HCDFRS must revise General Orders to separate evacuation from strategy changes for clarity.			
E.2. The change of strategy from offensive to defensive strategy also represented an exit, or evacuation of the dwelling.	See Recommendations E.1.1 & 1.2	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
E.3. There are conflicts between General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines and General Order 410.01 Communications concerning the evacuation process.	E.3.1 HCDFRS must examine the processes outlined in General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines and General Order 410.01 Communications to determine if either process meets current operational needs, make any needed modifications and then codify both process into one single process and rewrite each General Order with the same modified process. Additionally, the orders must be revised to: o Align with the intent of NFPA 1561's language: "[A]t the conclusion of the MAYDAY or emergency traffic situation, the Incident Commander should then transmit all clear, resume radio traffic."	Operations Command; Support Services & Howard County Police Department	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	○ Add the sounding of apparatus (air horns minimally) at the ordering of an abandon evacuation order. ○ Include PARs of all crews at an incident who are not in staging. E.3.2 HCDFRS personnel should be trained on all modified orders. The training should include a practical component that utilizes the audio warning(s) fire fighter will hear via Communications Center. This training should also include units from outside jurisdictions that regularly respond into Howard County. E.3.3 HCDFRS must standardize emergency evacuation procedures, practices and alerts with surrounding jurisdictions so that neighboring jurisdictions and HCDFRS have similar emergency evacuation and			

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	MAYDAY practices and audio warnings (air horns).			
E.4. HCDFRS has discontinued the practice of sounding air horns at the order of an "exit" or "abandon" evacuation due to the proliferation of portable radios.	See Recommendation E.3.1	Operations Command; Support Services, & Howard County Police Department	**2**	
Rapid Intervention Crew and Rescue Operations				
F.1. Crews near the collapsed area where FF Flynn fell should have considered a method to apply water to the area	F.1.1 Train crews who may be operating near a MAYDAY to respond to the MAYDAY situation while continuing to address suppression activities. F.1.2 HCDFRS must develop a progressive training plan that develops and reinforces basic skills. This training plan must include: • RIC training at least bi-annually, focusing on low frequency, high stress situations for operations and communication staffing. • Instruction for personnel on actions to be taken from	Operations Command & Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	different positions within the structure. For example, personnel shall be instructed on proper search techniques when searching for a downed firefighter, rescue from the floor above, stabilizing conditions, and providing protection to the MAYDAY firefighter. F.1.3 Officer training on managing a MAYDAY emergency. This training can take place simultaneously with the RIC training previously discussed.			
F.2. Crews should have used their Thermal Imaging Cameras (TIC) to locate FF Flynn and identify associated conditions in the crawlspace.	F.2.1 Crews should receive training on TIC usage and TIC limitations, and they should regularly use the TIC on various types of incidents to gain familiarity with the devices.	Operations Command & Support Services	**2**	
F.3. Crews near the space in which a MAYDAY firefighter has fallen should attempt a rescue from above	See Recommendation F.1.1	Operations Command & Support Services	**2**	
F.4. The IRIC did not function as a team, with the two members in separate physical locations completing separate tasks.	F.4.1 The Incident Commander should ensure that IRIC remains ready for deployment as a team of two. The IRIC shall be positioned at the	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	initial point of entry for rapid deployment. F.4.2 Train IRIC personnel to remain a team of two. Personnel must understand the difference between functioning as a back-up crew and IRIC.			
F.5. Engine 111's failure to assume RIC as dictated in General Order 310.01 did not impact RIC operations during the incident because the Incident Commander assigned RIC duties to Truck 7 prior to the MAYDAY.	F.5.1 Notwithstanding the lack of impact, HCDFRS must revise General Orders to instruct the Communications Center to advise the third arriving engine that they are the RIC. F.5.2 The highest-ranking responding officer, typically the responding Battalion Chief, should confirm with the third engine company that they will be the RIC engine. The RIC engine should acknowledge the assignment shortly after units transmit they are responding. F.5.3 Shift directives that may alter assignments must be communicated to the Incident Commander.	Operations Command	**1**	
F.6. Truck 7 lacked enough time because of their delayed assignment to RIC and the subsequent immediate MAYDAY	F.6.1 HCDFRS must add an additional engine company to all Box Alarms, including Local Box assignments, with the third due engine	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
to gather all standard RIC equipment and do a 360-degree assessment of the dwelling.	(minimum 4 personnel) dedicated as the RIC.			
F.7. The RIC at Woodscape Drive consisted of Truck 7, Engine 71, and Paramedic 56D. Engine 71 supplemented Truck 7 in completing the 360-degree assessment of the dwelling.	F.7.1 The IC must articulate the companies that form a RIC at an incident, including single resources like Paramedic 56D at this incident.	Operations Command	**1**	
F.8. Crews working on the first floor of the structure during the MAYDAY immediately attempted to rescue FF Flynn but determine that rescue should be made via the basement.	F.8.1 An additional Safety Officer should be assigned to RIC operations with responsibility of the safety of the RIC. The Safety Officer should monitor incident conditions and operational periods to assist with managing air supply. If necessary, the Safety Officer should request additional resources to ensure the RIC operation may continue with minimal interruption.	Operations Command	**1**	
F.9. The RIC members and members that assisted with the operation overcame all obstacles presented to them. Although FF Flynn did not survive, the actions and bravery of the crews allowed the safe recovery of him from the structure.	No recommendation			

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
F.10. For large structures with multiple points of entry, a second RIC is needed to ensure quick response time to any potential MAYDAY emergency.	F.10.1 ICs should consider assigning additional RICs when multiple points of entry are used. The size of the structure should identify the need for additional RIC's and/or enlarging the RIC to ensure adequate personnel are assigned if an emergency occurs. F.10.2 HCDFRS must develop a General Order that Addresses tiered RIC structures based on the complexity of an incident (e.g., adding additional engine(s), special services, or a collapse team with a Level II RIC structure).	Operations Command	**1**	
Accountability				
G.1 Some of the responding units lacked Level I accountability established under HCDFRS General Order 300.02: Personnel Accountability because of inconsistent collection and organization of Personnel Accountability Tags.	G.1.1 Revise General Order 300.02 Personnel Accountability. Specifically, an accountability manager is critical to the safety of operating crews and there should be a standard process to quickly appoint one on all multi-unit responses. G.1.2 All members of HCDFRS should be provided accountability and crew integrity training so they understand the necessity for and	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	implementation of accountability relating to incident management, PARs, and MAYDAY situations. G.1.3 HCDFRS must revise the personnel accountability control boards to better meet the intent of NFPA 1561 4.5.2, particularly to identify units' geographical location and functional assignments. G.1.4 HCDFRS should provide initial and continuous training to responders on General Order 300.02: Personnel Accountability and, in particular, identify the need for use of remote accountability boards at incidents that involve large structures or large incident scenes. This should include training for initial responders serving as an accountability manager for an incident commander or division and group supervisors.			
G.2 The Incident Commander's understanding of crew location and deployment did not match the actual locations of the crew.	G.2.1 HCDFRS should initiate the use of common terminology when referencing occupancies in all communications, to maintain a shared mental model. In particular, all HCDFRS members should	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	reference occupancies based on NIMS Incident Command System. G.2.2 General Order 310.01 (41) should be revised to reflect this recommendation and crews should use "floor number ____" in all communications when referencing floors of a structure in conjunction with basement, attic and roof as specified in General Order 300.07: Incident Command System(Line 278). G.2.3 HCDFRS crews should state Location in addition to Conditions, Actions and Needs (LCAN) when an assignment is completed or when requested by the Incident Commander. This change should be reflected in the applicable General Orders. G.2.4 In revising General Orders, HCDFRS should consider emphasizing reporting a PAR at the end of an LCAN report.			
G.3 Although the Incident Commander had a general understanding of staffing levels from Engine 51, Engine 101, Tower 10 and later responding units—and the officers of those units clearly	G.3.1 HCDFRS should examine how volunteer member accountability is maintained and should determine a means of tracking volunteer member's staffing on units as it	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
know the number of firefighters, their names, and their crew numbers—there is no indication that the Incident Commander had foreknowledge of additional staffing provided by volunteer firefighters on Engine 51 or any other volunteer station.	changes throughout any particular shift. G.3.2 Use of new or existing technologies could assist in identifying staffing levels. HCDFRS should explore technologies and procedures available to address volunteer and career staffing assignments.			
G.4 In reviewing the policies and practices of Heavy Vehicle Operators (HVOs) there appears to be room for interpretation of whether HVO PATs remain with their assigned apparatus or are included in the collector ring with the crew.	G.4.1 HCDFRS should consider establishing a procedure to account for an HVO and the HVO's PAT when a HVO operates separate of a crew as represented on the crew's collector ring. G.4.2 Establishing a procedure for PATs and collector rings to account for a fire fighter who moves between crews at an incident will enhance accountability.	Operations Command	**1**	
G.5 It is unclear whether personnel who responded to the scene, but were not dispatched, followed the appropriate protocols for accountability.	G.5.1 HCDFRS should review associated General Orders and modify as needed to restrict an officer from self-dispatching units by phone or radio to an incident,	Operations Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	separate of the Incident Commander.			
G.6 While there are clear guidelines for the Communications Center responsibilities to support accountability efforts, the investigation revealed a conflict between the Communications Center's understanding and the General Orders.	G.6.1 The HCDFRS and Communications Center must agree upon how unit staffing information will be relayed from units and summarized to the incident commander on multi-unit responses. The result should be consistent written policies and training for both HCDFRS and Communications Center staff.	Howard County Police Department	**2**	
G.7 Communications Center discontinued the fifteen (15) minute notifications during the incident after the MAYDAY transmission.	G.7.1 HCDFS should establish a command channel on incidents as needed G.7.2 To align with NFPA Standard 1500.8.2.5.1, HCDFRS should adjust its interval notifications from fifteen (15) minutes to ten (10) minutes. G.7.3 The practice of time interval notifications from Communications Center to the Incident Commander is a critical task that should be continued. During a MAYDAY, the notifications should be restricted to a command channel. After the MAYDAY situation is resolved,	Howard County Police Department	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	interval notifications should resume on the operations channel.			
G.8 HCDFRS General Order 300.02 Personal Accountability does not reflect current fireground operations.	G.8.1 General Order 300.02 Personnel Accountability should be reviewed, updated and republished. G.8.2 All General Orders that reference or discuss Accountability procedures should be congruent to the revised General Order 300.02: Personnel Accountability.	Operations Command	**1**	
G.9 The current system for accountability using verbal PAR reports is time consuming and requires significant radio communications	G.9.1 HCDFRS should investigate an electronic or radio-based PAR system.	County Administration	**3**	
G.10 The Charlie Division supervisor was unclear as to which crews were assigned to his division during the Incident.	G.10.1 HCDFRS should consider division and group supervisors having an accountability manager to assist with accountability when the situational demands exceed the ability of a group or division supervisor to make decisions and maintain accountability of units and personnel.	Operations Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
G.11 Crews were provided specific assignments but did not consistently refer to themselves by their assignments.	G.11.1 HCDFRS should provide additional training on proper radio procedures pursuant to General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines and General Order 300.07: Incident Command System. Additionally, training should be provided on the use of the "communications order model" as specified in General Order 410.01: Communications, Section 9.3.	Operations Command & Operations Support Command	**1**	
Crew Integrity				
H.1. Paramedic 56's crew did not maintain crew integrity as the crew divided to accomplish both Initial Rapid Intervention Crew (IRIC) duties and water supply duties.	H.1.1. Fire Chief must ensure unit supervisors and crew members are trained on and implement best practices for maintaining crew integrity. This includes: ○ Verbalizing to all responders any deviations from a General order; ○ Pausing operations to restate crew tasks and objective and to regain crew integrity whenever a supervisor	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	observes crew members violating such integrity; and o Ensuring crew members inform their supervisors of their location and task or objective if they are given a conflicting order by a different supervisor.\Implement Crew Resource Management to make crew responsible for crew safety and situational awareness.			
H.2. The Rapid Intervention Crew demonstrated an extraordinary level of crew integrity on this incident given the fact that the Rapid Intervention Crew (RIC) comprised crews from Engine 71, Truck 7, and Paramedic 56D.	H.2.1 Personnel must train together on a regular basis to allow all crew members to identify the crew's strengths, weaknesses, and enhance team cohesiveness. Training priorities should include topics that are low-frequency, high-risk, such as RIC deployments. The goal being that crew integrity will be maintained as various types of operations are conducted.	Operations Command & Operations Support Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
H.3. Engine 111 also did not maintain crew integrity by separating crew.	See recommendation H.1.1			
H.4. Engine 51A could not account for crew members after the MAYDAY	See recommendation H.1.1			
H.5. Battalion Chief 1 and Command Aide maintained crew integrity, although the Command Aide completed duties outside of their normal tasks.	H.5.1 When the Command Aide assists crew members with tasks outside of their scope, the Command Aide must notify the Battalion Chief of the additional task.	Operations Command	**1**	
H.6. Other resources operating individually may pose a problem if they enter the IDLH without becoming part of a crew	H.6.1 Ensure that ICs require any individual entering the IDLH to become part of a minimum 2-person crew.	Operations Command	**1**	
Effective Response Force				
I.1 esponse assignment initially dispatched to manage this incident was consistent with HCDFRS policies in place at the time of the incident	I.1.1 HCDFRS must clearly define parameters of a Local Box Alarm versus a Full Box Alarm I.1.2 HCDFRS should codify expectations for units responding to Local Box Alarms, including a dedicated RIC company and an ability to establish a secondary water supply	Fire Chief	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	I.1.3 Local Box Alarm and Full Box Alarm assignments should be standardized throughout the Baltimore Metropolitan Region			
I.2 7005 Woodscape Drive was an 8,400 square foot residential structure, however initial response treated it similarly to a smaller single-family home rather than adapting staffing, strategy and tactics for the unique size and scale of the residence.	I.2.1 HCDFRS must train personnel to recognize how structure size, residential or commercial, affects visual cues such as smoke characteristics.	Support Services	**2**	
Health and Safety				
J.1 Not all personnel on the fireground had an up-to-date physical.	J.1.1 General Order 120.02 Volunteer Officer Requirements should be amended to require all volunteer fire fighters obtain a yearly NFPA 1582 physical, including certification of their ability to safely operate an SCBA. J.1.2 HCDFRS should fully enforce 29 CFR 1910.134, mandating that any and all members on the fireground	Fire Chief	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	must be properly fit tested and medically certified to use SCBA. J.1.3 HCDFRS should develop a records management system that accurately accounts for all operational department members and their medical certification status and annual fit testing.			
J.2 Several members on scene operated within an IDLH environment with SCBA without the appropriate fit testing or medical certification, which is non-compliant to 29 CFR 1910.134. All four (4) of the individuals who operated in the IDLH environment without these certifications were volunteer firefighters.	See Recommendations [J.1.1 & 1.2]	Support Services	**2**	
J.3 There was no formal rehabilitation process or area established for members on the fireground to recharge and be evaluated for continued fitness of duty.	J.3.1 Develop a rehabilitation general order consistent with the intent of NFPA 1584. J.3.2 Develop a mechanism to ensure that one of the volunteer operated canteen units is available to respond to an incident request in a timely and consistent matter.	Operations Command	**2**	
J.4 With the complexity of this incident and size of the structure, it was unreasonable to only have one safety	J.4.1 Expand the response plan for the Field Safety Officer to include responding on all local box alarms to	Fire Chief	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
officer on the fireground. Although there was not another safety officer on the fireground, a second safety officer could have been requested and filled by a Company Officer, Chief Officer, or mutual aid Officer.	provide on scene safety oversight. Having on scene safety oversight is critical on incidents where an IDLH or active hot zone may be present. J.4.2 Deploy a second full time field Safety Officer. J.4.3 Establish a department order outlining procedures for preserving and documenting evidence at the scene of an employee injury, accident, or near miss.			
J.5 The change to HCDFRS on-call matrix, which occurred sometime after 2013, merged the on-call Safety Officer and on-call Battalion Chief into a single position. During this incident, that individual became the Incident Commander (relieving the initial Incident Commander) making it impossible for him to fulfill the duties of Safety Officer.	J.5.1 Re-establish a dedicated, on-call Safety Officer. J.5.2 Deploy a second full time field Safety Officer.	Fire Chief	**2**	
J.6 The Communications Center did not transmit periodic single extended alert tones at fifteen (15) minute intervals, as required by General Order 300.02 Personnel Accountability.	J.6.1 Amend HCDFRS General Orders to be consistent with NFPA 1500 8.2.5.1 to provide for 10-minute status updates from the Communication Center to the Incident Commander and provide the Communications Center with the	Fire Chief & Howard County Police Department	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	associated training to implement the changed order.			
J.7 Although an IRIC and RIC were established, it did not comply with the General Orders governing those areas.	J.7.1 Amend HCDFRS orders (310.01 Single Family and Townhouse Structure Fire Operational Guidelines, 300.11 Rapid Intervention and IDLH Initial Entry Teams) to clearly define which response unit(s) shall be the IRIC and RIC units. J.7.2 Amend applicable orders and response pattern to provide for an additional dedicated RIC engine on all Local Box and greater assignments. J.7.3 Amend applicable General Orders to reflect that an IRIC and/or RIC shall be established at the point of entry into the IDLH environment prior to entry, unless a known life hazard exists. J.7.4 Amend General Order 410.01 Communications to require that prior to entry into an IDLH environment, the crew leader shall verbally report their entry location, intended actions upon entry, and staffing level to the Incident Commander. The Incident Commander should confirm and approve the actions prior to entry.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
J.8 HCDFRS does not fully fund or maintain a robust behavioral health program.	J.8.1 Develop and implement a structured behavioral health program.	County Administration & Fire Chief	**3**	
J.9 HCDFRS provides minimal wellness or fitness support falling short of recommendations by national consensus standards.	J.9.1 Implement a mandatory, non-punitive, confidential fitness assessment program. This can be done independent of the annual physical, or incorporated into the annual physical, and done by the contracted Occupational Health provider. J.9.2 Develop a health education component to department training. J.9.3 Re-establish a functional Occupational Safety and Health Committee that is funded, respected, and utilized by senior administration. J.9.4 Develop, by training and administrative support, a culture of safety that transcends the organization. The culture must be supported by Administration and include continuous training for Safety Officers. Staffing in BOSH needs to be increased to meet the growing demands of the new culture and expanding workforce.	Fire Chief & Member Services Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	J.9.5 Conduct annual fire station safety inspection program consistent with NFPA and MOSH standards.			
J.10 HCDFRS current efforts to inspect and maintain PPE are inadequate to ensure that PPE is fully safe and functional for personnel.	J.10.1 Develop a PPE inspection, cleaning, and training program that effectively cleans PPE after exposure to contaminates and documents PPE maintenance across the garment lifespan.	Operations Command & Support Services	**2**	
Treatment				
K.1 Several personnel reported difficulty in removing FF Flynn's turnout gear while continuing treatment and some turn out gear was transported with FF Flynn.	K.1.1 A standardized process for removal of turnout gear of a downed fire fighter in breathing apparatus, as well as a process to initiate and secure a chain of custody of the gear, must be developed. This process needs to be in the form of a policy with an associated department-wide training completed to ensure competency.	Support Services	**2**	
K.2 Although General Order 310.01 does not pre-assign EMS-1 a function unless they are the First Arriving Chief or Command Officer, EMS-1 followed best practices in preparing for any medical needs.	K.2.1 HCDFRS must revise General Order 310.01 and assign EMS-1 and/or EMS-2 functional duties for preparing EMS and rehabilitation early into an incident. K.2.2 Should EMS-1 be used as command staff, HCDFRS must alert	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	EMS-2 to fulfill the EMS supervisory functions. K.2.3 HCDFRS must have an on-call EMS officer.			
K.3 Although the Medical Duty Officer was able to complete the Quality Assurance review, there is not a process for any external review of an incident.	K.3.1 HCDFRS must develop a policy that allows for and has a predetermined flow path for external QA.	Fire Chief	**2**	
K.4 The transport of FF Flynn used the only dedicated EMS transport unit.	K.4.1 Add an additional transport unit per alarm to ensure quick and effective treatment of civilian and fire service personnel.	Operations Command	**1**	
Training				
L.1. Although all HCFRS personnel train on the Incident Command System (ICS) neither the current General Orders nor the current training program establish a clear philosophy of Incident Command for divisions, groups and unit operations.	L.1.1 HCDFRS policies and training for the ICS must emphasize a mission-oriented philosophy of command.	Fire Chief	**1**	
L.2. Current HCDFRS training rarely provides realistic, practical, hands-on scenarios for personnel to master fireground fundamentals. Particularly noteworthy in this incident was the inability for	L.2.1 HCDFRS training must be conducted in realistic practical environments that contain the elements of stress and friction. L.2.2 HCDFRS must develop a competency-based mentorship and	Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
fireground personnel to properly identify situational cues that there was an active basement fire. This aspect alone should have indicated that entry on the first floor was unsafe and caused personnel to alter their tactics for fire attack.	training program to address effective rapid decision making and situational awareness on the fireground. Said program should include evaluative mechanisms for measuring an officer's core skills of proficiency for their position.			
L.3. HCDFRS personnel are trained in MAYDAY and RIC protocols and best practices.	See Recommendations L.2.1 & 2.2	Support Services	**2**	
L.4. HCDFRS MAYDAY training does not incorporate error prevention or error trapping on the fireground.	L.4.1 HCDFRS must implement practical, realistic training on preventing and trapping errors on the fireground.	Support Services	**2**	
L.5. Although many HCDFRS members have been trained on the Blue Card communication method, which uses the communications order model, personnel on the fireground did not effectively implement the communications order model.	L.5.1 HCDFRS's needs define the terminology conventions for geographic locations used on the fire scene. Training needs to include the terminology as well as practicing the proper functions in the communications order model	Operations Command & Support Services	**1**	
L.6. HCDFRS has deployed equipment into the field without adequate training on the equipment (Thermal Imagine Cameras and	L.6.1 Before any future equipment field deployment, HCDFRS must facilitate hands-on, competency-based training in realistic scenarios for all personnel on the equipment.	Operations Command & Support Services	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
Motorola APX8000XE portable radios).	L.6.2 HCDFRS needs to develop a training program that incorporates NFPA 1408, Standard for Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers.			
L.7. After a review of the HCDFRS training General Orders the ISRB recognized a discrepancy between the minimum training requirements for Career HCDFRS and Corporate Volunteer officers.	L.7.1 All HCDFRS personnel, career and corporate volunteer, of the same rank should have the same minimum training to assure consistency and team cohesion.	Fire Chief	**1**	
Personal Protective Equipment				
M.1 FF Flynn's personal protective clothing had not received advanced inspection or cleaning within the twelve (12) months prior to the incident.	M.1.1 The Howard County Department of Fire and Rescue Services should consider incorporating guidance from Special Order 2004-42 into a newly issued General Order that aligns with NFPA 1851. This order should mandate yearly advanced inspection and cleaning of all personal protective equipment, regardless of soiled condition, to assure that this equipment is in safe and serviceable condition.	Fire Chief	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
M.2 Although FF Flynn's turnout coat had his name displayed on the rear tail, some personnel on the fireground did not have their names displayed on the rear of their coats.	M.2.1 General Order 530.02 should be revised to require all turnout coats to have the member's last name affixed to the rear tail of the coat. Should multiple members have the same last name, additional lettering would be used to further differentiate those individuals. M.2.2 Officers should assure all of their personnel have their name affixed to the rear tail of their turnout coats and request name panels for personnel, as necessary.	Support Command	**2**	
M.3 FF Flynn's personally owned helmet and firefighting boots were greater than ten (10) years from manufacture date.	See Recommendation M.1.1 M.3.1 General Order 530.02, Personal Protective Equipment, should be revised to align with NFPA Standard 1971. These revisions should include: o An explicit prohibition of any modifications to equipment that would compromise or	Support Command	**2**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	void its NFPA 1971 certification. o Allowable length of service parameters for all personal protective clothing and equipment items.			
M.4 The examination of FF Flynn's protective hood revealed holes in the rear bib that matched the size and spacing of the snaps used to attach the coat liner to the outer shell of the turnout coat and collar.	See Recommendation M.3.1			
M.5 The independent examiner indicated that FF Flynn's turnout coat collar was not in a raised and secured position.	M.5.1 Instruction and training for personal protective equipment should focus on proper donning of the entire safety ensemble, including the importance of utilizing and securing all components for maximum safety and protection (i.e. collars up, snaps fastened, etc.). M.5.2 Personnel should ensure that all clothing is fully and properly donned	Operations Command & Support Services	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	during any structural firefighting event for their safety.			
M.6 It was noted that FF Flynn was wearing reissued personal protective equipment and not gear that had been manufactured to his specifications.	M.6.1 HCDFRS Quartermaster should continue their existing process of assuring gear is properly sized when re-issuing serviceable gear.	Support Services	**3**	
SCBA				
M.7 FF Flynn used an SCBA with the identifier (E101C) that did not correspond with his riding position and assignment (E101B).	M.7.1 Create or update a General Order to institutionalize cultural practice of associating SCBA with riding positions. M.7.2 Educate personnel on the important current practice of keeping SCBA in the riding position for which it is identified. Whenever an SCBA is removed from apparatus for maintenance, a spare SCBA is to be placed in the vacant position. M.7.3 Make available a spare SCBA with the same functional capabilities (i.e. thermal imaging camera) as the SCBA removed from service.	Operations Command & Support Services	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
	M.7.4 Remind personnel to assure that their SCBA and portable radio identifiers match. (The only exception being when utilizing a spare SCBA due to SCBA being out for maintenance.).			
M.8 Although the Howard County Department of Fire and Rescue Services owns MSA A2 SCBA monitoring software, the software has not been adopted for use on the fireground.	M.8.1 Develop a plan for the use of MSA A2 SCBA monitoring software, to include identifying who is responsible for monitoring the software on an incident and begin utilizing this software on incidents.	Operations Command	**2**	
M.9 Some SCBA unit control modules do not have an accurate date and time saved.	M.9.1 Evaluate all department SCBA for low or dead internal clock batteries and replace affected power modules, utilizing warranty provisions whenever possible. M.9.2 Evaluate BA Shop staffing options to provide for more efficient and timelier SCBA maintenance.	Support Services	**2**	
Apparatus and Equipment				

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
N.1. The age of many HCDFRS apparatus exceeds the recommended lifespan from the Optimal Vehicle Replacement Cycle Analyses conducted by Mercury Associates Inc.	N.1.1 HCDFRS shall replace apparatus that exceeds the recommended lifespan from the Mercury Associates report.	County Administratio n	**3**	
N.2. Engine 51's 25-foot hydraulic extension hose couplings were corroded.	N.2.1 HCDFRS must revise its Vehicle Check Sheet to include the Hydraulic pump, hydraulic lines, and the 25-foot hydraulic line extensions to the Weekly Check Sheet, including lubrication and exercise of the couplings.	Support Services	**1**	
N.3. Engine 51's air conditioning compressor locked up on the fireground, threatening pump operations. Operations were only able to continue thanks to FDVFD's mechanic responding to the scene and temporarily fixing the mechanical issue.	N.3.1 A Ground Support representative and a mechanic from the County Maintenance Facility must be added to the on-call availability. N.3.2 All HCDFRS apparatus purchases should be designed in a fashion so that critical apparatus functions run independently from internal climate control.	County Administratio n & Fire Chief	**3**	
N.4. Engine 22 (Reserve Engine 178) experienced mechanical failure	N.4.1 All completed repairs and maintenance must be documented, with a copy of the documentation	Support Services &	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
during the incident, placing the unit out of service.	returned with the apparatus. Units must be placed out of service if there are persistent mechanical issues that may impact critical apparatus functions.	County Fleet Maintenance		
N.5. Engine 22 should have been placed out of service prior to the incident due to recurrent issues--regarding the coolant sensor, oil pressure and an oil leak—that met the NFPA 1911 standard for taking a unit out of service.	See Recommendations N.4.1 & 4.2			
N.6. The 75-foot, 1 ¾-inch hose from Engine 101's Clemens Pack failed during the incident. There is no record of the hose being inspected, as required by Special Order 2018.30, and no record of the damaged hose's disposal.	N.6.1 Each section of hose must be assigned an identification number in accordance with NFPA 1962 4.11.1.2 and logged into a database, so it can be easily tracked for hose testing and out of service documentation. A section of hose that is taken out of service should be followed up with a Help Desk submission and entered in to the database with its reason for being taking out of service.	Operations Command & Support Services	**2**	
N.7. Not all Howard County Fire Rescue-Vehicle Check Sheets were	N.7.1 Apparatus Daily and Weekly check off sheets must be custom to that piece of Apparatus.	Operations Command	**1**	

Finding	Recommendation	Primary Responsible Department	Priority	Date of Completion
completed and/or recorded as required by General Order 510.03.	N.7.2 Each check off sheet must be filled out to include the date, unit number, and FAICS number. N.7.3 A designee assigned by the station Captain must maintain the apparatus check sheets, repair receipts and maintenance logs. N.7.4 HCDFRS should evaluate technology solutions to aid in maintenance, inspection, and inventory check sheets. Ideally, this electronic system will be compatible with smartphones and station computers.			
N.8. HCDFRS has adopted NFPA 1962 standards for nozzle testing, but not all tests from the standard are reflected in inspection checklists.	N.8.1 HCDFRS Nozzle and Appliance Inspection Checklist, found in Appendix B of Special Order 2018.30, should be amended to include service testing of Nozzles as recommended by NFPA 1962 5.3.	Operations Command	**2**	
N.9. HCDFRS has neither standardized thermal imaging devices deployed in the field, nor established training for thermal imaging devices.	N.9.1 Prior to placing thermal imagers in service, training shall be implemented. Including, but not limited to, operation, application, use, and limitations as stated in NFPA 1408. All training shall be documented and placed in the training log.	Support Services	**1**	

Appendix C. Radio Transmissions

Color Key	
Howard County Communications Center	Green
Caller/Resident	Orange
Radio Channel: Call Taker	Purple (background fill)
Alpha 1 Talk Group	Light Blue (background fill)
Bravo 2 Talk Group	Dark Orange (background fill)
Bravo 3 Talk Group	Orange (background fill)
Bravo 4 Talk Group	Brown (background fill)
Bravo 6 Talk Group	Green (background fill)

Time	Radio Channel	Unit From	Unit To	Remarks
1:51:03	Call Taker	Resident	Communications	Howard County 911 , Yes we have a fire in our house, What's your address, 7005 Woodscape Drive Clarkesville, and what's on fire, were not sure we just smelled smoke and we are out of the house, ok do you see flames, we don't see any flames, ok, do you see, there was a lightning strike, ok and alright, everyone is out?, Everyone is out, ok I have the fire department on the way we will be there shortly ok, OK.

Time	Radio Channel	Unit From	Unit To	Remarks
1:52:14	Alpha 1	Communications		Local Box 5-62, Paramedic 56, Paramedic Engine E-101, Engine 51, Paramedic Tower 10, Battalion Chief 1 respond 7005 Woodscape Drive, visible smoke from a lightning strike Operate Bravo 1 at 1:52
1:54:11	Bravo 1	Tower 10	Communications	Tower 10 with 4
1:54:16	Bravo 1	Communications	Tower 10	Tower 10 1:54
1:54:19	Bravo 1	Engine 51	Communications	51-5
1:54:23	Bravo 1	Communications		51, Tower 10, Engine 101, Paramedic 56, Battalion Chief 1 your responding 7005 Woodscape Drive off Guilford Road, Lightning struck the house now visible smoke 1:54
1:57:21	Call Taker	Resident	Communications	Howard County 911, Yea we have a fire in our house, Say it again please, We have fire in our house due to lightning, what is your address, 7005 Woodscape Drive Clarksville, Maryland, ok do you see flames, no I don't see a flame but our whole house is filled with smoke, ok yeah the fire department is on the way some else already called in and

Time	Radio Channel	Unit From	Unit To	Remarks
				they are coming as fast as they can, ok, ok, thank you, thank you bye bye.
2:00:29	Bravo 1	51A	Communications	51 to Howard single family 2 story, smoke showing, go ahead and start a box
2:00:43	Bravo 1	Communications		51 single family two story
2:00:44	Bravo 1	51A	Tower 10A	Tower 10 take the front of the building
2:00:48	Bravo 1	Communications		Tower 10 to go to front, Starting full box
2:01:23	Bravo 1	Battalion 1	51	Battalion 1 to 51 shows a pool in the back, if you can position such to use your hydraulic pump for a non-hydranted street
2:01:19	Alpha 1	Communications		Three Beeps for pre alert for Box
2:01:23	Alpha 1	Communications		Open Mic at Communications
2:01:24	Alpha 1	Communications		Upgrading box alarm 5-62, 7005 Woodscape Drive

Time	Radio Channel	Unit From	Unit To	Remarks
2:01:56	Alpha 1	Communications		Box Alarm 5-62 Tower 7, Paramedic Engine 71, Paramedic Tower 3, Engine 111, Paramedic 105 EMS-1, Safety 1 respond 7005 Woodscape Drive, upgrade to a building fire, operate on Bravo 1, Bravo 1 2:02.
2:02:14	Bravo 1	Tower 10	Communications	Tower 10 is on location positioning side alpha
2:02:19	Bravo 1	Communication	Tower 10A	Tower 10 2:02
2:02:24	Bravo 1	101A	Communications	101's arrived, second engine
2:02:28	Bravo 1	Communications	101A	101, 02:02
2:03:07	Bravo 1	105A		105 *en* route
2:03:11	Bravo 1	71A		71 with 4
2:03:15	Bravo 1	Communications		105, 71 2:03
2:03:21	Bravo 1	51A	Battalion 1	51 to Battalion 1
2:03:28	Bravo 1	Battalion 1	51A	Go Ahead
2:03:32	Bravo 1	51A	Battalion 1	We pulled around back to use the pool and we're going to make entry from the back. The owner talked, talked to the owner most of the heavy smoke was in the basement area

Time	Radio Channel	Unit From	Unit To	Remarks
2:03:55	Bravo 1	Battalion 1	51A	Battalion 1 direct, Battalion 1 to Howard on location confirming a large two story single family do have visible smoke showing, going to committing offensive strategy, I have the command.
2:04:25	Bravo 1	Communications	Battalion 1	ok Battalion Chief 1 on location with command at 2:04
2:04:31	Bravo 1	Command	51A	Command to 51, you're going to have fire attack, you're going to have yourself and Tower 10, and your advising your operator is going to access the, the swimming pool for water supply.
2:04:54	Bravo 1	51A	Command	That's correct, we are on side Charlie making an attack from side Charlie, suggest you have other units come in from Alpha
2:05:07	Bravo 1	Command	51A	give me a report give me a visible report on side Charlie from the basement as soon as you can
2:05:16	Bravo 1	BC 1 Aide	Command	Aide to Command
2:05:19	Bravo 1	Command	BC 1 Aide	Go ahead Aide

Time	Radio Channel	Unit From	Unit To	Remarks
2:05:22	Bravo 1	51A	Command	We checked from outside and see nothing from the outside. Going to make entry through uh
2:05:22	Bravo 1	BC 1 Aide	Command	Glass slider access across side Charlie as well as side Delta, we got smoke in the basement. It's pretty hazy, going to assume it's finished but again I've got smoke in basement
2:05:47	Bravo 1	Command	BC 1 Aide	Command to the Aide, all I got was finished and you do have a haze, but you and 51 were both talking, Give me a complete 360 again
2:06:05	Bravo 1	BC 1 Aide	Command	Aide to command, I've got 2 stories on side Charlie, I've got smoke in the basement, with glass slider access on side Delta and Charlie, I've got finished basement, and I do have smoke conditions
2:06:32	Bravo 1	Command	BC 1 Aide	Very good, finished basement, smoke conditions with a slider on Charlie and Delta
2:06:57	Bravo 1	BC 1 Mobile		Open Mic
2:06:59	Bravo 1	Tower 10D	Command	Tower 10 Operator to Command
2:07:04	Bravo 1	Command	Tower 10D	Go ahead

Time	Radio Channel	Unit From	Unit To	Remarks
2:07:06	Bravo 1	Tower 10D	Command	Chief right to the left of front door is a set of windows stacked, I got moderate smoke coming from the ground level
2:07:20	Bravo 1	Command	Tower 10	You got moderate smoke ground level, as seen from the windows at the front door
2:07:36	Bravo 1	Command	56	56 do you have 2 out duties
2:07:43	Bravo 1	101A	Command	101 to Command we are two out, side Charlie
2:07:51	Bravo 1	Command		last unit on side Charlie, repeat
2:07:57	Bravo 1	101A	Command	101
2:08:01	Bravo 1	Command	101 A	101 you're advising that you are on side Charlie and you, you're with 51. Is that correct?
2:08:12	Bravo 1	101A	Command	We are outside, but we are, second line pulled two out
2:08:23	Bravo 1	Command	101A	Ok 101 you've got second line pulled and you're on Charlie
2:08:28	Bravo 1	Tower 10 A	51A	Tower 10 to Fire Attack
2:08:32	Bravo 1	Battalion 1 Mobile		Open Mic
2:08:38	Bravo 1	51A	Command	51 to Command
2:08:42	Bravo 1	Command	51A	51 go ahead

Time	Radio Channel	Unit From	Unit To	Remarks
2:08:46	Bravo 1	51A	Command	We are going to reexamine if we have access to the basement we're going to come in through the basement slider
2:09:00	Bravo 1	Command	51A	You are advising you have access to basement via the slider on side Charlie
2:09:08	Bravo 1	51A	Command	That's what we are going to do right this { unrecognizable Audio}
2:09:20	Bravo 6	51E		E-51 E Open Mic
2:09:27	Bravo 1	71A	Command	Engine 71 to Command
2:09:31	Bravo 1	Command	71A	71 go ahead
2:09:34	Bravo 1	71A	Command	I am getting off on Great Star now. Do you need me to come into the scene or grab secondary water
2:09:42	Bravo 1	Command	71A	No, you are going to have to bring second water. I believe if uh 101 has laid in off of Woodscape, if you can lay from Guilford into Woodscape and Uh I'm not even sure who we've got on the remainder of the assignment but somebody got to get that hydrant on Guilford and the next street up
2:10:06	Bravo 1	71A	Command	Ok confirm the hydrant on Berrywood Court. Confirming you want me to forward lay into the scene or you need

Time	Radio Channel	Unit From	Unit To	Remarks
				me to reverse lay from the scene to back to Woodberry
2:10:19	Bravo 1	Command	71A	Go ahead and forward lay from Woodberry in
2:10:39	Bravo 1	Command	Tower 10	Command to Tower 10
2:10:44	Bravo 1	Tower 10A	Command	Tower 10
2:10:47	Bravo 1	Command	Tower 10	I had heard you call fire attack but didn't hear them answer you. Do you have a message
2:10:55	Bravo 1	Tower 10A	Command	Yea I was just telling the Lt. on 51 to redeploy their line to the basement. We're currently exterior right now side Charlie getting ready to make entry
2:11:09	Bravo 1	Command	Tower 10A	Alright confirming that you are making entry with 51 from that same location on Charlie Side
2:11:18	Bravo 1	Tower 10A	Command	That's Correct
2:11:23	Bravo 1	Tower 10C	Command	Tower 10 C to Command electric in the garage is secured
2:11:32	Bravo 1	Command	Tower 10B	Tower 10 B your advising electric is secured
2:11:41	Bravo 1	Tower 10C	Command	Tower 10 C to Command electric is secured in the garage

Time	Radio Channel	Unit From	Unit To	Remarks
2:11:45	Bravo 1	Command		Electric secured in the garage
2:12:01	Bravo 1	Command	56A	Command to Ambulance 56, Medic 56 confirming your location
2:12:07	Bravo 1	56D	Command	56 IRIC side A
2:12:12	Bravo 1	Command	56D	56 IRIC on side A
2:12:31	Bravo 1	Truck 7		Truck 7 has arrived 2nd arriving Aerial
2:12:39	Bravo 1	Battalion 1 Mobile		Open Mic
2:12:41	Bravo 1	Command		Command to all units, we do have an all clear from the occupants occupied x3 all clear of the house. We do have an all clear
2:12:53	Bravo 1	Battalion 2		Battalion 2 is on location
2:13:00	Bravo 1	Communications		Truck 7 and Battalion 2, 2:13
2:13:01	Bravo 1	Command	Battalion 2	Battalion 2 I am going to have you assume the Charlie Division when you can get here and get around there
2:13:10	Bravo 1	Battalion 2	Command	Copy Battalion 2 taking Charlie Division
2:13:22	Bravo 1	105A	Communications	105 on the scene
2:13:29	Bravo 1	Communications	105	105 02:13
2:13:33	Bravo 1	111A	71D	71 let us squeeze by you we're picking up your plug

Time	Radio Channel	Unit From	Unit To	Remarks
2:14:00	Bravo 1	111A	Communications	Engine 111 on the scene 4th Engine we've got 7's line we've got their hydrant
2:14:05	Bravo 1	Communications		111 2:14
2:14:12	Bravo 1	Command		Command is direct 111 has 71's line and 71 have you made it all the way into the fireground
2:14:30	Bravo 1	71A	Command	I have my driver; he is stopped at Guilford and Woodscape so we don't have the street blocked off just yet. We have about 600 feet on Guilford right now. If you want me to continue in
2:14:46	Bravo 1	Command	71A	Yea you're going to have to continue until you connect to 101's line, 101 laid in off of Woodscape
2:14:56	Bravo 1	Command	51A	Command to Fire Attack Engine 51 "CAN" report
2:14:56	Bravo 1	Battalion 1 Mobile		Open Mic
2:15:09	Bravo 1	51B	51D	Engine 51 charge the 300-foot line
2:15:18	Bravo 1	101A	Command	101 to Command
2:15:23	Bravo 1	51A	Command	51 to Command
2:15:26	Bravo 1	Command	51A	51 go ahead

Time	Radio Channel	Unit From	Unit To	Remarks
2:15:30	Bravo 1	Fire Attack	Command	Fire Attack to Command go ahead and have somebody positive pressure the front door we have smoke in the basement and can't find the fire at this time
2:15:45	Bravo 1	71C	71A	71 STOP
2:15:48	Bravo 1	101A	Command	101 to Command we have heavy fire on floor number 1 side Charlie
2:15:56	Bravo 1	Command	101A	101 you are advising you've got visible fire on floor number 1 on the Charlie side, is that correct
2:16:08	Bravo 1	101A	Command	That is correct
2:16:12	Bravo 1	Command	101	Can you hit the fire from the exterior
2:16:17	Bravo 1	101		We need to redeploy our lines back up to the initial entrance
2:16:25	Bravo 1	Command	101	When you talk the initial entrance you're talking the Alpha Side. Is that correct?
2:16:33	Bravo 1	101	Command	Yes, side Charlie
2:16:37	Bravo 1	Command	101	No, you mean the initial entrance on side Charlie
2:17:04	Bravo 1	Battalion 1 Mobile		Open Mic
2:17:11	Bravo 1	BC 1 Mobile		Open Mic or Unrecogizable words

Time	Radio Channel	Unit From	Unit To	Remarks
2:17:16	Bravo 1	Command	101	101 advice which quadrant you have fire showing from
2:17:33	Bravo 1	Tower 10A	Command	Tower 10 to Command
2:17:37	Bravo 1	Command	Tower 10A	Tower 10 go ahead
2:17:39	Bravo 1	101A		Open Mic
2:17:41	Bravo 1	101A		Open Mic
2:17:43	Bravo 1	Tower 10A	Command	It's going to be Quadrant 2, 101 and Engine 51 are making entry right now. We have made access to the basement. Still have smoke from floor to ceiling; I closed the door back up. Only crews you should have in are on 1st level entering side Charlie
2:18:07	Bravo 1	Command		Very well, Command to 71 and Truck 7 hold do not make that attack
2:18:19	Bravo 1	Truck 7A		Truck 7's OK
2:18:24	Bravo 1	71A		71's direct as well
2:18:29	Bravo 1	Command	Truck 7A	Truck 7 I want you to assume RIT, Truck 7 I want you to assume RIT. From that position where you're located you've got 51 and 101, Tower 10 they've entered from the Charlie Side
2:18:48	Bravo 1	Truck 7A	Command	Truck 7's OK

Time	Radio Channel	Unit From	Unit To	Remarks
2:18:52	Bravo 1	Command	71A	71 your just on deck, right there your on deck
2:18:59	Bravo 1	71A	Command	71 copy's on deck
2:19:07	Bravo 1	BC 1 Mobile		Open Mic
2:19:08	Bravo 1	Communications	Command	Howard to Command you are at 15-minute mark
2:19:10	Bravo 1	Command	Communications	Command is direct you're at the 15 minute mark, Go ahead and give me the task force
2:19:21	Bravo 1	Communications		Direct
2:19:31	Bravo 1	Battalion 1 Mobile		Mic Click
2:19:34	Bravo 1	Battalion 1 Mobile		Open Mic
2:19:45	Bravo 2	101B		Mic Keyed up No message
2:20:11	Bravo 1	101A		May Day, May Day, May Day, Flynn's in the basement to the left
2:20:21	Bravo 1	101A		Open Mic
2:20:22	Alpha 1	Communications		Upgrading box alarm to the Task Force 5-62 7005 Woodscape Drive, Engine 61, Engine 91, Squad 1, HR, PIO, on call center supervisor, on call FI, on call Battalion Chief, on call Safety, due to respond Bravo 6, Bravo 6 2:20.
2:20:27	Bravo 1	Command		Unit calling the May Day unit calling the May Day go ahead

Time	Radio Channel	Unit From	Unit To	Remarks
2:20:31	Bravo 1	101A	Command	101 is in the basement now, I believe he's in the basement now
2:20:44	Bravo 1	Communication	Command	Howard to Command, it's 101 portable A
2:20:47	Bravo 1	Command	101A	101A I've got you on the MayDay, Tower 7 RIT deploy from the Charlie Side you've got a MAYDAY from 101, All units hold the air, 101 go ahead with your MAYDAY
2:21:05	Bravo 1	101A		He's in the basement, hose line trying to pull him up, go through the basement
2:21:05	Bravo 2	101B		Transcript removed out of respect for the Flynn family; however, he transmitted his who, what, where.
2:21:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:21:19	Bravo 1	Command	Tower 10, 51	Tower 10 and 51 can you advise on 101's MAYDAY, all I hear is the basement.
2:21:28	Bravo 1	Communication	Command	Howard to Command it sounds like she fell through the basement
2:21:30	Bravo 1	51A	Command	51 to Command, 10, Tower 10 to command, we are trying to find her now

Time	Radio Channel	Unit From	Unit To	Remarks
2:21:44	Bravo 1	Command	51A	Very well 51 you are trying to find her, [E 101A] I understand that you've fallen into the basement?
2:22:03	Bravo 1	Communication		Channel Marker for MAYDAY
2:22:05	Bravo 1	Command	Communications	Command to Howard, give me the second alarm and keep them on Bravo 6
2:22:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:22:14	Bravo 1	Communications		Howard is direct
2:22:17	Bravo 6	91A		Engine 51 responding, correction Engine 91 responding
2:22:18	Bravo 1	Command	71A	Command to 71, you're with Tower 7, 71 you're on RIT with Tower 7
2:22:25	Bravo 6	61A		61 has 4
2:22:27	Bravo 1	71A	Command	71 to Command we are redeploying the line around side Delta to side Charlie, I'll team up with Truck 7
2:22:31	Bravo 6	SQD 1A		Squad 1 enroute with 4
2:22:39	Bravo 1	101A		Open Mic from Engine 101 A No Message
2:22:41	Bravo 1	101A		Chief, I need people at the front door, [other person talking] [incomprehensible message]
2:22:48	Bravo 1	101A		Open Air Space, no verbal 101 A

Time	Radio Channel	Unit From	Unit To	Remarks
2:22:54	Bravo 1	Command	Tower 10	Command to Tower 10, Tower 10 can you advise on 51 and 101
2:22:56	Alpha 1	Command		Upgrading Box Alarm 5-62 to 2nd Alarm, Paramedic Engine 22, Paramedic Engine (pause for correction) Prince George Engine 849, Anne Arundel Truck 29, Air Unit 17, MAB 13, Chaplain , Command 17, Canteen 6 due to respond 7005 Woodscape Drive it's going to be for a house fire now with a MAY DAY you're going to operate on Bravo 6, Bravo 6 2:23
2:23:04	Bravo 1	Tower 10A	Command	Negative Chief, I am still checking
2:23:12	Bravo 1	Tower 10A		Give me a minute
2:23:19	Bravo 1	Tower 10A	Command	Tower 10 to Command
2:23:23	Bravo 1	Command	Tower 10A	Tower 10
2:23:27	Bravo 1	Tower 10A		I have 101 officer
2:23:33	Bravo 1	Communications		Channel Marker for MAYDAY
2:23:36	Bravo 1	Command	Tower 10A	Tower 10 you've got 101 Officer, are you out of the structure
2:23:42	Bravo 1	Tower 10A		Correction Engine 51 Officer
2:23:47	Bravo 1	Charlie	Command	Charlie to Command, priority message [E 101A] is out

Time	Radio Channel	Unit From	Unit To	Remarks
2:23:49	Bravo 1	Command	Charlie	Go ahead Charlie
2:23:54	Bravo 1	Squad 1D		Open Air Space from Squad 1 Driver
2:24:00	Bravo 1	Command		Go ahead Charlie Division
2:24:03	Bravo 1	Communications		Channel Marker for MAYDAY
2:24:05	Bravo 1	Charlie		We've got 101 Officer is out, we are still looking for Flynn, FF Flynn
2:24:16	Bravo 1	Command		Ok you've got 101 Officer out, still looking for Flynn, that would be 101 Bravo portable advise on 51's crew
2:24:28	Bravo 6	22A		Engine 22 with 3
2:24:32	Bravo 1	Truck 7A	Command	RIT to Command
2:24:34	Alpha 1	BC 20	Communications	Battalion 20 I'm the on-call Battalion and Safety Officer
2:24:36	Bravo 1	Command	Truck 7A	RIT
2:24:43	Bravo 1	Communications		Channel Marker for MAYDAY
2:24:44	Bravo 6	OEM 13		OEM 13 to Howard
2:24:45	Alpha 1			Direct Sir
2:24:45	Bravo 1	Command	RIT	RIT go ahead
2:24:48	Bravo 6	Communications	OEM 13	Howard to OEM 13 "OEM 13"
2:24:48	Bravo 1	RIT	Command	Can we confirm if Flynn went through the floor as well or if he is on the first level

Time	Radio Channel	Unit From	Unit To	Remarks
2:24:52	Bravo 6	OEM 13	Communications	OEM 13 to Howard enroute to PSTC for command 17 I'll notify you when I'm enroute
2:24:57	Bravo 1	51A		51 copy
2:25:00	Bravo 6	Communications	OEM 13	Howard 13 to OEM 13 we're direct
2:25:03	Bravo 1	Charlie	Command	Charlie to Command with an update on the uh uh lost firefighters
2:25:11	Bravo 1	Command	Charlie	Go ahead Charlie
2:25:15	Bravo 1	Charlie	Command	Fire fighter Flynn fell through the floor he is on the hose line he he's down the hose line and could not get pulled back up. Units are inside right now uh searching for him
2:25:30	Bravo 1	Charlie	Command	Confirmed he did go down one level and he fell through a fire a hole in the floor
2:25:41	Bravo 1	Command	Charlie	So, from the Charlie side he is down one level, he is on a sub-basement level. Is that correct?
2:25:53	Bravo 1	Charlie	Command	He is one floor below the grade level at the front door the only area that has exposed at that grade level is the Delta side as well as the lower part of the Charlie side

Time	Radio Channel	Unit From	Unit To	Remarks
2:26:03	Alpha 1	Chief 6B	Communications	6-B to Howard, I'm responding on the box, going over to Bravo 1
2:26:09	Alpha 1	Communications	Chief 6B	Go to Bravo 6 sir
2:26:13	Alpha 1	Chief 6B	Communications	OK
2:26:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:26:15	Bravo 1	Command	Charlie	Ok and Charlie can you confirm a PAR on 51's crew and Tower 10's crew
2:26:24	Bravo 1	Charlie	Command	[E 101A] is uh the only person right now that is unaccounted for is FF Flynn off of 51
2:26:38	Bravo 1	Command	Charlie	Flynn is from 101 and you have 101 Officer you have her out and we have, we still have contact with 51[A] and Tower 10[A]
2:26:58	Bravo 1	Charlie	Command	I am talking to Tower 10 right now were redeploying them to the lower section
2:27:10	Bravo 1	Charlie	Command	And he is PAR
2:27:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:27:17	Bravo 1	Command	Charlie	Ok when you can Charlie I need a PAR on 51 also, 51[A]
2:27:23	Bravo 1	Communications		Channel Marker for MAYDAY
2:27:25	Bravo 1	Charlie	Command	ok I have not seen [E 51A]

Time	Radio Channel	Unit From	Unit To	Remarks
2:27:32	Bravo 1	51D		[E 51A] is located in the front of 51, as is [E 51B] and [E 101A]
2:27:43	Bravo 1	Communications		Channel Marker for MAYDAY
2:27:44	Bravo 1	Command		51 Operator I am direct on that so what about the third member of 51's crew
2:27:53	Bravo 1	51D		We are continuing Chief, [E 51C] has not been located by us as of yet
2:28:02	Bravo 1	Truck 7D		7 Charlie at the basement, we have [E 51C] right at the entrance to the basement, he is with the RIT crew
2:28:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:28:16	Bravo 1	Command		Unit that just identified [E 51C] repeat your unit
2:28:22	Bravo 1	Truck 7D		Truck 7 Operator
2:28:29	Bravo 1	Command		Alright Truck 7 Operator you've got [E 51C] return him to his crew
2:28:34	Bravo 6	61A	Communications	61 to Howard on Bravo 6
2:28:40	Bravo 6	Communications	61A	Howard to 61
2:28:40	Alpha 1	115A	Communications	115 to Howard, you can add us to the box
2:28:41	Bravo 1	Truck 7D		Truck 7 Operator to [E 51C] been removed from the structure under his

Time	Radio Channel	Unit From	Unit To	Remarks
				own power and is sitting out here on the back deck
2:28:43	Bravo 6	61A	Communications	Just confirming we're one of the engines on the task force probably the initial
2:28:46	Alpha 1	Communications	115A	Alright go ahead and start on Bravo 6
2:28:50	Bravo 6	Howard	61A	Yes, that is correct you're on the task force on the initial "ah" it looks like maybe the first engine on scene so if you can set up command, umm, maybe Clarksville Middle School as the staging area.
2:28:55	Bravo 1	Command		Ok [E 51C] has came out under his own power and he is sitting on the back deck Command to [E 51C] I want you to return to E51 to your crew
2:29:07	Bravo 6	61A	Communications	I'm ok! Who's on the Task Force with me
2:29:12	Bravo 6	Communications	61A	Ok you have Engine, yourself Engine 91, Squad 1, then the … administrative units on call FI, on call BC, on call Safety, Assistant Chief

Time	Radio Channel	Unit From	Unit To	Remarks
2:29:12	Bravo 1	Charlie		[E 51C] is direct on that, one priority addition, we have [E 51E] who is also unaccounted for so we have Flynn and [E 51E] still unaccounted for [E 51C] is safe and out
2:29:31	Bravo 6	61A	Communications	Copy, Engine 91, myself, Squad 1 as the special service
2:29:33	Bravo 1	51A		51 to Command, [E 51E] is with me, [E 51B] is with me, [E 51C] is unknown at this time
2:29:40	Bravo 6	Communications	61A	That's right the second alarm is also going to be enroute with Engine 22, AA Truck 29, P-115
2:29:50	Bravo 1	51A		Correction he is now with me, also be advised the doorway that we initially went in is about ready to flash
2:29:51	Bravo 6	61 A	Communications	I'm ok!
2:30:03	Bravo 1	Communications		Channel Marker for MAYDAY
2:30:12	Bravo 1	Command	Charlie	Command to Charlie, I am sending you Tower 3's crew, so you should have 71, Truck 7 and Tower 3 back there as resources
2:30:13	Bravo 6	FM 202	Communications	FM 202 to Howard FM 202 responding as the on-call FM

Time	Radio Channel	Unit From	Unit To	Remarks
2:30:18	Bravo 6	Communications	FM 202	FM 202
2:30:31	Bravo 1	Charlie	Command	Charlie to Command, I'm not honestly sure who I got back here I know I got Tower 10
2:30:41	Bravo 1	Charlie	Command	That's really about it
2:30:45	Bravo 1	Command	Charlie	Charlie Division, the initial was 51, 101, and Tower 10 then RIT came around it was Truck 7, 71; and now I am sending you Tower 3
2:31:05	Bravo 1	Charlie		Ok
2:31:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:31:14	Bravo 6	22A	61A	22 to 61 on Bravo 6
2:31:20	Bravo 6	61A	22A	E61 to E22 Go Ahead
2:31:23	Bravo 6	22A	61A	Hey [E 61A] this is 22 2nd alarm engine we're going to the middle school off Guilford
2:31:23	Bravo 1	Communications		Channel Marker for MAYDAY
2:31:31	Bravo 6	61A	22A	Sounds good up at south Trotter
2:31:33	Bravo 1	51D		51 to command, 51 to command, be advised we are at less than a 1/4 tank of water, we are out of water
2:31:40	Bravo 6	22A	61A	Copy! Staging area is off South Trotter at the school

Time	Radio Channel	Unit From	Unit To	Remarks
2:31:45	Bravo 6	61A	91A	Engine 61 to Engine 91 are you over here
2:31:50	Bravo 1	111A	71D	111 to 71, water is on the way, 71 operator,
2:31:53	Alpha 1	Bureau Chief 2	Communications	Bureau Chief 2 to Howard
2:31:58	Alpha 1	Communication	Bureau Chief 2	Go Ahead
2:31:59	Bravo 1	Command	Charlie	Command to Charlie Division
2:32:00	Alpha 1	Bureau Chief 2	Communications	Can you add me to the 5 box? I'm going over to Bravo
2:32:05	Alpha 1	Communications	Bureau Chief 2	That’s right, switch over
2:32:05	Bravo 1	Charlie	Command	Go ahead Command
2:32:09	Bravo 1	Command	Charlie	Charlie Division, confirm for me that we had a PAR on 51, do we have a PAR on Tower 10, and we 're still missing one Fire Fighter and you've got 71 and the Truck deployed
2:32:27	Bravo 1	Charlie	Command	I have a PAR on 51, I have 71 and Tower 7 deployed, Tower 3 is about to deploy, Tower 10 is out of air and switching out
2:32:53	Bravo 1	Communications		Channel Marker for MAYDAY
2:32:56	Bravo 1	Command	Charlie	Alright Charlie Division how many lines do you have deployed?
2:32:59	Bravo 1	Communications	Command	Howard to Command

Time	Radio Channel	Unit From	Unit To	Remarks
2:33:06	Bravo 1	Communications	Command	Howard to Command
2:33:09	Bravo 1	Command	Communications	Go ahead if urgent
2:33:12	Bravo 1	Communications	Command	Getting the emergency identifier 101B portable, should be Flynn
2:33:17	Bravo 1	Command	101B	Command to Fire Fighter Flynn, Command to Fire Fighter Flynn
2:33:19	Bravo 6	BC 1 Aide		BC1 aide to all units staging on Bravo 6, have your personnel report up to the fireground for assignment, all personnel report to the fireground for assignment
2:33:33	Bravo 1	Communications		Channel Marker for MAYDAY
2:33:38	Bravo 6	61A	BC1	We're ok, we're spinning around from staging headed down to the fireground
2:33:43	Bravo 1	Communications		Channel Marker for MAYDAY
2:33:47	Bravo 2	Communications	101B	Howard to Engine 101 B Portable Flynn
2:33:49	Bravo 6	BC 1 Aide	61A	Copy Thank you
2:33:53	Bravo 1	Communications		Channel Marker for MAYDAY
2:33:55	Bravo 1	Command		Open air from Battalion 1 Mobile
2:34:03	Bravo 1	Communications		Channel Marker for MAYDAY
2:34:07	Bravo 6	61A	22A	Engine 61 "ah" 22 units still responding on this channel use caution when you

Time	Radio Channel	Unit From	Unit To	Remarks
				get to Woodscape there's hose in the road
2:34:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:34:19	Bravo 6			Engine 22's okay we're getting on Great Star
2:34:23	Bravo 1	Communications		Channel Marker for MAYDAY
2:34:25	Bravo 1	Command	Charlie	Command to the Charlie Division
2:34:30	Bravo 1	Charlie		Go Ahead
2:34:35	Bravo 1	Command	Charlie	Can you advise on a PAR on Tower 10 and do you have any status updates
2:34:53	Bravo 1	Communications		Channel Marker for MAYDAY
2:34:58	Bravo 1	Charlie		Charlie division can confirm Tower 10 is PAR
2:35:02	Bravo 6	PIO	Communications	PIO 1 is enroute
2:35:05	Bravo 6	Communications	PIO	PIO 1 Direct
2:35:11	Bravo 1	Command		Charlie Division is direct, Tower 10 and 51 are PAR we still got 71 and Truck 7 deployed and Tower 3 deployed in an effort to find Fire Fighter Flynn, you are direct we had an emergency identifier on Flynn

Time	Radio Channel	Unit From	Unit To	Remarks
2:35:30	Bravo 1	Charlie		I am direct. I would also recommend getting a transport unit cot around back uh for when we are able to get him out, he's going to probably need medical attention
2:35:44	Bravo 1	Command		I am direct EMS-1 should have that
2:35:45	Bravo 6	22A		Open Mic
2:35:46	Alpha 1	FM200	Communications	FM 200 is enroute to Woodscape Drive
2:35:47	Bravo 6	91A	Communications	Engine 91's on location
2:35:50	Alpha 1	Communications	FM200	Switch over to Bravo 6
2:35:52	Bravo 1	Charlie		Make sure they are on the lower side and not up by 51, come around the delta side
2:35:52	Bravo 6	Communications	91A	91 we're direct, were you direct to report to the fireground?
2:35:57	Bravo 6	91A	Communications	Direct, we are on our way
2:36:00	Bravo 6	Tower 2A	Communications	Tower 2's arrived
2:36:01	Bravo 1	Command		I've got 105's crew and EMS-1 coming down the Delta side now
2:36:08	Bravo 6	Communications	Tower 2A	Tower 2 direct; are you enroute to the fireground correct?
2:36:12	Bravo 1	P56A		51 Operator charge the hydraulic pump

Time	Radio Channel	Unit From	Unit To	Remarks
2:36:12	Bravo 6	Tower 2A	Communications	Open Mic
2:36:16	Bravo 6	Tower 2A	Communications	We're ah, on Guilford approaching Woodscape
2:36:17	Bravo 1	51D		Were direct
2:36:23	Bravo 1	Communications		Channel Marker for MAYDAY
2:36:25	Bravo 6	Communications	Tower 2A	Ok, report to the Fireground
2:36:27	Bravo 1	E22A		22 on scene
2:36:29	Bravo 6			Tower 2's ok switching over to Bravo 1
2:36:32	Bravo 1	Communication		22 on the scene
2:36:36	Bravo 6	Chief 6B	Communications	Chief 6 B's on location
2:36:40	Bravo 6	Communications	Chief 6B	Chief 6 B we are direct
2:36:43	Bravo 1	Communications		Channel Marker for MAYDAY
2:36:45	Bravo 6	Chief 6B	Communications	You said go over to Bravo 1 and come to the scene?
2:36:49	Bravo 6	Communications	Chief 6B	That’s correct, Howard to all units responding on the task force or second alarm, report to the fireground and wait for assignment, report to the fireground and wait for assignment
2:36:53	Bravo 1	Communications		Channel Marker for MAYDAY
2:37:00	Bravo 1	Communications	Command	Howard to Command
2:37:02	Bravo 1	Command	Communications	Go Ahead

Time	Radio Channel	Unit From	Unit To	Remarks
2:37:05	Bravo 1	Communications	Command	Engine 82 is currently getting the air unit and the MAB and headed that way also can you confirm that [E 51E] was located
2:37:15	Bravo 1	Command	Communications	Yea that's correct, [E 51E] was accounted for by Engine 51
2:37:21	Bravo 1	Communications		Ok I am direct
2:37:22	Bravo 6	115A	Communications	115's on location at Woodscape and _____
2:37:23	Bravo 1	Communications		Channel Marker for MAYDAY
2:37:28	Bravo 1	51D	Command	E-51 Operator to Command
2:37:29	Bravo 6	115A	Howard	and Guilford
2:37:31	Bravo 6	Communications	115A	115 report to the fireground
2:37:32	Bravo 1	Command	51D	51 go ahead
2:37:35	Bravo 1	51D	Command	Hydraulic pump is deployed and activated I have a water source
2:37:43	Bravo 1	Command		51 has water
2:37:52	Bravo 1			Tower 10 and Tower 3 (in back ground) Command go
2:37:58	Bravo 1	Charlie	Command	Charlie Side to Command, Tower 10 is reentering, so I've got Tower 10 and Tower 3 inside working on in the basement

Time	Radio Channel	Unit From	Unit To	Remarks
2:38:00	Alpha 1	FM213	Communications	213, Howard, I'm switching over to Bravo 1, responding on the box
2:38:06	Alpha 1	Communications	FM213	Switch over to Bravo 6 Sir to respond
2:38:09	Bravo 1	Command	Charlie	You've got Tower 10 and Tower 3 in the basement; do they have a line with them?
2:38:17	Bravo 1	Charlie	Command	That is correct
2:38:23	Bravo 1	Command		And what is the status of Truck 7 and 71 the original RIT
2:38:33	Bravo 1	Communications		Channel Marker for MAYDAY
2:38:42	Bravo 1	Charlie		What were the units you were still looking for
2:38:46	Bravo 1	Command		The original RIT was Truck 7 and Engine 71
2:38:53	Bravo 1	Communications		Channel Marker for MAYDAY
2:38:56	Bravo 1	Charlie		I've got the units from 7 both Truck and Engine are on the hand line Tower 10 is in the area as well as uh, Tower 3 is in the area in the search process
2:39:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:39:18	Bravo 1	Command		Battalion 1 Mobile Open Air
2:39:20	Bravo 1	Command		Squad 6 is that you I see on the scene

Time	Radio Channel	Unit From	Unit To	Remarks
2:39:27	Bravo 1	61A	Command	61 three of us down here ones getting dressed coming down to meet us, we are on the alpha side on deck
2:39:39	Bravo 1	Command	61A	Alright squad 6 form up with 91 and 22 and you're going to go to the rear. Squad 6, you're going to have the second, you're going to have the second RIT Truck 6 correction Squad 6 you are now assuming RIT number 2
2:40:00	Bravo 1	61A	Command	ok that's 61, 91, and 22 we are going to be the (third) Second RIT
2:40:12	Bravo 1	Command	61A	Yes, and 91 and 22 have just gone down the delta side in front of you. Those three companies you're going to have as RIT number 2. 22 and 91 are you direct on that
2:40:25	Alpha 1	Tanker 11D	Communications	Tanker 11 to Howard
2:40:29	Alpha 1	Communications	Tanker 11D	Tanker 11
2:40:30	Bravo 1	91A		91 is direct
2:40:32	Alpha 1	Tanker 11D	Communications	Add me to the box on Woodscape. They operating on Bravo 1?
2:40:33	Bravo 1	Communications		Channel Marker for MAYDAY
2:40:35	Bravo 1	Truck 7A	Command	RIT to Command
2:40:36	Alpha 1	Communications	Tanker 11D	You need to operate on Bravo 6

Time	Radio Channel	Unit From	Unit To	Remarks
2:40:40	Alpha 1	Tanker 11D	Communications	Advice Bravo 6
2:40:43	Bravo 1	Communications		Channel Marker for MAYDAY
2:40:44	Alpha 1	Communications	Tanker 11D	That's correct. The May Day is on Bravo 1
2:40:49	Alpha 1	Tanker 11D	Communications	Copy, Bravo 6. I'll be switching over to that
2:40:50	Bravo 1	Truck 7A		Truck 7 A Open Mic
2:40:51	Bravo 1	Truck 7A	Command	RIT to Command
2:40:56	Bravo 1	Command	Truck 7A	Go ahead RIT
2:41:00	Bravo 6	Squad 1A	Communications	Squad 1's on the scene switching over to Bravo 1
2:41:03	Bravo 1	Communications		Channel Marker for MAYDAY
2:41:07	Bravo 6	Communications	Squad 1	Squad 1 direct, advised to report to report to the fireground
2:41:07	Bravo 1	Command	Truck 7A	Go ahead RIT [T 7A], go ahead for command
2:41:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:41:16	Bravo 6	Tanker 11D	Communications	Tanker 11 to Howard on Bravo 6 responding
2:41:22	Bravo 6	Communications	Tanker 11D	Tanker 11 Direct
2:41:23	Bravo 1	Communications		Channel Marker for MAYDAY
2:41:27	Bravo 1	Charlie	Command	Charlie to Command I've got 22 entering now as well

Time	Radio Channel	Unit From	Unit To	Remarks
2:41:35	Bravo 1	Truck 7A		Truck 7A Open Mic
2:41:39	Bravo 1	Command		Charlie Division Engine 22, Engine 91 and 61 were coming to you all part of RIT number 2, RIT number 2 those three units, Command to RIT [T 7A]
2:41:59	Bravo 1	Truck 7A	Command	RIT to Command
2:42:03	Bravo 1	Command	Truck 7A	Go Ahead RIT
2:42:06	Bravo 1	Truck 7A	Command	We've got FF Flynn need EMS to the Charlie Side basement door
2:42:16	Bravo 1	Command	Truck 7A	Alright RIT you have FF Flynn and you're on the Charlie side basement door, EMS-1 are you direct? Division Charlie are you direct
2:42:32	Bravo 1	Command		Battalion 1 Mobile Open Air
2:42:34	Bravo 1	Command	Communications	Command to Howard, Go ahead and give me the evacuation tone, Charlie Division I want all units pulled out, with Flynn found all units pulled out and give me a PAR as soon as you can
2:42:39	Bravo 1	Communications		Go Ahead
2:42:50	Bravo 1	Communications		Evacuations Tone Sounded
2:42:54	Bravo 1	Truck 7B		Open Mic Unrecognizable Truck 7B

Time	Radio Channel	Unit From	Unit To	Remarks
2:42:56	Bravo 1	Communications		Howard to all units evacuate, Howard to all units, evacuate the scene authority of Command 02:43
2:43:13	Bravo 1	Communications		Channel Marker for MAYDAY
2:43:19	Bravo 1	Charlie		Tower 10 is out and PAR
2:43:23	Bravo 1	Command		Tower 10 out and PAR
2:43:33	Bravo 1	Communications		Channel Marker for MAYDAY
2:43:39	Bravo 1	Charlie	Command	Charlie to Command Flynn is out of the building
2:43:44	Bravo 6	AA Truck 29	Communications	Anne Arundel Truck 29 has arrived at Guilford and Woodscape
2:43:48	Bravo 1	Command	Charlie	Charlie I'm direct Flynn is out of the building, and we are evacuating, and I need PAR's on everything that went in
2:43:57	Bravo 6	Communications		Sorry last unit?
2:44:02	Bravo 1	Charlie		Working on it
2:44:05	Bravo 6	Communications		Howard to last unit in transmitted on Bravo 6?
2:44:05	Bravo 1	51A	Command	51 is out and PAR
2:44:10	Bravo 1	Command		51 out and PAR
2:44:10	Bravo 6	AA Truck 29	Communications	Anne Arundel Truck 29 has arrived at Guilford and Woodscape
2:44:13	Bravo 1	Communications		Channel Marker for MAYDAY

Time	Radio Channel	Unit From	Unit To	Remarks
2:44:17	Bravo 6	Communications	AA Truck 29	Ok I'm direct, if you go and report to the fireground and wait for assignment
2:44:23	Bravo 1	Communications		Channel Marker for MAYDAY
2:44:25	Bravo 1	Charlie	Command	Can confirm Tower 7 out and PAR, Tower 3 out and PAR
2:44:27	Bravo 6	AA Truck 29	Communications	Anne Arundel Truck 29 copies
2:44:33	Bravo 1	Command		Charlie is confirming Tower 7 or Truck 7, Tower 3 both out and PAR, what about 71
2:44:36	Bravo 6	AA Engine 21	Communications	Anne Arundel Engine 21's arriving as well
2:44:41	Bravo 1	Charlie	Command	71 is out and PAR, just confirmed
2:44:45	Bravo 6	Communications	AA Engine 21	Direct
2:44:47	Bravo 1	Command	Charlie	71 is out and PAR, and confirming did 22 get into building and do you have 22 out
2:44:59	Bravo 1	Charlie	Command	Yea uh, Stand By
2:45:06	Bravo 1	Charlie	Command	22 is out and PAR
2:45:11	Bravo 1	Command	Charlie	22 is out and PAR, and confirming that you have 61 and 91 on deck there as RIT #2 to the rear and advise on Paramedic 56, the crew of 56 should have been with the Tower 7 on RIT

Time	Radio Channel	Unit From	Unit To	Remarks
2:45:17	Bravo 6	FM202	Communications	FM 202's on the scene switching to bravo
2:45:21	Bravo 2	71A		Mic Click
2:45:21	Bravo 6	Communications	FM202	202
2:45:33	Bravo 1	Communications		Channel Marker for MAYDAY
2:45:36	Bravo 1	51A	Command	51 to command
2:45:40	Bravo 1	Charlie	Command	I can confirm 56 is out of the building, both both members
2:45:46	Bravo 1	Command		Ok I just got a PAR on 56, 56 is out of the out of the hot zone and PAR
2:45:57	Bravo 1	Charlie		I am PAR with Squad 6 and I am PAR with 91 believe that is all the units out of the building
2:46:09	Bravo 1	Command		that should have been 61 not squad 6, 61, [E 61A] that crew is PAR
2:46:16	Bravo 1	Charlie		Yea I got [E 61A]
2:46:20	Bravo 1	51A	Command	51 to command
2:46:24	Bravo 1	Command	51A	51 go ahead
2:46:27	Bravo 1	51A	Command	Charlie side garage side we have heavy black smoke coming out of the second floor
2:46:36	Bravo 1	Command		That’s correct, all units on the fireground, units are PAR, we are going

Time	Radio Channel	Unit From	Unit To	Remarks
				to commit to a defensive strategy, defensive strategy
2:46:53	Bravo 4	EMS-1	Command	EMS-1 to command send me a second ALS provider from the scene to the back of 105
2:46:53	Bravo 1	Communications		Channel Marker for MAYDAY
2:46:54	Bravo 1	Command		Open Mic Battalion 1 Mobile
2:46:59	Bravo 1	Charlie		Open Mic Battalion 2 portable no verbal
2:47:03	Bravo 1	Communications		Channel Marker for MAYDAY
2:47:13	Bravo 1	Command	Charlie	Alright Charlie Division confirm that you are direct that we are defensive, we are now defensive
2:47:25	Bravo 1	Charlie		That's correct all units are out and I am starting to clear the area that we're currently operating in
2:47:47	Bravo 1	Command	111A	Command to Engine 111, Engine 111 [E 111A]
2:47:53	Bravo 1	111A	Command	111
2:47:56	Bravo 1	Command	111A	Confirming you are PAR and your location
2:48:02	Bravo 1	111A	Command	My operator is at the rig, I going to make my way down, meet up with my fire fighter

Time	Radio Channel	Unit From	Unit To	Remarks
2:48:09	Bravo 1	111B		Fire fighter off of 111 is with 105
2:49:00	Bravo 4	EMS-1	Command	EMS-1 to Command
2:48:13	Bravo 1	Command		Ok I'm direct fire fighter from 111 is with 105 that is fire fighter [E 111B] and the Lieutenant is on his way down
2:49:23	Bravo 1	Command		Open Air Battalion 1 Mobile
2:49:24	Bravo 1	Command	Communications	Command to Howard, go ahead and transmit me a third alarm, and have them stage at Guilford Road and Woodscape.
2:49:29	Bravo 1	Communications		Go Ahead
2:49:44	Bravo 1	Communications		I've got third alarm staged Guilford and Woodscape
2:50:35	Alpha 1	Communications		Upgrading Box Alarm 5-62 (Tanker 11)
2:50:36	Bravo 6	Tanker 11D	Communications	Tanker 11
2:50:37	Bravo 1	Chief 5A	Command	5A to Command
2:50:39	Alpha 1	Communications		Alarm 3 - On call HR, on call PIO, On Call FI, On Call Battalion Chief, On Call Safety, Prince George Engine 849, Montgomery Engine 17, Anne Arundel Engine 273, On Call Deputy Chief to respond, 7005 Woodscape Drive for 3rd Alarm. Operate on Bravo 6, Bravo 6 at 02:51:00

Time	Radio Channel	Unit From	Unit To	Remarks
2:50:44	Bravo 6	Communications	Tanker 11D	Tanker 11
2:50:45	Bravo 1	Command		Unit calling Command
2:50:47	Bravo 6	Tanker 11D		Tanker 11 at the staging area at Guilford and Woodscape
2:50:48	Bravo 1	Chief 5A	Command	Chief 5A
2:50:58	Bravo 1	Command		Unit calling command you'll have to repeat
2:51:03	Bravo 1	Chief 5A	Command	Chief 5A to Command
2:51:03	Bravo 6	Communications	Tanker 11 D	Tanker 11 that’s correct
2:51:07	Bravo 6	MAB 13		MAB 13 enroute
2:51:08	Bravo 1	Command	Chief 5A	5A go ahead
2:51:10	Bravo 1	Chief 5A	Command	I suggest all crews on Charlie that dealt with the removal uh get uh return to the front for rehab; You've got a third alarm now correct?
2:51:12	Bravo 6	Communications	MAB 13	MAB 13
2:51:15	Bravo 6	MAB 13	Communications	MAB 13 is enroute with three personnel. Air Unit 17 is responding with one. Where is the staging area?
2:51:18	Alpha 1	Deputy Chief 3	Communications	Deputy Chief 3 to Howard, I'm enroute to the 5 Incident
2:51:19	Bravo 1	Command		That is correct

Time	Radio Channel	Unit From	Unit To	Remarks
2:51:23	Bravo 6	Communications	MAB 13	The staging area will be Guilford Road and Woodscape Drive
2:51:24	Bravo 1	Chief 5A		And I am on side Charlie at this time as well
2:51:26	Alpha 1	Communications	Deputy Chief 3	Deputy Chief 3, I'm direct Sir
2:51:29	Bravo 6	MAB 13	Communications	MAB 13's direct Woodscape Road and Guilford
2:51:31	Bravo 1	Command	Charlie	Command to Division Charlie
2:51:39	Bravo 1	Charlie	Command	Charlie go ahead
2:51:44	Bravo 1	Command	Charlie	Alright so you should now have 22, 91, and 61 with you and making a plan for defensive operations
2:51:56	Bravo 1	Charlie	Command	I have those units with me, basically we are just trying to make sense of whatever is going on back here as far as uh getting stuff out of the way we have not yet put a plan into uh, action as to how we are going to defensively operate here
2:52:07	Bravo 6	BUC 2	communications	Bureau Chief 2's on location
2:52:11	Bravo 6	Communications	BUC 2	Bureau Chief 2 Direct
2:52:17	Bravo 1	Command	Charlie	Very well you have those three units and you are the Charlie Division

Time	Radio Channel	Unit From	Unit To	Remarks
2:52:23	Bravo 1	Charlie	Command	I also have the units from 7 who are not working they are taking a blow, and they're well out of the way
2:52:34	Bravo 1	Command	Charlie	Very well, get them up here for for recycle
2:53:35	Bravo 1	111A	Command	Engine 111 to Command
2:53:42	Bravo 1	Command	111A	111
2:53:45	Bravo 1	111A	Command	Roadway is clear of hose and 105 is pulling out now, I, I've got [P 56A] from 56 driving 105
2:53:52	Bravo 1	Command	111A	Okay so you've got 56's medic driving 105
2:54:17	Bravo 1	B Chief 2	Command	Bureau Chief 2 to command do you want me on the scene, or do you want me to go to 105's destination?
2:54:26	Bravo 1	Command	B Chief 2	Go to 105's destination
2:54:30	Bravo 1	B Chief 2	Command	Howard County?
2:54:33	Bravo 1	Command	B Chief 2	That's correct
2:54:36	Bravo 1	B Chief 2	Command	Direct
2:54:40	Bravo 1	Charlie	Command	Charlie to Command
2:54:43	Bravo 1	Command	Charlie	Go Ahead Charlie

Time	Radio Channel	Unit From	Unit To	Remarks
2:54:46	Bravo 1	Charlie	Command	I transitioned Charlie Op's over to Chief 5 A; he's going to be coming up with a plan for defensive operations
2:55:00	Bravo 1	Command	Charlie	Very good, 5A now has Charlie Division and he has 61, 22, and 91
2:55:29	Bravo 1	Charlie	Command	Charlie to Command
2:55:33	Bravo 1	Command	Charlie	Charlie go ahead
2:55:36	Bravo 1	Charlie	Command	At this we are opening up windows on the Charlie side putting water on the fire from the exterior only, all crews accounted for
2:55:45	Bravo 1	Command	Charlie	Charlie you are opening up, all crews are accounted for, operating from the exterior
2:56:03	Bravo 1	51A	Charlie	51 to Charlie
2:56:08	Bravo 1	Charlie	101D and 51A	Stand by 1 second, 101 can you charge the green 300 foot, go ahead 51
2:56:13	Bravo 6	FM200	Communications	FM 200 has arrived
2:56:15	Bravo 1	51A	Charlie	Be advised the 300 is inside the building it is burned out, it's flowing water somewhere we also have visible smoke or visible fire coming out the doorway where we were
2:56:22	Bravo 6	Communications	FM200	FM 200 I'm direct

Time	Radio Channel	Unit From	Unit To	Remarks
2:56:29	Bravo 1	Charlie	51A	Ok you are no longer on side Charlie correct
2:56:32	Bravo 1			Open Air
2:56:35	Bravo 1	51A	Charlie	Side Charlie, we are at the garage doors
2:56:38	Bravo 1	Chief 5A	51A	Ok, have your operator shut that bad line down, we've got 101's line charged on side Charlie, go ahead and deal with that fire from the exterior if you with another line
2:56:40	Bravo 6	AA Engine 27	Communications	Anne Arundel Engine 27 with three
2:56:45	Bravo 6	Communications	AA Engine 27	Anne Arundel Engine 27 direct. Staging area will be Guilford Road at Woodscape Drive
2:56:49	Bravo 1	51A		Copy
2:56:51	Bravo 6	AA Engine 27	Communications	OK
2:56:52	Bravo 1	51A		Trying to find out what line who's got what
2:56:57	Bravo 1	Chief 5A		Ok we just charged 101's green line. I think it’s a 300 foot to the rear on Charlie
2:56:57	Bravo 6	PG Engine 810	Communications	PG 810 with five

Time	Radio Channel	Unit From	Unit To	Remarks
2:57:01	Bravo 6	Communications	PG Engine 810 C	PG Engine 810 C direct. The staging area is on Guilford Road at Woodscape Drive
2:57:03	Bravo 1	Chief 5A		Putting water on the fire at this time
2:57:08	Bravo 1	Charlie	Command	Charlie to Command
2:57:08	Bravo 6	PG Engine 810C	Communications	Can you repeat the staging area
2:57:11	Bravo 1	Command	Charlie	Charlie go ahead
2:57:12	Bravo 6	Communications	PG 810C	It will be Guilford Road and Woodscape Drive at the intersection
2:57:15	Bravo 1	Charlie	Command	Just making triple sure are PAR on all units prior to recommencing correct
2:57:19	Bravo 6	PG Engine 810C	Communications	Engine 810's okay
2:57:23	Bravo 1	Command	Charlie	Yes, that is correct we are going to start over again on a new PAR
2:57:35	Bravo 1	Command	51A	Command to Engine 51 confirming you are PAR
2:57:35	Bravo 3	61B		Incomprehensible sounds
2:57:42	Bravo 1	51A	Command	51 is PAR
2:57:46	Bravo 6	P Engine 715	Communications	Paramedic Engine 715 with four
2:57:48	Bravo 1	Command		51 you are PAR
2:57:51	Bravo 6	Communications	PE 715	Paramedic Engine 715 Direct
2:58:01	Bravo 1	Command	101A	Command to 101 Officer
2:58:07	Bravo 1	Command		I have a verbal on 101 Officer

Time	Radio Channel	Unit From	Unit To	Remarks
2:58:14	Bravo 1	Command	71A	Command to Engine 71
2:58:20	Bravo 1	Charlie	Command	Charlie to Command Urgent
2:58:23	Bravo 1	Command	Charlie	Go ahead Charlie
2:58:26	Bravo 1	Charlie	Command	I have one walking wounded [E 61C] fell about 8 feet off of a deck, need EMS care around front he's walking around now
2:58:10	Bravo 1	Command	Tower 2A	Very Well, Command to Tower 2, Tower 2 can you handle that
2:58:21	Bravo 2	71A		Engine
2:58:22	Bravo 2	71A	Command	71 to Command
2:58:48	Bravo 1	Charlie	Command	They are walking around to your vehicle know also I need a ground ladder to side Charlie right away
2:58:56	Bravo 1	BC 1 Mobile		We're going to get an ambulance down here right
2:59:08	Bravo 1	Charlie		Charlie to command or 51, you just shut a line down that we still need, go ahead and recharge please on a hand line
2:59:15	Bravo 1	Charlie		1 3/4
2:59:20	Bravo 1	51D		It's charged
2:59:23	Bravo 1	Charlie	51D	Copy thanks

Time	Radio Channel	Unit From	Unit To	Remarks
2:59:30	Bravo 1	Command	Charlie	Command to Charlie Division, I am sending you Anne Arundel 21 and Anne Arundel 29, combined group coming to you with a ladder
2:59:44	Bravo 1	Charlie		I copy, all units coming to Charlie be aware also there is a pool within about 20 feet of the house be sure not to fall into the pool
2:59:55	Bravo 1	51A	Command	51 to Command, we have a ladder coming to you
3:00:00	Bravo 1	Charlie		I'm direct we could also use some more lights around here
3:00:05	Bravo 1	51A	Charlie	Copy I'll see what we can work out
3:00:10	Bravo 1	Command	71A	Command to engine 71 Confirm your PAR
3:00:18	Bravo 1	71A	Command	Engine 71 is PAR and out of the structure on side Charlie
3:00:24	Bravo 1	Command	Truck 7A	Command to Truck 7 confirm your PAR
3:00:31	Bravo 1	71A	Command	71 for Truck 7 got a PAR on side Charlie
3:00:38	Bravo 1	Command		Command is direct on Truck 7 PAR, Command to Tower 10 Tower 10
3:00:50	Bravo 1	Tower 10A	Command	Tower 10
3:00:54	Bravo 1	Command	Tower 10	Tower 10 are you PAR and out
3:00:58	Bravo 1	Tower 10A	Command	PAR out on side Delta rehabbing

Time	Radio Channel	Unit From	Unit To	Remarks
3:01:03	Bravo 1	Command	111A	Very good, Command to Engine 111, Engine 111 PAR
3:01:12	Bravo 1	111A	Command	Engine 111
3:01:17	Bravo 1	Command	111A	Engine 111 is your crew PAR
3:01:22	Bravo 1	111A	Command	That's correct it is myself and [P 115D], my paramedic went on 105, my fire fighter went on 105
3:01:31	Bravo 1	BC 1 Mobile		Open Air
3:01:35	Bravo 1	Command	111A	Very good and the fire fighter was [E 111B], [E 111B] went 105
3:01:41	Bravo 1	111A	Command	That's correct [E 111B] and [P 115A] are gone
3:02:32	Bravo 1	Command	Communications	Command to Howard, confirming the Ambulance 56 and 105 are my only two EMS units, if that's correct give me a third
3:02:45	Bravo 1	Communications	Command	No, you should have 115 there also
3:02:49	Bravo 1	Command	Communications	Ah, I have already committed 115 also, Give me an additional transport unit
3:02:54	Bravo 1	Communications	Command	Direct
3:02:59	Bravo 1	Command		Unit calling, Go ahead
3:03:10	Bravo 1	51A	Charlie	51 to Charlie
3:03:16	Bravo 1	Charlie		Charlie, go ahead

Time	Radio Channel	Unit From	Unit To	Remarks
3:03:19	Bravo 1	51A	Charlie	Fire fighter [E 51E] twisted his ankle I'm going to need EMS back here, he can't put weight on it.
3:03:29	Bravo 1	Charlie	51A	Ok where is he located and advise command
3:03:36	Bravo 1	51A		He's up here on the wall by Engine 51
3:03:43	Bravo 1	Charlie	Command	Charlie to Command are you direct, another injured
3:03:48	Bravo 1	Command	Charlie	Command to Charlie, was that uh [E 51E] from Engine 51
3:03:59	Bravo 1	Charlie	Command	That's correct [E 51E] twisted ankle apparently sitting on a retaining wall now near Engine 51, needs EMS
3:04:09	Bravo 1	Command		Very well
3:04:14	Bravo 1	Charlie	Command	Update side Charlie is opened up by windows and all access from outside, no fire fighters in the structure, putting water on the fire that we can see
3:04:25	Bravo 1	51A	Command	51 to Command, [E 51E] is being helped to side Alpha
3:04:34	Bravo 1	Command	51A	Very well, 51 [E 51E] is being helped to side Alpha and I believe the other injured fire fighter, Tower 2, can you make a connection between [E 51E]

Time	Radio Channel	Unit From	Unit To	Remarks
				and [E 61C], get them both in the same spot receiving care
3:04:52	Bravo 6	Communications		Howard to all units on Bravo 6, Bravo 6, will not be monitored. Bravo 6 will not be monitored go to Alpha 2 if you need anything, Alpha 2 if you need anything. We have another incident
3:04:55	Bravo 1	Tower 2	Command	Tower 2 is ok
3:04:58	Bravo 1	Safety	Command	I have [E 61C] with me at my buggy, suggest maybe get second safety officer here
3:05:08	Bravo 1	Command		Very well
3:05:13	Bravo 1	Communications	Command	Howard to Command
3:05:17	Bravo 1	Command	Communications	Go ahead, Command
3:05:21	Bravo 1	Communications	Command	Just letting you know we are not monitoring Bravo 6 however all the units there are direct we have another smoke inside an assisted living, they're going to be on Charlie
3:05:32	Bravo 1	Command	Communications	You advised units from third alarm are in staging and you have another incident operating on Charlie

Time	Radio Channel	Unit From	Unit To	Remarks
3:05:41	Bravo 1	Communications	Command	That’s right we can't monitor Bravo 6 but they're direct
3:05:45	Bravo 1	Command		Very well have those units have those units report to the Alpha side and go on deck, they can report first arriving can report to me and tell me who've they got
3:06:04	Bravo 1	Communications		Direct
3:06:07	Bravo 6	Communications		Howard to all units Staging on Bravo 6 you can move to the Alpha side, correction, The Alpha side then report to Bravo 1, Command on Bravo 1
3:06:16	Bravo 1	Charlie	Command	Charlie to Command
3:06:32	Bravo 1	Charlie	Command	Charlie to Command
3:06:35	Bravo 1	Command	Charlie	Charlie go ahead
3:06:39	Bravo 1	Charlie	Command	We'll be switching out the crews from company 2 and company 6 with Tower 3 and 91. Anne Arundel’s crew will remain on deck on side Charlie monitoring the ladders and third line for back up still exterior operation
3:07:50	Bravo 1	Charlie	Command	Charlie to Command

Appendix D: PPE Examination Report

Examination of Selected PPE Worn by Lieutenant Nathan Flynn
During July 23, 2018 Structure Fire at
7005 Woodscape Drive, Clarksville, MD

Prepared for:
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31 October 2018

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Examination of Selected PPE Worn by Lieutenant Nathan Flynn During July 23, 2018 Structure Fire at 7005 Woodscape Drive, Clarksville, MD

October 31, 2018

Summary

This report describes my examination of selected personal protective equipment items worn by Lieutenant Nathan Flynn who died as a result of injuries in sustained in a structure fire at 7005 Woodscape Drive, Clarksville, MD on July 23, 2018. A review was conducted for the condition of the PPE items that were provided for examination and other information provided by the Howard County Department of Fire and Rescue Services.

In general, Lieutenant Flynn was part of an entry team into the burning structure and fell through the entry level floor into a large basement crawlspace area where he remained for approximately 22 minutes before he was extricated by the department Rapid Intervention Team. No other specific details are provided for the incident in this report. Instead, a detailed narrative is available from the Howard County Department of Fire and Rescue Services.

For the purposes of this examination, the protective helmet, protective hood, protective coat, protective pants, left protective glove, and protective footwear were provided for examination. The right protective glove was not recovered from the fireground and the SCBA was subjected to a separate evaluation by the National Institute for Occupational Safety and Health. The examined items were subjected to a rigorous visual inspection on all surfaces of the clothing items to assess how the specific areas of damage might be related to the protective qualities of the respective items. The protective garments (coat and pants) were further examined for their compliance with the purchase specifications for the Howard County Department of Fire and Rescue Services. The elements most affected included the protective helmet and protective coat. Significant thermal degradation was observed for the protective helmet while there was significant heat penetration on parts of the protective coat primarily in the left back shoulder and lower left back side. Thermal damage was noted for other clothing elements including the back of the protective pants, left glove, and both boots. The helmet was significantly affected by the fire exposure.

No specific defects or issues were found with the quality of the examined clothing items that could be considered as contributing to the adverse injuries sustained by Lieutenant Flynn. All clothing items were found to meet the relevant edition of NFPA 1971 at the time of their manufacture with the exception of the hood, for which the product label was missing. The coat and pants had all of the requisite features and materials as indicated on the purchase specification. Nevertheless, these items were not originally issued to Lieutenant Flynn. Both the protective helmet and the protective footwear had dates of manufacturing that are more than 10 years relative to the fire incident. These items should have been retired from service but would have not affected the protection levels afforded to Lieutenant Flynn. It further appears that the protective coat collar was not worn in its deployed position and the hood was altered to connect to the coat collar; however, these factors also did not likely exacerbate any exposure conditions to Lieutenant Flynn.

Objective

I was asked by the Howard County Department of Fire and Rescue Services to determine if there were any defects or other factors related to the personal protective equipment items worn by Lieutenant Nathan Flynn that may have contributed to his injuries sustained while engaged in a structural fire that ultimately led to his death.

Overview of the Incident

A complete description of the incident is provided in a separate report being prepared by the Howard County Department of Fire and Rescue Services. For the purposes of this report, Lieutenant Flynn was part of an entry team where upon after advancing into the structure fell through the entry level floor into a large basement crawlspace area. Approximately 22 minutes elapsed from the time that Lieutenant Flynn fell into the basement until the time he was extricated by the Rapid Intervention Team. The residential structure at 7005 Woodscape Drive, Clarksville, MD on July 23, 2018 was described as a relatively large, custom-built, multi-floored mansion. A photograph of the fire operations at this location pulled from local new media appears in Figure 1.



Figure 1 – Photograph of Structure During Fire Operations

Specific Description of Firefighter Injuries or Cause of Death

At the time this report was prepared, no specific information was provided regarding any burn areas for the subject firefighter or the cause of his death. This information is being separately provided by the Howard County Department of Fire and Rescue Services.

Methodology Used in Evaluation

The primary approach in evaluating the provided items of personal protective equipment (PPE) was through a detailed inspection. Clothing and equipment were specifically evaluated for:

- Compliance with the relevant editions of NFPA 1971 standards at the time the item was indicated as being manufactured
- Conformity of the product design to the relevant design requirements of NFPA 1971
- Adherence to the Howard County Department of Fire and Rescue Services specifications (protective garments only)
- The general condition of the clothing in terms of its levels of soiling and wear
- Specific areas of physical damage and contamination
- The types, location, and severity of the thermal damage of the clothing
- Evidence of how the clothing item was worn and exposed
- Indications of prior care and maintenance

Knowledge of the general thermal environment conditions faced by the respective firefighters is used to assist in the characterization of the thermal damage sustained by the clothing. Particular attention is generally given to examining areas of the clothing or equipment that covered or was adjacent to known areas of personal injury. For this incident, specific locations of burn injury were not provided. Patterns of soiling and damage may be indicative of whether the clothing or equipment item was properly worn.

Observations for the types of damage found on different parts of the clothing and equipment items can provide clues as to the severity of the thermal exposures encountered by the respective firefighter. Many materials provide thermal signatures, i.e., telltale signs of specific damage that can be linked to certain exposure temperature or energies. For example, some dyed outer shell materials are known to release the dye through a process call dye sublimination (evaporation of the dye chemicals) at known temperatures. In addition, particular components of the clothing, such as trim, will tend to degrade at lower temperatures than the base materials used in the clothing's construction.

Where possible, assessments are made on interior layers and surfaces to determine the level of heat penetration that can be used to assess the propensity of heat transfer that can lead to burn injury. The relative susceptibility of each clothing or equipment layer and component is taken into account for judging the overall exposure levels and determining how the clothing or equipment item performed in the exposure environment.

The Fireground Environment and its Effects on the Protective Clothing

One approach to analyze the burn injuries to the respective firefighters and the damage to their protective clothing is to examine industry information that shows the range of fireground conditions that can be experienced and relate these conditions to the types of damage that can occur to clothing and equipment. The relationship between increasing thermal radiation (expressed in cal/cm^{2}s) and the resulting rise in air temperature (expressed in degrees Celsius and degrees Fahrenheit) is presented in the figure below. Possible structural fire fighting situations are illustrated in this figure:[1,2]

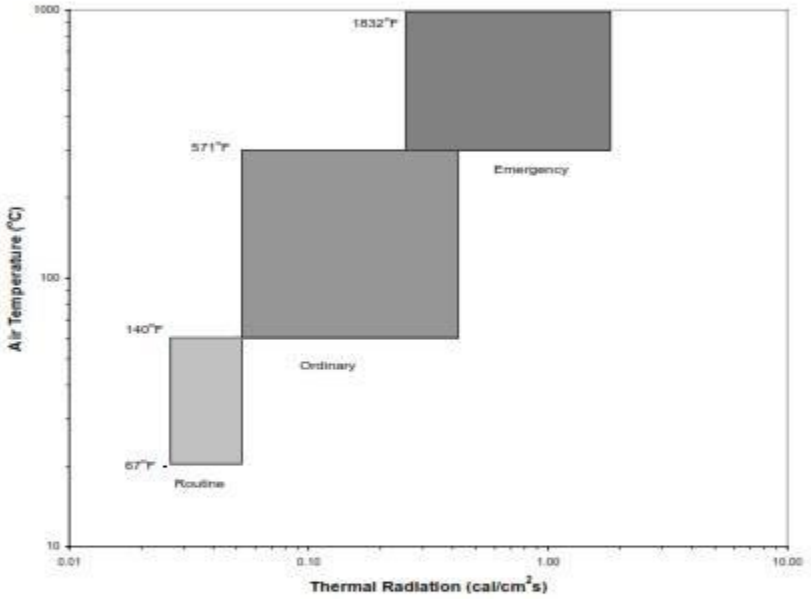


Figure 2 – Classification of Fireground Exposures

- The ***Routine*** region describes conditions where one or two objects, such as a bed or waste basket, are burning in a room. The thermal radiation and the air temperatures are virtually the same as those encountered on a hot summer day. As shown in Figure 17, ***Routine*** conditions are accompanied by a thermal radiation range of 0.025 to 0.05 cal/cm^{2}s and by air temperatures ranging from 68 to 140°F. Protective clothing for firefighters typically provides protection for tens of minutes under these conditions, but excessively long exposure times may still create a burn injury situation.

[1]N. J. Abbott and S. Schulman, "Protection from Fire: Nonflammable Fabrics and Coatings, *Journal of Coated Fabrics*, Vol. 6, July 1976, pp. 48-64.

[2]H. P. Utech, "High Temperatures vs. Fire Equipment," *International Fire Chief*, Vol. 39, 1973, pp. 26-27.

- The ***Ordinary*** region describes temperatures encountered in fighting a more serious fire or being next to a "flash-over" room. ***Ordinary*** conditions are defined by a thermal range of 0.05 to 0.6 cal/cm^{2}s, representing an air temperature range of 140 to 571°F. Under these conditions, protective clothing may allow sufficient time to extinguish the fire or to fight the fire until the nominal air supply is exhausted (usually at periods limited to several to tens of minutes).

- The ***Emergency*** region describes conditions in a severe and unusual exposure, such as those caused inside a "flash-over" room or next to a flame front. In ***Emergency*** conditions, the thermal load exceeds 0.6 cal/cm^{2}s and temperatures exceed 571°F. In such conditions, the function of firefighters' clothing and equipment is simply to provide protection during the short time needed for an escape without serious injury.

The specific fireground conditions have not been described for this incident. However, the fire was described as a multi-alarm requiring several hours to bring under control. There was also an extended period of time that occurred, estimated to be approximately 22 minutes, for the department Rapid Intervention Team to enter the structure and to extricate Lieutenant Flynn. This information suggests that a wide range of fireground conditions that likely existed at high ordinary to low emergency conditions for at least part of the time for which Lieutenant Flynn was in the basement.

Identification and Examination of PPE Items Worn by Deceased Firefighter

The following personal protective equipment (PPE) items worn by Lieutenant Flynn were provided for examination:

- Protective coat
- Protective trousers
- Protective helmet
- Protective hood
- Left protective glove
- Protective footwear

The right protective glove was not recovered. Further it was reported that the left protective glove was recovered inside the structure after the incident and had come off during the extrication of Lieutenant Flynn. Similarly, the left boot had come off during Lieutenant's Flynn's extrication and was recovered after the incident.

It was reported that the protective garments, including coat and pants, were issued to other firefighters by the Howard County Department of Fire and Rescue Services prior to the items being issued to Lieutenant Flynn. The protective coat was originally manufactured in 2014 for another firefighter, but did not fit the firefighter. The protective coat was reissued to Lieutenant Flynn in a new condition on 4 October 2016. Similarly, the protective pants were originally manufactured in 2014 for a different firefighter and were reissued to Lieutenant Flynn on 4 October 2016. The pants were sent for cleaning on 3 November 2015. There were no other cleaning records available for this item.

Table 1 provides an overview of the different PPE items worn by Lieutenant Flynn. This table provides identifying information on each PPE item and the general observations for the condition of each item as provided to International Personnel Protection for examination. Each item was subjected to full inspection and was extensively photographed to show its overall condition.

Table 1 – Specific Identification and Condition of PPE Items for Lieutenant Flynn

PPE Item	Identifying Information	Observed Conditions
Protective coat	Manufacturer: Honeywell Model: LTO15I3TG Serial: 1404010275 Date of Mfr.: 5/22/2014 Size: Chest 42; Front 27; Back 33; Sleeve 33 ("Measured for Norman") Outer shell: Omi Vantage – 7.8 oz. Moisture Barrier: Crosstech Black Type 2F – 4.7 oz Thermal Barrier: Synergy II – 7.0 oz. Certification: NFPA 1971-2013 Dear Air Panels internal liner reinforcements on shoulders and lower arms. Articulating Drag Rescue Device Hook and pile front closure with hooks and dee hardware	• Cut open along sleeves and collar • Severe charring with break open on upper back left shoulder and left lower side through tail • Disintegration of lettering on left back; severe damage to trim bands on sleeves • Charring of department patch on left sleeve • Charring to liner at upper left back shows heat penetration through all layers • Examination through inspection port shows some melting of moisture barrier and seams in lower upper back area • DRD shows no signs of deployment
Protective pants	Manufacturer: Honeywell Model: LTO15I3PG Serial No. 1312006002 Date of Mfg.: 7/12/2016 Size: Waist 38; Inseam 30 ("Measured for Hand") Outer shell: Omi Vantage – 7.8 oz. Moisture Barrier: Crosstech Black Type 2F – 4.7 oz Thermal Barrier: Synergy II – 7.0 oz. Certification: NFPA 1971-2013 Written by hand next to product label: Hand, John 3971, 05/14 Biflex heat channel knee reinforcements Hook and pile front fly with hood and dee hardware	• Significant thermal damage on back left side in seat area at back pocket and lower back leg; lesser damage to back of right leg • Char marks on lower back right leg • Deterioration of trim band at back of lower leg; minor thermal damage to trim band at back of right leg • Molten residue on middle of left knee reinforcement • Charring on moisture barrier side of liner on upper and lower back leg; char marks appears on lower right leg • Examination through inspection port shows discoloration of moisture barrier film on upper and lower legs area; also charring of batting side of moisture barrier in seat area

PPE Item	Identifying Information	Observed Conditions
Protective helmet	Manufacturer: Cairns Model: N6A Houston Helmet Shop Order: 101243173 Order: 2441126 Sequence Count: 60-1 Color: 33 Yellow Size: Medium Ear Flap: L955B (Nomex) Chin Strap: PC893 Eye Protection: S550 Liner: LK2 B Model Weight: 77 oz. Misc: 43884 Customer: 300827 Date of Mfg: 6/18/2007 Certification: NFPA 1971-2007 Shell/interior materials: Leather over Lexan outer dome, high temperature urethane foam and with ABS inner liner	• Helmet has significant thermal damage and warping over entire shell and brim • Entire helmet is blackened with thermal degradation of exterior shell surface including underside of front/rear brims • No evidence of reflective markings being present • Deterioration of brim edges with shrinkage away from wire frames • Front shield warped/distorted • Ear covers severely soiled on exterior with moderate interior soiling • Distortion of end of chin strap
Protective hood	Manufacturer: Unknown Model: Unknown Date of Mfg.: Unknown Lot No.: Unknown Material: 100% Nomex or Nomex blend likely Certification: Unknown	• Heavy soiling on front of hood around face opening and majority of front bib and back area above back bib • Likely blood stains on front of hood bib area • Four holes punched in back hood bib corresponding to coat collar snap locations
Protective glove (left only)	Manufacturer: Shanghai Hygloves Company Model No. 7877 Date of Mfg.: 64/2017 Size: Large Shell: Goatskin, Kevlar, Cowhide Moisture Barrier: Polyurethane Lining: Kevlar knit Gauntlet style Certification: NFPA 1971-2013	• Heavy soiling over entire exterior surface of glove including splotchy white material • Likely shrinkage for glove, though new glove unavailable for comparison • Moderate to heavy soiling inside glove on liner including fibrous debris • Some liner tearing inside glove

PPE Item	Identifying Information	Observed Conditions
Protective footwear	Manufacturer: Honeywell Model: 3009 Size 9.5 D Style: 4N30002C Serial No. WP310274034 (right) Left boot serial number unreadable Leather outer Crosstech Cambrelle bootie package with Kevlar exterior reinforcement under leather Certification: NFPA 1971-2000	• Significant difference in appearance between left and right boots • Left boot shows light soiling on surface of leather, burnt away leather on front toe and separation of outer sole from midsole at heel • Right boot was recovered from fireground after incident and exhibits shrinkage and distortion of upper, white blotchy soiling over most of exterior and debris inside boot

Photographs for each item are presented in Appendix A of this report and are referred to in the following narrative describing the clothing and equipment's condition starting with the protective helmet.

Protective Helmet. The protective helmet worn by the Lieutenant Flynn showed extensive thermal damage. The helmet was of a leather construction and the top, front, rear, left, and right views (Figures A-1 through A-5) show that the entire surface was blackened and distorted with significant degradation and shrinkage of the leather, particularly along the front and left back brim areas. For example, Figure A-2 displays a darkened and distorted shield along with separation of the front brim from the underlying wire rim. Damage to the back brim of the helmet is shown in Figures A-3 and A-4. Figure A-6 provides a view of the underlying brim showing equal levels of damage and distortion of leather surfaces. This view also shows the severe soiling and charring of the extended helmet ear covers. The interior side of the ear covers shows the knit lining material is less soiled and includes some molten residue towards the front as seen in Figure A-7. A close-up of the charring on the back brim is provided in Figure A-8, which also depicts the inability to read the warning label. Product label information seen through the helmet suspension is shown in Figure A-9. It is noted that the helmet was manufactured in June 2007 (over 10 years old as of the accident date). The certification label provided in Figure A-10 shows that the helmet was certified to the 2007 edition of NFPA 1971.

Protective Hood. Photographs for the front and back of the protective hood are provided in Figures A-11 and A-12. However, there was no product label present in the hood and no way to identify its manufacturer, model number or style name, date of manufacture, or certification. The hood appears to be a 2-ply 100% Nomex or Nomex blend knit. The pictures of the hood show moderate to heavy soiling with the heaviest soiling around the face opening and on the front of the bib. The latter suggests that the front hood bib was either worn out, or pulled out sometime during the time that Lieutenant Flynn was on the fireground. There are also some reddish brown spots on the left side of the hood bib, which could be dried blood. The soiling pattern on the back of the hood (Figure A-12) extended from below the helmet to a series of four holes in a circular arc on the back of the hood. Soiling was heaviest towards the left side. Information from the department conveyed that the holes were likely the result of intentional modification of the hood

to allow the hood to be snapped into the coat liner at the back of the hood. It was explained that this practice was used by some firefighters in the department to help secure the back of the hood inside the coat. Figure A-3 shows the protective hood inverted and includes a view of the hood opening area showing some moderate soiling and light charring that penetrated the left side (appearing on the right side in the photograph). Figure A-14 is a photograph of the lower left side of the hood bib interior, which shows "Flynn 3633" below a couple of apparent dried blood spots, indicating that this item had been issued to Lieutenant Flynn.

Protective Coat Shell. Figures A-15 and A-16 provide front and back views of exterior side for the Lieutenant Flynn's protective coat outer shell. The coat outer shell was actually cut along the length of the sleeves and shoulder. Nevertheless, the coat was positioned together for the photographs as if the coat was still intact. The greatest damage of the coat appears on the left side and particularly at the upper left back shoulder and lower left back side. Both sleeves are heavily soiled, more than much of the other parts of the outer shell. Figures A-17 and A-18 further show damage to the offset trim bands near the sleeve ends, primarily on the back of the sleeves. Figure A-19 provides a close-up of the deteriorated department patch on the left upper sleeve. The extensive charring and break open of the outer shell at the upper left back shoulder area are shown in Figure A-20. This picture also shows missing lettering on the left back of the coat that likely burned away. Similar severe damage is show on the lower left side of coat next to the left bottom cargo pocket in Figure A-21. The photograph in Figure A-22 shows the pull tab for the coat drag rescue device (DRD) in place, indicating that it was not deployed during the extrication of Lieutenant Flynn from the fireground.

Figure A-23 shows the entire interior view of the protective coat outer shell. The ability for observing charring is best illustrated with this photograph since charring will usually penetrate through the entire outer shell layer whereas soiling generally does not. This charring is most evident in the upper left back and shoulder as well as the lower left side on the back coat tail area. A close-up of this damage is shown in Figures A-24 and A-25. The interior side of the collar is shown in Figure A-26, which shows heavy soiling and suggests that the collar was not in the required raised orientation during the fire event. The coat outer shell product identification label appears on the right closure facing material in Figure A-27.

Protective Coat Liner. Photographs of the moisture barrier and thermal barrier sides of the protective coat lining are provided in Figures A-28 and A-29. These photographs show the extreme heat penetration at the left upper shoulder and back areas of the protective coat. Close-up views of the damaged areas at the back on the moisture barrier side (Figure A-30) and corresponding areas on the thermal barrier layer facing the Lieutenant Flynn (A-31) indicate heat penetration through all 3 principal layers of the protective coat. Figure A-31 further shows a close-up of melting for the moisture barrier film and seam tapes in the same upper back shoulder area as found inside the liner. Additional insulation designed into the coat in for form of sewn on strips (referred to as "dead air panels" by Honeywell) is present at the upper back along both shoulders and over the upper and lower arms as shown in Figures A-33 and A-34. An elbow insulation layer is also present. Figure A-32 shows some light charring near the shoulder area on the left side of the garment at the interior batting. Product labels appear in Figure A-35 with a close-up of the product compliance label in Figure A-36 (NFPA 1971-2013). The product label indicates that the coat was measured for "Norman."

Protective Pants Shell. The front and back of the exterior side of outer shell for Lieutenant Flynn's protective pants are shown in Figures A-37 and A-38. The front of the pants shows moderate soiling along the front of the pants with the heaviest soiling at the left knee area where there is a melted resin-like deposit on the right side of the knee reinforcement; there is also a stain at the bottom of the right lower leg in the cuff area (see Figure A-39). The back of the pants show thermal damage with charring along the majority of the left leg particularly on the back pants pocket, upper leg cargo pocket, and lower pant leg. Damage to the back left pants pocket is seen in Figure A-40 while the disintegrated lower trim band on the back of the left leg is shown in Figure A-41. In comparison, the back lower right leg is shown in Figure A-42, which shows melted resin on part of the trim band and char marks to right of the lower back leg. The interior front and back sides for the pants outer shell are pictured in Figure A-43 and A-44. In these photographs, there is some penetration of charring as seen in left side of the pants (opposite of what is seen in the picture) primarily on the lower leg, though there is no internal charring in the back pocket area because the of multiple layers of fabric in the pants design element. The burn mark above the trim band on the right leg can clearly be seen on Figure A-45. The pants outer shell product identification label appears on the right closure facing material in Figure A-46.

Protective Pants Liner. Interior views for the front and back of the lining moisture barrier side are shown in Figures A-47 and A-48. The front view shows only moderate soiling with some light charring at the bottom of the left leg near the hem. However, the back shows charring in several areas including around the seat pockets, upper left inner leg and lower back leg. The char marks noted on the lower right leg coincide with similar marks on the moisture barrier in Figure A-49 and a closer view of the char damage is seen in Figure A-50, including the area where the trim disintegrated. Relatively little to no thermal damage is shown on the innermost layer of the lining as shown in Figures A-51 and A-52. Instead, there is moderate to heavy soiling, particularly in the area of the lower legs. There is mild discoloration and some soiling, particularly near lower left leg. The full protective pants product label and warnings are shown in Figure A-53, indicating compliance with the 2013 edition of NFPA 1971. Information written above the label in indelible ink include "Hand, John 3971 05/14. A close-up of the compliance label indicates that the pants were measured for "Hand."

An inspection of the liner interior was performed by inverting the lining through the inspection opening near the fly section of the protective pants pictured in Figure A-55. In this fashion, the moisture barrier film (dark gray) and thermal barrier batting (light yellow) layers of the liner are attached as seen in Figure A-56. The film side of the pants lining is presented in Figure A-57 while the batting or insulation side is shown in Figure A-58. Figures A-59 shows discoloration of the moisture barrier film along the left leg indicating high heat exposure on either side of the knee reinforcement. Figure A-60 shows corresponding charring in the same areas on the thermal barrier batting layer. Figure A-61 provides an interior view of the extra reinforcement material placed at the knee area inside the liner. Figure A-62 show charring in the seat area of the pants primarily between the back pockets.

Protective Gloves. Only one of the protective gloves worn by Lieutenant Flynn was recovered. It was reported that neither glove was on Lieutenant Flynn's hands when he was removed from the structure; however, was further undetermined at what point during the Mayday or rescue operation that each of the gloves came off his hands. The left glove was found after the incident,

several hours after Lieutenant Flynn had been removed from the structure. The back of the glove is shown in Figure A-61 while the palm side is shown in Figure A-62. The glove is heavily soiled with a white splotchy soiling over both back and palm sides, which was also characteristic of the contamination on some portions of the protective coat and pants. This soiling or contamination extends into the interior of the glove as seen in Figure A-63. This photograph further shows some wear on the glove interior. Labels provided for the glove show its compliance to the 2013 edition of NFPA 1971 (Figure A-64), the care instructions (Figure A-65), and the manufacturing date (Figure A-66).

Protective Footwear. Photographs of the exterior left and right sides of Lieutenant Flynn's protective footwear are provided in Figures A-67 and A-68. These photographs show a stark contrast in the condition of the footwear. The left protective boot came off of Lieutenant Flynn during his extrication and was not recovered until after the incident. Consequently, the left protective boot shows much more extensive soiling and fireground debris as compared to the right boot. It is further evident in the photographs including the close-up provided in Figure A-69 that there was distortion (and shrinkage) of the left boot as the result of extended high heat exposure. In comparison, the right boot has only light soiling, but it also shows the effects of high heat exposure. Figure A-70 shows degradation and missing piece of the leather covering the front of the toe cap. Figure A-71 show separation of the outer sole from the mid sole of the right protective boot in the heel area though the welt stitching is still intact. The product label inside the boot is seen in Figure A-72 which shows the product information, the size, and serial number. The compliance statement indicates certification to the 2000 edition of the NFPA 1971, which is well beyond the maximum service life of protective elements specified by NFPA 1951. For the left boot (label shown in Figure A-72, the serial number and bar code were completely faded in contrast to the right boot label provided in Figure A-73).

Findings and Conclusions

Characterization of the Exposure Environment. Certain portions of the clothing reached temperatures well above 500°F with some of these areas being at high temperatures for extended periods of time. Complete degradation of trim material on the garments and helmet indicated temperatures in excess of 600 to 700°F. Charring and break open of the outer shell material is caused by similar or slightly higher temperatures. Heat penetration was further noted on certain areas (upper back) of the garment from the shell to underlying layers, including the seam tape of the moisture barrier and the innermost lining of the thermal barrier, which would have been adjacent to Lieutenant Flynn's station/work uniform. Heat penetration of this type is equivalent to heat exposure energies to the garments of 40 to 50 cal/cm^2. In perspective, this level of heat energy is above the minimum level of insulation required by thermal protective performance testing (35 cal/cm^2), which is used to simulate a flash fire condition, but undoubtedly involved a much lower radiant, convective, or conductive heat exposure rate for a considerably longer period of time. It is important to point out that these areas of high heat penetration were localized to only portions of the clothing and thus the heat energy levels experienced by Lieutenant Flynn were not uniform and thus varied significantly over his personal protective equipment. Nevertheless, it is also important to realize that the exposure conditions while not of the emergency or flashover conditions described above, were well in excess of the conditions for which the clothing and equipment items could provide adequate protection.

Damage Patterns on Clothing. An examination of the protective clothing showed uneven levels of thermal damage, which is common for protective clothing exposed in structural fires. Information provided by the Howard County Department of Fire and Rescue Services indicated that Lieutenant Flynn was found face down on his left when extricated by the Rapid Intervention Team. The greatest damage to Lieutenant Flynn's protective garments were on the left side, but towards the back. There is also more damage to left side of the hood and helmet, but no comparison can be made for either the gloves or footwear since only one glove was recovered and one boot remained on the fireground following extrication. The damage predominately on the left side and the fact that this damage is not uniform along the left side could be explained by the likelihood that sometime during his time in the basement crawl space, Lieutenant Flynn could have been in contact with burning debris or embers on his left side. However, the RIT advised that he was not trapped or covered with debris.

Firefighter Injuries Relative to Clothing Damage. Insufficient information was made available to provide any comparison between damaged areas of the clothing and skin (burn) damage to Lieutenant Flynn.

Clothing and Equipment Damage as Related to Item Protective Performance. Some items of protective clothing and equipment were more damaged than others. As already explained, certain items had significantly varying levels of damage due to the orientation of Lieutenant Flynn in the structure and the dynamic conditions of the fire exposure. Yet, some differences in performance are noteworthy. In particular, while leather helmet shell materials are viable for the majority of fireground operations, leather materials will deteriorate at lower temperatures than many synthetic high temperature polymeric materials. Extended exposure to relatively high temperatures causes distortion and shrinkage of leather. This was also evident on the two boots where right boot came out of the fireground with Lieutenant Flynn and the left boot was recovered later.

Protective Garment Conformance to Manufacturing Specifications. Both the protective coat and protective pants were compared to the manufacturing specifications. It is noted that these garments were made based on measurements of different firefighters and not Lieutenant Flynn. Therefore, no assessment can be made with regard to the relative fit of the two protective garments for Lieutenant Flynn, particularly since his dimensions were not provided. Relative to the specific identified materials, including reinforcement layers, and other features indicated in the purchase specifications, all items that could be identified were present and consistent with the indicated list of specification items.

Protective Clothing Service Life. All of the examined clothing and equipment were compliant to a relevant edition of the NFPA 1971 standard when provided to Lieutenant Flynn. Two items were beyond the recommended 10-year service life. These included the protective helmet. According to NFPA 1851-2014 (*Standard on the Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*), structural firefighting protective elements that are more than 10 years past the manufacturing date should be retired. This was the case for the protective helmet that was worn by Lieutenant Flynn by approximately one month. The protective footwear was much older. While no manufacturing date could be discerned off from the footwear, the product label indicated compliance to the 2000 edition of

NFPA 1971, meaning that the footwear was more than 10 years old since the next edition of NFPA 1971 became effective on August 17, 2006 with a grace period for allowing certifications to the older edition through March 1, 2007. It is further uncertain if the condition of both the protective helmet and the footwear could have shown signs or damage prior to their use in the July 23, 2018 fire. For example, the warning labels inside the footwear were completely worn away and the serial number of one of the boots was no longer visible. The separation of the outer sole from the midsole of the right boot (which came out with Lieutenant Flynn) could simply be due to the extended service life of this item. The same may be true of the missing outer leather on the right boot at the toe area, which was not observed for the left toe of the boot that remained on the fireground. Similarly, it is possible that some wear and tear, including thermal damage, could have been present on the protective helmet worn by Lieutenant Flynn. There is no way to fully discriminate if some damage could have been present prior to the fire incident.

Information related to cleaning was only provided on the protective garments. According to this information, only the protective pants had been subjected to an advanced cleaning. NFPA 1851-2014 specifies that clothing items should be subject to at least one advanced cleaning each year or after any fireground soiling. The indicated cleaning for the pants was approximately one and a half years prior to the fire incident. No cleaning was indicated for the protective coat since it was issued to Lieutenant Flynn.

Observations Related to Clothing Use. Two apparent discrepancies were noted in the wearing of the protective clothing items:

1. Holes were made in the back of the hood to allow its attachment to the back of the garment collar area between the coat shell and liner (secured by the liner snaps). While this practice may act to retain the back of the hood in place and to prevent the hood from accidentally pulling out from under coat, it is not a recommended practice for the use of structural firefighting protective ensembles and is an unauthorized modification of both the hood and the protective coat. Further, it is quite possible that fixing the position of the back hood bib could lead to front bib more easily coming out of the front of the coat. It is possible that the extensive levels of soiling appearing on the front bib may have occurred because the front bib either came out on the fireground or was never tucked in initially.

2. The patterns of soiling on the interior side of the collar suggest that the collar was not in a raised position. It is important for the collar to be raised since this wearing position helps to provide further thermal insulation to the firefighter's neck, which are not protected by the ear covers, which should also be fully extended downward. The protective hood by itself does not offer the same insulation as the other elements of clothing.

While these discrepancies are pointed out and are not contributory to any specific hazard or failure of the protective ensemble, it remains good practice to ensure that all clothing is fully and properly donned during any structural firefighting event.

Overall Assessment of PPE. There was no evidence of any design defect or specific item manufacturing defect in any of the PPE items that were examined. The fireground conditions, as indicated by the levels of damage observed on the clothing items and by the known time of

overall exposure faced by Lieutenant Flynn, exceeded the capacity of the protective clothing and equipment to provide full protection. I could not find any specific issue with any of the examined clothing and equipment items in terms of their selection, fabrication, manner of wearing, or maintenance that would have exacerbated the specific hazards faced by Lieutenant Flynn under the circumstances of his exposure.

Recommendations

As the result of this investigation, I recommend that the Howard County Department of Fire and Rescue Services consider the following:

1. Instructions on the need and specific procedures for wearing of all personal protective clothing and equipment should be provided to each member. It is important to emphasize that all components must be deployed, and that all elements of the ensemble should be properly closed. If members indicate problems with any interface that leaves the interface area potentially exposed, corrections to the ensemble or wearing practices should be implemented for that individual. The department should specifically instruct its members on the correct wearing of protective coat collars and helmet ear covers for structural firefighting.

2. The department should discourage putting holes in the hood for their retention in the protective coat collar. These practices are not condoned by the respective manufacturers and may lead to their ineffective use with firefighter head movements. The department should also instruct firefighters on the proper wearing of hoods by indicating that the bibs should be fully tucked in before engaging in firefighting.

3. The department should employ a means for assessing the fit of clothing that is not made for a specific firefighter. This means of assessing fit should include matching the dimensions of the firefighter with the manufactured dimensions of the clothing with the advice of the clothing manufacturer and by having the firefighter wear the clothing in a series of exercises to assess freedom of movement and fit. For example, having a firefighter reach above their head and bend over are ways to assess the interface between the coat and pants. Having the firefighter also squat and reach overhead can ascertain any restriction in movement.

4. The department should review all PPE in place for its service life. Any PPE that is older than 10 years from the date of manufacturer should be removed in accordance with NFPA 1851-2014. While not all of the fire service agrees with this requirement, it has been put in place because it is extremely difficult to ascertain the continuing performance of protective clothing and equipment and secondly for the reason that NFPA standards are usually revised every 5 years and 10 years represents two cycles of revisions where significant changes in product materials, construction, and requirements can take place. If an item of protective clothing does not have a product label on which the date of manufacture can be determined, the item should be replaced or a replacement label obtained, if allowed by the manufacturer.

5. The department should institute a regular program of advanced cleaning as part of a PPE care and maintenance program. The department should confirm that it has records keeping practices in place that conform to NFPA 1851-2014.

6. For the clothing directly examined as part of the investigation, these items of clothing and equipment should be retained by the department because of its involvement in a situation where injuries were sustained. I recommend that the department retain the clothing and equipment for a period of at least 2 years with an appropriate chain of custody. The clothing should be condemned and destroyed after that period has elapsed.

Please contact me if you have any specific questions on this report.

Respectfully submitted,

Jeffrey O. Stull

Jeffrey O. Stull, President
International Personnel Protection, Inc.
Austin, Texas

Appendix A

PHOTOGRAPHS OF EXAMINED PROTECTIVE CLOTHING ITEMS FOR LIEUTENANT NATHAN FLYNN



Figure A-1. Top of Lieutenant Flynn's Protective Helmet



Figure A-2. Front of Lieutenant Flynn's Protective Helmet



Figure A-3. Rear of Lieutenant Flynn's Protective Helmet



Figure A-4. Left Side of Lieutenant Flynn's Protective Helmet



Figure A-5. Right Side of Lieutenant Flynn's Protective Helmet



Figure A-6. Interior View of Lieutenant Flynn's Protective Helmet



Figure A-7. Interior of Ear Covers for Lieutenant Flynn's Protective Helmet



Figure A-8. Close-Up of Charring on Warning Label and Underside of Back Brim for Lieutenant Flynn's Protective Helmet



Figure A-9. Product Label inside Lieutenant Flynn's Protective Helmet



Figure A-10. Certification Label inside Lieutenant Flynn's Protective Helmet



Figure A-11. Front View of Lieutenant Flynn's Protective Hood



Figure A-12. Back View of Lieutenant Flynn's Protective Hood



Figure A-13. Close-Up of Front Interior of Lieutenant Flynn's Protective Hood



Figure A-14. Name on Inside Front Bib of Lieutenant Flynn's Protective Hood



Figure A-15. Front of Lieutenant Flynn's Protective Coat (Exterior Side)



Figure A-16. Back of Lieutenant Flynn's Coat (Exterior Side)



Figure A-17. Close-Up of Lower Left Sleeve of Lieutenant Flynn's Protective Coat



Figure A-18. Close-Up of Lower Right Sleeve of Lieutenant Flynn's Protective Coat



Figure A-19. Close-Up of Patch on Right Sleeve of Lieutenant Flynn's Protective Coat



Figure A-20. Close-Up of Thermal Damage to Left Back Shoulder Area of Lieutenant Flynn's Protective Coat



Figure A-21. Close-Up of Lower Back Left Side of Lieutenant Flynn's Protective Coat



Figure A-22. Close-Up of Soiling on Pull Tab on Back of Lieutenant Flynn's Protective Coat



Figure A-23. Shell Interior of Lieutenant Flynn's Protective Coat



Figure A-24. Charred Area at Left Shoulder on Shell Interior of Lieutenant Flynn's Protective Coat



Figure A-25. Charred Area at Lower Left Side on Shell Interior of Lieutenant Flynn's Protective Coat



Figure A-26. Close-Up of Collar Interior on Outer Shell Lieutenant Flynn's Protective Coat



Figure A-27. Product Label on Left Front Facing on Shell Interior of Lieutenant Flynn's Protective Coat



Figure A-28. Moisture Barrier Side of Lieutenant Flynn's Protective Coat Liner



Figure A-29. Thermal Barrier Side of Lieutenant Flynn's Protective Coat Liner



Figure A-30. Close-Up of Charring at Shoulder Upper Back of Lieutenant Flynn's Protective Coat Liner (Moisture Barrier Side)



Figure A-31. Close-Up of Charring at Shoulder Upper Back of Lieutenant Flynn's Protective Coat Liner (Thermal Barrier Side)



Figure A-32. Close-Up of Moisture Barrier Seams near Shoulder Areas inside Lieutenant Flynn's Protective Coat Liner



Figure A-33. Dead Air Panels at Shoulder Area inside Lieutenant Flynn's Protective Coat Liner



Figure A-34. Dead Air Panels and Elbow Patch inside Sleeve of Lieutenant Flynn's Protective Coat Liner



Figure A-35. Product Label Appearing on Lieutenant Flynn's Protective Coat Liner



Figure A-36. Close-Up of Compliance Label Appearing on Lieutenant Flynn's Protective Coat Liner



Figure A-37. Front of Lieutenant Flynn's Protective Pants (Exterior)



Figure A-38. Back of Lieutenant Flynn's Protective Pants (Exterior)



Figure A-39. Condition of Left Knee Reinforcement on Lieutenant Flynn's Protective Pants



Figure A-40. Condition of Back Left Pocket on Lieutenant Flynn's Protective Pants



Figure A-41. Close-Up of Lower Back Left Leg on Lieutenant Flynn's Protective Pants



Figure A-42. Close-Up of Lower Back Right Leg on Lieutenant Flynn's Protective Pants



Figure A-43. Front of Lieutenant Flynn's Protective Pants (Shell Interior)



Figure A-44. Back of Lieutenant Flynn's Protective Pants (Shell Interior)



Figure A-45. Close-Up of Charring to Back Lower Left Leg of Lieutenant Flynn's Protective Pants (Shell Interior)



Figure A-46. Product Label on Shell of Lieutenant Flynn's Protective Pants



Figure A-47. Front of Lieutenant Flynn's Protective Pants Liner (Moisture Barrier Side)



Figure A-48. Back of Lieutenant Flynn's Protective Pants Liner (Moisture Barrier Side)



Figure A-49. Close-Up of Back Lower Right Leg of Lieutenant Flynn's Protective Pants Liner (Moisture Barrier Side)



Figure A-50. Close-Up of Back Lower Left Leg of Lieutenant Flynn's Protective Pants Liner (Moisture Barrier Side)



Figure A-51. Front of Lieutenant Flynn's Protective Pants Liner (Thermal Barrier Side)



Figure A-52. Back of Lieutenant Flynn's Protective Pants Liner (Thermal Barrier Side)



Figure A-53. Product Label Appearing on Lieutenant Flynn's Protective Pants Liner



Figure A-54. Close-Up of Compliance Label Appearing on Lieutenant Flynn's Protective Pants Liner



Figure A-55. Inspection Port Opening in Lieutenant Flynn's Protective Pants Used to Invert Liner



Figure A-56. Crotch Area inside Lieutenant Flynn's Protective Pants Liner



Figure A-57. Moisture Barrier Film Side of Liner Interior for Lieutenant Flynn's Protective Coat



Figure A-58. Moisture Barrier Film Side of Liner Interior for Lieutenant Flynn's Protective Coat



Figure A-59. Knee Reinforcement on Liner Interior of Lieutenant Flynn's Protective Pants



Figure A-60 Seat Area of Liner Interior for Lieutenant Flynn's Protective Pants



Figure A-61. Back Side of Lieutenant Flynn's Protective Left Glove



Figure A-62. Palm Side of Lieutenant Flynn's Protective Left Glove

Appendix E: SCBA Report & Data Documentation

DEPARTMENT OF HEALTH & HUMAN SERVICES

Centers for Disease Control and Prevention (CDC)
National Institute for Occupational Safety and Health (NIOSH)
National Personal Protective Technology Laboratory (NPPTL)
1095 Willowdale Rd., MS 2703
Morgantown, WV 26505
Phone: 304-285-5883

October 1, 2018

Joanne R. Rund, Assistant Chief
Howard County Fire and Rescue
6751 Columbia Gateway Drive
Columbia, MD 21046

Dear Assistant Chief Rund:

The National Personal Protective Technology Laboratory (NPPTL) has concluded its examination of a MSA Model G1, 4500 psi, 45-minute self-contained breathing apparatus (SCBA) under Task Number 22491.

The Howard County Department of Fire and Rescue Services was advised that NIOSH NPPTL would provide a written report of the inspections and any applicable test results.

Summary: MSA Model G1, 4500 psi, 45-minute self-contained breathing apparatus (SCBA) was submitted to NIOSH NPPTL by the Howard County Department of Fire and Rescue Services for evaluation and testing. The SCBA unit was delivered to NIOSH on August 20, 2018 and securely stored until the time of evaluation and testing. The unit was identified as having NIOSH approval number TC-13F-0798CBRN.

An extensive visual inspection of the unit was conducted on August 23, 2018 and the unit was determined to be testable. A corresponding facepiece and cylinder were provided with the unit. A cylinder, not involved in the incident, was provided by the fire department for testing. Overall, the SCBA was in fair condition with some heat damage and soot found on the straps, as well as melted debris. The PASS, HUD, and alarm systems functioned as designed.

The SCBA did not meet the test requirement during the first run. The inhalation breathing resistance was negative (-.25) for the first 10 minutes of the test. Then became positive and stayed positive the remainder of the test. This could possibly be explained by a piece of debris jarring loose from pressure of the air.

The unit was tested again and met the test requirements of the NIOSH Positive Pressure Test, as the SCBA maintained a positive pressure for the 45 minute minimum duration of the test. The unit passed all of the other NIOSH tests, as well as meeting the requirements of the NFPA "Airflow Performance" test.

In light of the information obtained during this investigation, NIOSH NPPTL has proposed no

further action on its part at this time. The SCBA was returned to the shipping container to be shipped back to the Howard County Department of Fire and Rescue Services.

If this unit is to be placed back in service, the SCBA must be repaired, tested, cleaned, and any damaged components replaced and inspected by a qualified service technician, including such testing and other maintenance activities as prescribed by the schedule from the SCBA manufacturer. Typically, a flow test is required on at least an annual basis.

The investigation under task number TN-22491 will be considered closed. If you have any questions or require additional information, please contact me at 304-285-5883.

Sincerely yours,

Angela S. Andrews
Physical Scientist
Evaluation and Testing Branch
National Personal Protective Technology Laboratory

Enclosures

cc: John Giovengo, Product Engineering Director

PPE CASE



Personal Protective Equipment Conformity Assessment Studies and Evaluations

Evaluation of a Self-Contained Breathing Apparatus Involved in a Fatality While Operating at a Structure Fire

Howard County Department of Fire and Rescue Services Request for a MSA Model G1

NIOSH evaluated a SCBA involved in a fatal event while the fire fighter operated at a structure fire. The SCBA was not found to contribute to the fatality.

A qualified service technician must inspect, repair, test, clean, and replace damaged components of any SCBA involved in an incident before it may be returned to service.

At the request of the Howard County Department of Fire and Rescue Services, NIOSH's National Personal Protective Technology Laboratory (NPPTL) inspected and evaluated the Self-Contained Breathing Apparatus (SCBA) involved in a fatal event at a structure fire.

This report provides a summary of NPPTL's inspection and evaluation methods, as well as findings, for an SCBA that was being used by a fire fighter while operating at a structure fire. The SCBA used was a MSA Model G1, 4500 psi, 45 minute unit. The Howard County Department of Fire and Rescue Services was advised that NIOSH NPPTL would provide a written report of the investigation and any applicable test results.

What NIOSH Did to Protect the Worker

Upon receipt of the SCBA, NPPTL managed the custody of evidence throughout the entire inspection and evaluation process at its Morgantown, West Virginia facility. NPPTL staff inspected all SCBA components and documented their findings with written and photographic evidence. NIOSH assigned Task Number TN-22491 to identify the unit. NPPTL also tested the SCBA to determine conformance to NPPTL's approval requirements as outlined in Title 42, Code of Federal Regulations, Part 84 (42 CFR 84). Further testing was conducted to provide an indication of the conformance of the SCBA to the National Fire Protection Association (NFPA) Airflow Performance requirements of NFPA 1981, Standard on Open-Circuit Self-Contained Breathing Apparatus for the Fire Service, 2013 Edition. If the inspection or evaluation data suggested that the SCBA unit may have contributed to the fatal event, NPPTL would have engaged in corrective action to ensure that no other users of the product would experience a fatal event. In this case, no such corrective action was necessary. NPPTL then managed the disposition of the SCBA.

Chain of Custody

The SCBA unit was delivered by NIOSH investigators, from DSR, who were assigned to investigate the Howard County Department of Fire and Rescue Services fatal event. They delivered the unit to Lab H1513 for secure storage at the NIOSH facility in Morgantown, West Virginia on August 20, 2018. The SCBA unit remained in secure storage in Lab H1513 throughout the inspection and testing process.

SCBA Inspection

On August 23, 2018, NPPTL employees Jay Tarley and Angie Andrews inspected the SCBA unit. These employees identified the SCBA as a Howard County Department of Fire and Rescue Services SCBA and visually examined the devise, component by component, in the condition received to determine the conformance of the unit to the NIOSH-approved configuration. The unit was a MSA Model G1, 4500 psi, 45 minute unit; with NIOSH Approval Numbers TC-13F-0798CBRN.

As received (pictured below) SCBA unit

- SCBA unit was hand delivered to Lab H1513 by NIOSH DSR investigators
- Cylinder was received with 2250 psi and closed
- Bypass was closed
- Mask-mounted regulator (MMR) was securely connected to the low pressure line
- Facepiece was included



Figure 1: SCBA as received

Components and Observations for SCBA (Figure 1) ("Right" or "left" are from the user's perspective) **(see Figures in Appendix)**

Facepiece (Figures 2-5)

- Facepiece seal P/N: 10161810; M/N: 7-2771-1: CE 0168 EXLLC; EN 136 1998 CL3+
- Nosecup MFG date: 8/14
- Overall condition: fair, dirty with scratches
- Lens was crazed and dirty
- Upper lens ring had molten debris on it
- Lens retaining ring was intact
- MMR housing was clean and in good condition
- HUD was present and intact
- Hairnet was in good condition with dirt present
- All straps and buckles functioned properly

Mask Mounted Regulator (MMR) (Figure 6-8)

- MMR label on front: MSA; M/N: 7-2779-1
- Overall condition was dirty with signs of heat damage
- MMR was secured to low pressure line
- Bypass closed
- Inside flange had normal wear and in good condition
- Sealing area was fair and slightly dirty
- Regulator could be attached and removed
- Outer rubber casing had physical heat damage

Low Pressure Regulator Hose (Figures 8-9)

- Secured at all attachment points
- Line was in good condition
- Line passed through the shoulder strap to the reducer

Pressure Reducer Assembly (Figure 10-11)

- Overall condition was good
- All airline connections were secure
- All lines going to the pressure reducer were in good condition
- 4500 Psi; 2115380

PASS Control Module (Figures 12-14)

- Lines to control module looked good
- Gauge lens was readable
- Protective casing was good and in place
- M/N 2816-1

High Pressure Hose and Cylinder Attachment (Figures 15-17)

- High pressure S/N: 7-2844-1 DP
- High pressure line had heat damage, dirty
- Cylinder quick connect attachments were dirty; rubber wheel was burnt

ExtendAire II EBSS (Emergency Breathing Support System (18-21)

- Quick Connect snap tite 9847-22; 3715
- Fair condition; covered with soot

Quick-Fill line (22-24)

- FD 17 series
- HCFD; sticker 10-14
- Sleeve is frayed

PASS Power Module (Figures 25-26)

- SEI label:05-2015; 10148687 4500 psi; RFID
- PASS met requirements of NFPA 1982: Standard on Personal Alert Safety Systems (PASS) 2013 edition
- FCC ID P9R 10154953, RPN 10069330
- SCBA containing power module M/N 7-2810-1
- Overall condition was good, but very dirty with debris and melted in spots
- Held securely to backframe
- Power module battery was unattached, looked good with dirt

Backframe Assembly (Figures 27-28)

- S/N: 7-N/A
- SEI label 1981-2013 edition
- NIOSH Approval Number label: TC-13F-0798CBRN
- FD label with E 101C
- Overall condition was fair
- Extensive heat damage to left railing and right top
- Soot and debris were found everywhere
- Shoulder straps were attached to the frame

Straps and Buckles (Figures 29-30)

- Overall condition of straps was good, but dirty
- Hose lines passed through shoulder straps
- All adjustable buckles moved and held in place
- Waist area buckle latched

Compressed Air Cylinder and Cylinder Valve Assembly (Figures 31-32)

- DOT-SP 10915-4500; TC-SU-5134-310; OM 164301
- Luxfer P/N L65M-122; REE 123
- MSA M/N 7-1348-1
- Hydrostatic date: ?/2015; 45 minute, 4500 PSI
- Received with 2250 psi
- Overall condition was poor with heat damage
- Gauge was not readable
- Threads were good; attached to the threads was the male quick connect
- O-ring was present and in good condition
- Rubber bumper at base of cylinder valve was in good condition

SCBA Testing

The SCBA unit was tested using the six NIOSH test methods and one NFPA test method as described in **Table 1**.

**A replacement cylinder was used for testing due to damaged cylinder gauge on corresponding cylinder*

Table 1. Summary of results from testing SCBA unit against established NIOSH SCBA certification tests.

NIOSH Tests	Description of Results	PASS/ FAIL
Positive Pressure Test - NIOSH Standard Test Procedure Number 120, 42 CFR Part 84 Reference: Subpart H, § 84.70 (a)(2)(ii) **Requirement:** *The pressure inside the facepiece in relation to the immediate environment is positive during both inhalation and exhalation.* **Procedure:** A breathing machine with a 622 kg.-m./min cam operating at 24 RPM with a 40 liters per minute flow rate (115 liters per minute peak flow) is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece.	Run #1 The unit did not meet the test requirement during the first run (details of test are in the synopsis of findings section). Run #2 The unit met the test requirements the entire second run. The inhalation breathing resistance did not become negative during the test. The PASS, digital remote and HUD were all functional. Run #2 results are recorded here. **Inhalation Breathing Resistance: (inches of water column) = 0.34**	**PASS**
Rated Service Time Test - NIOSH Standard Test Procedure Number 121, 42 CFR Part 84 Reference: Subpart F, § 84.53 (a) and Subpart H, § 84.95 (a) and (b) **Requirement:** *Service time will be measured while the apparatus is operated by a breathing machine as described in § 84.88. The open-circuit apparatus will be classified according to the length of time it supplies air or oxygen to the breathing machine. Classifications are listed in § 84.53.* **Procedure:** A breathing machine with a 622 kg.-m./min cam operating at 24 RPM with a 40 liters per minute flow rate is connected to an anthropometric head for cycling. A pressure tap in the head is connected to a transducer which in turn is connected to a strip chart recorder for determining the pressure in the facepiece. The breathing machine is run until the inhalation portion of the breathing curve falls below the minimum requirement.	The SCBA met the test requirement. The measured service time (adjusted to correspond with the recorded breathing cycles) was more than the rated service time of 45 minutes. The SCBA did not go negative on inhalation; therefore, maintained positive pressure in the facepiece. The PASS functioned. **Measured Service Time:** **46 Minutes 38 Seconds**	**PASS**

Static Pressure Test - NIOSH Standard Test Procedure Number 122, 42 CFR Part 84 Reference: Subpart H, § 84.91 (d) **Requirement:** *The static pressure (at zero flow) in the facepiece shall not exceed 38 mm (1.5 inches) water column height.* **Procedure:** The facepiece is fitted to an anthropometric head for testing. A pressure tap in the head is connected to a calibrated manometer. Full cylinder pressure is applied to the unit at zero flow and a reading from the manometer is recorded.	The SCBA met the test requirement. **Facepiece Static Pressure:(inches of water column)= 1.22**	**PASS**
Gas Flow Test - NIOSH Standard Test Procedure Number 123, 42 CFR Part 84 Reference: Subpart H, § 84.93 (b) and (c) **Requirement:** *The flow from the apparatus shall be greater than 200 liters per minute when the pressure in the facepiece of demand apparatus is lowered by 51 mm (2 inches) water column height when full container pressure is applied. Where pressure-demand apparatus are tested, the flow will be measured at zero gauge pressure in the facepiece.* **Procedure:** A pressure tap in the anthropometric head is connected to a manometer for determining when the pressure inside the facepiece is at zero. A mass flow meter is connected in line between the anthropometric head and an adjustable vacuum source to measure flow. The SCBA cylinder is replaced by a test stand which is adjusted initially to full cylinder pressure. The vacuum source is adjusted during the test to maintain the desired pressure inside the facepiece. Once the proper facepiece pressure has stabilized, a flow reading is recorded. The procedure is then repeated with the test stand adjusted to 500 psig.	The SCBA met the test requirement. **Applied Pressure — Airflow (liters per minute)** **4500 psig — 374.1** **500 psig — 300.2**	**PASS** **PASS**
Exhalation Resistance Test - NIOSH Standard Test Procedure Number 122, 42 CFR Part 84 Reference: Subpart H, § 84.91 (c) **Requirement:** *The exhalation resistance of pressure-demand apparatus shall not exceed the static pressure in the facepiece by more than 51 mm (2 inches) water column height.* **Procedure:** The facepiece is mounted on an anthropometric head form. A probe in the head form is connected to a slant manometer for measuring exhalation breathing resistance. The airflow through the apparatus is adjusted to a rate of 85 liters per minute and the exhalation resistance is recorded.	The SCBA met the test requirement. **Exhalation Breathing Resistance: (inches of water column)= 2.19** **Static Pressure: (inches of water column)= 1.22** **Difference: (inches of water column)= 0.97**	**PASS**

Remaining Service Life Indicator Test - NIOSH Standard Test Procedure Number 124, 42 CFR Part 84 Reference: Subpart H, § 84.83 (f) and Subpart G, § 84.63 (c) **Requirement:** *Each remaining service life indicator or warning device shall give an alarm when the remaining service life of the apparatus is reduced within a range of 33 to 37 percent of its rated service time or pressure.* *This requirement is modified under § 84.63(c) as follows: For apparatus which do not have a method of manually turning off remote gauge in the event of a gauge or gauge line failure the remaining service life indicator is required to be set at 33% + 4% of the rated service time or pressure.* **Procedure:** A calibrated gauge is connected in line between the air supply and the first stage regulator. The unit is then allowed to gradually bleed down. When the low air alarm is activated, the pressure on the gauge is recorded. This procedure is repeated six times. The average of the six readings is calculated and recorded.	As these SCBA models do not have a remote gauge shutoff, the test requirement is 33% + 4%. **Run # / Electrical Alarm Point (psi) / Bell Alarm Point (psi)** **1** 1650 1640 **2** 1660 1640 **3** 1620 1610 **4** 1650 1640 **5** 1660 1660 **6** 1560 1660 **Average** 1633 1642	**PASS** **PASS**

National Fire Protection Association (NFPA) Test (in accordance with NFPA 1981, 2013 Edition):

NFPA Test	Description of Results	PASS/ FAIL
NFPA Airflow Performance Test - NFPA 1981 (1997 Edition) Reference: Chapter 5, Performance Requirements, Sec. 5-1.1 **Requirement:** *SCBA shall be tested for airflow performance as specified in Section 6-1, Airflow Performance Test, and the SCBA facepiece pressure shall not be less than 0.0 in (0.0 mm) water column and nor greater than 3½ in (89 mm) water column above ambient pressure from the time the test begins until the time the test is concluded.* **Procedure:** The required equipment specified in the NFPA standards were used to conduct the tests on this unit. A pressure tap in the head is connected to a transducer which in turn is connected to a flatbed chart recorder for determining the pressure in the facepiece.	The SCBA passed this test. PASS unit, HUD, and Alarm system were all functional. **During initializing the PosiChek a message popped up stating exhalation valve could be sticky* **Maximum Facepiece Pressure: (inches of water column)= 2.6** **Minimum Facepiece Pressure: (inches of water column)= 0.18**	**PASS** **PASS**

Disposition of SCBA

Following testing on September 11, 2018, the SCBA unit was returned to secure storage in Lab H1513 at the NIOSH facility in Morgantown, West Virginia.

Synopsis of Findings

The SCBA unit inspected and evaluated by NPPTL was a MSA Model G1, 45 minute, 4500 psi unit with NIOSH Approval Numbers TC-13F-0798CBRN. The corresponding facepiece and cylinder were provided with the unit. A cylinder, not involved in the incident, was provided by the fire department for testing. Overall, the SCBA was in fair condition with some heat damage and soot found on the straps, as well as melted debris. The NFPA approval label was present and readable. The PASS, HUD, and alarm systems functioned as designed.

The SCBA did not meet the test requirement of the NIOSH Positive Pressure Test during the first run. The inhalation breathing resistance was negative (-.25) for the first 10 minutes of the test then became positive and stayed positive the remainder of the test. This could possibly be explained by a piece of debris jarring loose from pressure of the air.

The unit was tested again and met the test requirements of the NIOSH Positive Pressure Test, as the SCBA maintained a positive pressure for the 45 minute minimum duration of the test. The unit passed all of the other NIOSH tests, as well as meeting the requirements of the NFPA "Airflow Performance" test.

In light of the information obtained during this investigation, NIOSH NPPTL has proposed no further action on its part at this time. The SCBA was returned to the shipping container to be shipped back to the Howard County Department of Fire and Rescue Services.

CASE Conclusion

No evidence was identified to suggest that the SCBA unit inspected and evaluated contributed to the fatality. NIOSH determined that there was no need for corrective action with regards to the approval holder or users of SCBAs manufactured under the approval numbers granted to these products.

Actions to be Taken by the Fire Departments With SCBAs Involved in an Incident

- Any SCBA unit involved in an incident may not be placed back in service until the SCBA has been repaired, tested, cleaned, and any damaged components replaced and inspected by a qualified service technician, including such testing and other maintenance activities as prescribed by the schedule from the SCBA manufacturer
- All SCBA units, even those not involved in an incident, must undergo a flow test on at least an annual basis

Actions the PPE Users, Selectors, and Purchasers May Take to Further Protect Themselves and Others from Hazards

- Sign up for NPPTL's Listserv at https://www.cdc.gov/niosh/npptl/sub-NPPTL.html to receive email notifications relevant to PPE.

To request additional information about this report, contact NPPTL at ppeconcerns@cdc.gov, and reference NIOSH Task Number 22491 in your request.

For more information related to personal protective equipment, visit the NIOSH website www.cdc.gov/niosh/npptl.

To receive documents or other information about occupational safety and health topics, contact NIOSH:

Telephone: 1–800–CDC–INFO (1–800–232–4636)
TTY: 1–888–232–6348
CDC INFO: www.cdc.gov/info

Or visit the NIOSH website at www.cdc.gov/niosh.

For a monthly update on news at NIOSH, subscribe to *NIOSH eNews* by visiting www.cdc.gov/niosh/eNews.

Appendix Photographs to Support Inspection Findings for SCBA

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Figure 2: Front of facepiece



Figure 3: Inside facepiece



Figure 4: Labeling on facepiece seal



Figure 5: Facepiece hairnet and straps



Figure 6: Mask mounted regulator with signs of heat damage



Figure 7: Inside of mask mounted regulator



Figure 8: Mask mounted regulator and low pressure line connected to SCBA



Figure 9: Low pressure line disconnected from intermediate pressure hose



Figure 10: Pressure reducer, RIC UAC with primary low pressure warning device (bell)



Figure 11: Bottom view of pressure reducer assembly



Figure 12: PASS control module and medium pressure line



Figure 13: Front of PASS control module



Figure 14: Back of PASS control module



Figure 15: High pressure hose and cylinder attachment



Figure 16: Top view of high pressure hose



Figure 17: Cylinder attachment and Quick Connect adapter



Figure 18: ExtendAire II EBSS (Emergency Breathing Support System)



Figure 19: ExtendAire II EBSS hose with male and female Quick Connect



Figure 20: Male and female Quick Connect



Figure 21: Quick Connect cover removed to show markings



Figure 22: Quick-Fill pouch



Figure 23: Quick-Fill hose



Figure 24: Quick-Fill hose with covers off



Figure 25: PASS power module SEI label



Figure 26: Power module MSA label



Figure 27: Back of backframe with labels



Figure 28: Cylinder strap and heat damage to side rail



Figure 29: Overview of straps and cylinder connected to SCBA



Figure 30: Overview of waist belt, straps, and buckles



Figure 31: Cylinder gauge



Figure 32: Top view of cylinder with labeling

Disclaimer

The purpose of this effort was to determine the conformance of a respirator to the NIOSH approval requirements found in Title 42, *Code of Federal Regulations*, Part 84. A number of performance tests are selected from the complete list of Part 84 requirements and each respirator is tested in its "**As received**" condition to determine its conformance to those performance requirements. Each respirator is also inspected to determine its conformance to the quality assurance documentation on file at NIOSH.

In order to gain additional information about its overall performance, each respirator may also be subjected to other recognized test parameters, such as National Fire Protection Association (NFPA) consensus standards. While the test results give an indication of the respirator's conformance to the NFPA approval requirements, NIOSH does not actively correlate the test results from its NFPA test equipment with those of certification organizations which list NFPA-compliant products. Thus, the NFPA test results are provided for information purposes only.

Selected tests are conducted only after it has been determined that each respirator is in a condition that is safe to be pressurized, handled, and tested. Respirators whose condition has deteriorated to the point where the health and safety of NIOSH personnel and/or property is at risk will not be tested.

FIT TEST REPORT

7/30/2018

ID NUMBER	3633		
LAST NAME	FLYNN	CUSTOM1	
FIRST NAME	NATHAN	CUSTOM2	
COMPANY	HCDFRS	CUSTOM3	
LOCATION		CUSTOM4	
TEST DATE	3/27/2018 10:06	PORTACOUNT S/N	8030144615
DUE DATE	3/27/2019	N95 COMPANION	N
RESPIRATOR	MSA G1 FULL [1000]	PROTOCOL	OSHA 29CFR1910.134
MANUFACTURER	MSA	PASS LEVEL	1000
MODEL	G1		
MASK STYLE	FULL	APPROVAL	
MASK SIZE	M	EFFICIENCY<99%	False

EXERCISE	DURATION (sec.)	FIT FACTOR	PASS
NORMAL BREATHING	60	17919	Y
DEEP BREATHING	60	108645	Y
HEAD SIDE TO SIDE	60	99022	Y
HEAD UP AND DOWN	60	44592	Y
TALKING	60	50949	Y
GRIMACE	15	Excl.	
BENDING OVER	60	26302	Y
NORMAL BREATHING	60	55638	Y
OVERALL FF		40426	Y

FIT TEST OPERATOR TG DATE _____

NAME NATHAN FLYNN DATE _____

Note:

Respirator Fit Test Card

Name: NATHAN FLYNN
ID: 3633

Test Date: 3/27/2018
Next Test Date: 3/27/2019

Respirator

Mfg: MSA
Model: G1
Style: FULL
Size: M

Results

Overall FF: 40426
FF Pass Level: 1000
Pass: Y
Operator: TG

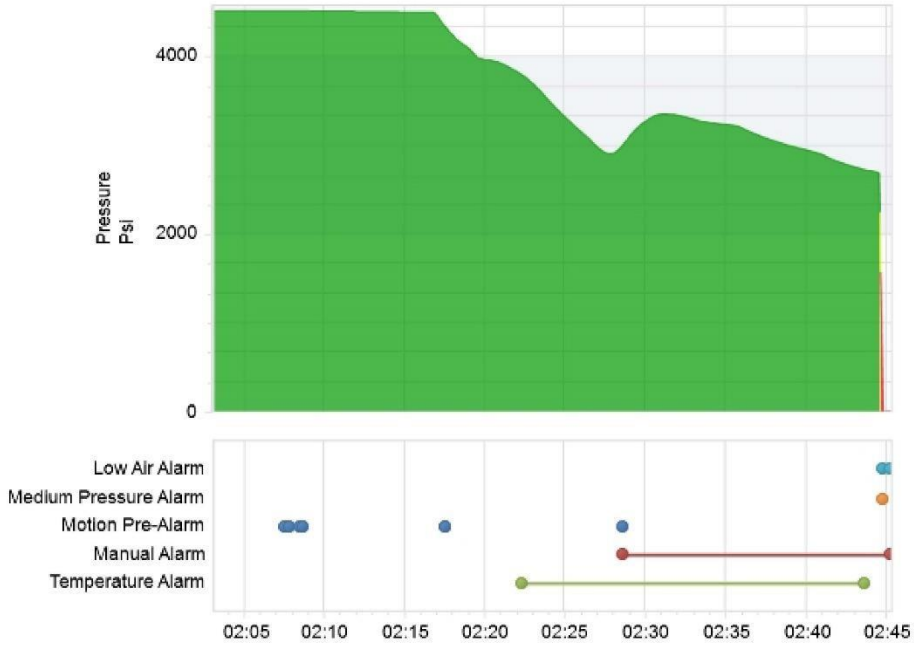
Protocol: OSHA 29CFR1910.134
Fit Test Method: QNFT using TSI PortaCount
*** Your company contact information here ***

G1 Incident Log

Serial number: 15052112

Incident Start: 7/23/2018 2:03 AM

Incident End: 7/23/2018 2:45 AM



SessionId	Timestamp	SENSOR PRESSURE	SENSOR MOTION	SENSOR TEMPERATURE
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61	7/23/2018 2:03	4530	1	26
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61	7/23/2018 2:04	4530	1	27
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61	7/23/2018 2:14	4515	1	27
61	7/23/2018 2:15	4515	1	27
61	7/23/2018 2:15	4515	1	27
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61	7/23/2018 2:18	4165	1	27
61	7/23/2018 2:18	4135	1	27
61	7/23/2018 2:19	4100	1	28
61	7/23/2018 2:19	4050	1	28
61	7/23/2018 2:19	4000	1	28
61	7/23/2018 2:19	3990	1	29
61	7/23/2018 2:20	3975	1	30
61	7/23/2018 2:20	3975	1	31
61	7/23/2018 2:20	3965	1	32
61	7/23/2018 2:20	3955	1	33
61	7/23/2018 2:21	3935	1	34
61	7/23/2018 2:21	3915	1	36
61	7/23/2018 2:21	3890	1	37
61	7/23/2018 2:21	3865	1	38
61	7/23/2018 2:22	3840	1	39
61	7/23/2018 2:22	3810	1	41
61	7/23/2018 2:22	3780	1	42
61	7/23/2018 2:22	3740	1	43
61	7/23/2018 2:23	3700	1	44
61	7/23/2018 2:23	3655	1	46
61	7/23/2018 2:23	3610	1	47
61	7/23/2018 2:23	3560	1	48
61	7/23/2018 2:24	3510	1	49
61	7/23/2018 2:24	3460	1	51
61	7/23/2018 2:24	3415	1	52
61	7/23/2018 2:24	3370	1	53

SessionId	Timestamp	SENSOR PRESSURE	SENSOR MOTION	SENSOR TEMPERATURE
61	7/23/2018 2:25	3325	1	54
61	7/23/2018 2:25	3285	1	56
61	7/23/2018 2:25	3240	1	56
61	7/23/2018 2:25	3200	1	58
61	7/23/2018 2:26	3160	1	59
61	7/23/2018 2:26	3120	1	60
61	7/23/2018 2:26	3080	1	61
61	7/23/2018 2:26	3030	1	62
61	7/23/2018 2:27	2990	1	63
61	7/23/2018 2:27	2955	1	64
61	7/23/2018 2:27	2930	1	64
61	7/23/2018 2:27	2920	1	65
61	7/23/2018 2:28	2930	1	65
61	7/23/2018 2:28	2965	1	66
61	7/23/2018 2:28	3015	0	66
61	7/23/2018 2:28	3070	0	66
61	7/23/2018 2:29	3130	0	67
61	7/23/2018 2:29	3180	0	67
61	7/23/2018 2:29	3225	0	67
61	7/23/2018 2:29	3265	0	68
61	7/23/2018 2:30	3295	0	68
61	7/23/2018 2:30	3325	0	68
61	7/23/2018 2:30	3350	0	68
61	7/23/2018 2:30	3365	0	68
61	7/23/2018 2:31	3370	0	68
61	7/23/2018 2:31	3370	0	69
61	7/23/2018 2:31	3365	0	69
61	7/23/2018 2:31	3365	0	69
61	7/23/2018 2:32	3355	0	69
61	7/23/2018 2:32	3345	0	69
61	7/23/2018 2:32	3335	0	69
61	7/23/2018 2:32	3320	0	69
61	7/23/2018 2:33	3310	0	69
61	7/23/2018 2:33	3295	0	69
61	7/23/2018 2:33	3285	0	69
61	7/23/2018 2:33	3280	0	70
61	7/23/2018 2:34	3270	0	70
61	7/23/2018 2:34	3265	0	70
61	7/23/2018 2:34	3260	0	70
61	7/23/2018 2:34	3255	0	70
61	7/23/2018 2:35	3250	0	70
61	7/23/2018 2:35	3245	0	70
61	7/23/2018 2:35	3240	0	70
61	7/23/2018 2:35	3230	0	70

SessionId	Timestamp	SENSOR PRESSURE	SENSOR MOTION	SENSOR TEMPERATURE
61	7/23/2018 2:36	3210	0	69
61	7/23/2018 2:36	3185	0	69
61	7/23/2018 2:36	3165	0	69
61	7/23/2018 2:36	3150	0	69
61	7/23/2018 2:37	3130	0	69
61	7/23/2018 2:37	3110	0	69
61	7/23/2018 2:37	3095	0	69
61	7/23/2018 2:37	3080	0	69
61	7/23/2018 2:38	3065	0	69
61	7/23/2018 2:38	3050	0	69
61	7/23/2018 2:38	3035	0	69
61	7/23/2018 2:38	3020	0	69
61	7/23/2018 2:39	3010	0	68
61	7/23/2018 2:39	3000	0	68
61	7/23/2018 2:39	2985	0	68
61	7/23/2018 2:39	2975	1	68
61	7/23/2018 2:40	2965	1	68
61	7/23/2018 2:40	2950	1	68
61	7/23/2018 2:40	2940	1	68
61	7/23/2018 2:40	2925	1	68
61	7/23/2018 2:41	2910	1	67
61	7/23/2018 2:41	2885	1	67
61	7/23/2018 2:41	2865	1	67
61	7/23/2018 2:41	2845	1	67
61	7/23/2018 2:42	2830	1	67
61	7/23/2018 2:42	2815	1	66
61	7/23/2018 2:42	2800	1	66
61	7/23/2018 2:42	2785	1	65
61	7/23/2018 2:43	2770	1	65
61	7/23/2018 2:43	2760	1	65
61	7/23/2018 2:43	2745	1	64
61	7/23/2018 2:43	2735	1	64
61	7/23/2018 2:44	2730	1	63
61	7/23/2018 2:44	2720	1	63
61	7/23/2018 2:44	2705	1	62
61	7/23/2018 2:44	0	1	62
61	7/23/2018 2:45	0	1	61
61	7/23/2018 2:45	0	0	22

E 101C Flynn 7-23-2018 0203 Session.xlsx

Session Id	Timestamp	Event Type	Event Detail 1	Event Detail 2	Event Detail 3	Event Detail 4
61	7/23/2018 2:03	PURPOSE_POWER_UP	BATTERYTYPE_LIION	Battery Voltage 84		
61	7/23/2018 2:03	PURPOSE_SENSOR_ALARM_ON	CYL_PRS	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_NONE	Threshold 0
61	7/23/2018 2:07	PURPOSE_SENSOR_ALARM_ON	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	Threshold 0
61	7/23/2018 2:07	PURPOSE_ALARM_RESET	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	
61	7/23/2018 2:08	PURPOSE_SENSOR_ALARM_ON	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	Threshold 0
61	7/23/2018 2:08	PURPOSE_ALARM_RESET	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	
61	7/23/2018 2:17	PURPOSE_SENSOR_ALARM_ON	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	Threshold 0
61	7/23/2018 2:17	PURPOSE_ALARM_RESET	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	
61	7/23/2018 2:22	PURPOSE_SENSOR_ALARM_ON	TEMP	ALARMTYPE_EXPOSURE	ALARM_PRIORITY_WARNING	Threshold 0
61	7/23/2018 2:24	PURPOSE_SENSOR_ALARM_OFF	CYL_PRS	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_NONE	Threshold 0
61	7/23/2018 2:24	PURPOSE_SENSOR_ALARM_ON	CYL_PRS	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_CAUTION	Threshold 0
61	7/23/2018 2:28	PURPOSE_SENSOR_ALARM_ON	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	Threshold 0
61	7/23/2018 2:28	PURPOSE_SENSOR_ALARM_ON	MOTION	ALARMTYPE_MANUAL_ACTIVATION	ALARM_PRIORITY_ALARM	Threshold 0
61	7/23/2018 2:28	PURPOSE_ALARM_RESET	MOTION	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	
61	7/23/2018 2:43	PURPOSE_ALARM_RESET	TEMP	ALARMTYPE_EXPOSURE	ALARM_PRIORITY_WARNING	
61	7/23/2018 2:44	PURPOSE_SENSOR_ALARM_ON	CYL_PRS	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_WARNING	Threshold 0
61	7/23/2018 2:44	PURPOSE_SENSOR_ALARM_ON	CYL_PRS	ALARMTYPE_DEFICIENCY	ALARM_PRIORITY_ALARM	Threshold 0

Appendix F: Manufacturer Radio Test Report

November 19, 2018

Fr: Mario Phang
Electrical Engineer
8000 W. Sunrise Blvd,
Plantation, FL 33322

To: Fire Chief Daniel G. Merson
Captain Daniel S. Dushanko
Howard County MD Fire and Rescue
6751 Columbia Gateway Drive Suite 400
Columbia MD 21046

RE: Radio Testing for Howard County Fire Department

Dear Daniel:

Please find below the test results of equipment samples that were picked up by me on Oct 26th, 2018 at Motorola Solution Plantation receiving. The test results are per test protocols identified below.

The equipment samples picked up from Receiving are:

Radio Model#	Radio S/N	Radio Name	Remote Speaker microphone	Battery	Antenna
H91TGD9PW7AN	581CST1697	BXE F3-F1-BT	PMMN4106	PMNN4504A	Whip

1. All radio tests were carried out on Nov 07, 2018 at Motorola Solutions located at 8000 West Sunrise Blvd. Plantation FL 33322, unless otherwise noted.
2. Captain Dushanko from Howard County was present during all testing.
3. Electrical performance radio tests were carried out using a battery eliminator with a nominal 7.5V supply.
4. Talk/Listen test was carried out using battery and RSM that came with the radio. The Talk/Listen test was performed using a conventional talk-around channel, "A11-FDELK".
5. All testing was completed on November 7th. The equipment was sealed and shipped back to Detective Corporal Gregory.

Test Protocol 1:

Visual inspection of radio exterior carried out by Steve Dash

1. Examine the radio for any physical damage to the exterior
2. Check radio buttons for tactility and function
3. Check radio with GCAI accessory for fitment
4. Check radio with battery for fitment.

Test Protocol 2:

Download and review of software logs carried out by Scott Greven. Retrieved error log entries and reset captures to better understand the software behavior. The error logs are used by developers to detect potential issues, the logs are used for debugging only.

Equipment used:
PMKN4013C Data Cable
Windows based Workstation
DebugDataExtractor (proprietary log extractor software running on windows machine)

1. Use data cable to attach radio GCAI to computer usb
2. Run DebugDataExtractor on computer to extract logs.

Test Protocol 3:

Auto Test of receiver and transmitter parameters (using Aeroflex 3920 test set) carried out by Mario Phang

Equipment used:
PMKN4013C Data Cable
AeroFlex 3920 Test Set (\w calibrated rf cable)
66009254001 APX Battery Adapter
Motorola Programmable Power Supply

1. Use data cable to attach radio GCAI to AeroFlex usb
2. Run "Motorola APX Autotest" on AeroFlex to test radio rf performance.

Test Protocol 4:

Talk and listen (functional) testing Carried out by Steve Dash and Mario Phang

In addition to the radio performance tests specified above, talk and listen test shall be conducted. Two people are needed. Follow these steps:

1. Locate one conventional talk around personality that is common to both radios.
2. Set the volume knob to approximately 75% of the maximum position on both units.
3. Position the radios at approximately 10 feet apart.
4. Key up on the first radio and proceed to count out loud from one to ten while facing the radio's microphone, keeping it approximately two inches away from your face. Verify that the count is intelligible and that all numbers are heard on the second radio's speaker.
5. Repeat steps three and four from the secondary radio.

Test results of Test Protocol 1:

External visual inspection showed signs of exposure to very high temperatures
- partially melted volume knob, channel selector knob and antenna
- burn marks on housing

RSM channel selector knob (switch shaft) was bent slightly
- most likely due to a high impact force
- however no loss of functionality or tactility

No other signs of physical damage observed
Radio and RSM button check revealed no anomalies
- all buttons, levers and switches had good tactility
- all buttons, levers and switches worked properly when actuated

Radio-to-RSM fit was good. No fit or functionality issues noted
Radio-to-battery fit was good. No fit or functionality issues noted

Test results of Test Protocol 2:

Analyze codeplug for suggested improvements.

The County's codeplug configuration was analyzed.

Below are the observations:

1. Mandown was not configured to automatically transmit with mic enabled, instead the user needs to press PTT
2. Emergency "FindMe" Tx/Rx was not enabled. This is a feature which will send an emergency signal directly to adjacent radios when either the mandown emergency or manually triggered emergency is activated. Along with the notification a range indicator is provided to help identify the radio location.
3. Setup the emergency revert was not enabled to utilize a monitored talkgroup.
4. Recommendation: "End Tx on Voice Absence" was not enabled. This is to prevent a case where the microphone wires are shorted which could continuously cause the PTT to be activated.

Test results of Test Protocol 3:

Electrical performance was within factory specifications

Reference Oscillator Test : PASS
Allowable Specs (< 250 Hz from 869.8875 MHz)

Broadband Power Test : PASS
Allowable Specs(< 0.65W for VHF, < 0.55W for UHF, < 0.3W for 700MHz, <0.4W for 800MHz)

P25 Rx BER Test : PASS
Allowable Specs(< 5% BER at -116 dBm)

P25 Tx Tests : PASS
Allowable Specs(MOD Fidelity < 5% and Symbol DEV <180 Hz from 1800)

Raw Test Data:

Test Freq	BER (%)	MOD Fidelity (%)	Sym DEV (Hz)	PWR (W)	Osc Dev (Hz)
F1	0	0.6	-12.6	0.05	
F2	0	0.42	-9.1	0.10	
F3	0	0.59	-12.2	0.24	
F4	0.004	0.7	-13.1	0.00	
F5	0	0.71	-13.8	0.01	

F6	0.227	0.61	-11.7	0.18	
F7	0.349	0.59	-12	0.20	
F8	0.336	0.77	-15.2	0.16	
F9	0.32	0.55	-10.9	0.13	
F10	0.803	0.67	-11.7	0.07	
F11	0.755	0.43	-9.1	0.03	
F12	0.629	0.63	-13	-0.06	
F13	0.528	0.6	-11.7	-0.03	
F14	0.554	0.81	-14.3	-0.02	-110
AVG =	0.321786	0.62	-12.17142857	0.08	
STDEV =	0.295501	0.110731831	1.738004413	0.094276	

Test results of Test Protocol 4:

Talk and listen test results was clear and intelligible for both transmit and receive.

Appendix G: HCDFRS PPE Records for FF Flynn

HOWARD COUNTY DEPARTMENT of FIRE and RESCUE SERVICES

TURNOUT GEAR TRACKING INFORMATION.

NAME: Nathan Flynn EID#: 3633

STATION: 10 SHIFT: A DATE: 6·22·17

This form shall be use to collect information of Turnout Gear.

Requested ☐ **Issued** ☑ **Returned to service** ☐ **Returned to QM** ☐

Replacement ☐ Loaner ☐ Used ☐ New ☑ Clean/Repair ☐ Condemned ☐ Expired ☐

DESCRIPTION	SERIAL #	SIZE	MFG. DATE
T.O. COAT	170100976 7	42 x 28 / 34 x 33	2 / 17 / 2017
T.O. PANTS		X	/ /

Additional comments:

Received By: [signature] *Date:* 6·23·17

Computer filing location: *Destroyed Gear* ☐ *Returned Gear* ☐ *Cleaning Gear* ☐ *Master Log* ☑

Morning Pride Mfg
1 Innovation Court
Dayton, OH 45414
Telephone 937/454-4925

C T 9767

Production Order #1701009767

5

Customer: FCFE01 Howard County Dept.of Fire & Rescue
SO #: 699854 **PO #:** DB/2000018214
Specid: MDHWCO00223 **Model:** LTO15I3TG
Descrip.: LTO-15I3 Tail Golden Brown -Howard Co Dept of Fi, MD
Name: N. FLYNN
Patch1: < FLYNN >

Date written up 02/15/2017 **170219RED**
Date Due Out 03/07/2017 **CONTRACT**

Garment #: 8 of 34

Sizes:			
Chest	42	Shoulder	
Front	28	Neck	
Back	34	Forearm	
Sleeve	33.0	Bicep	
		Stomach	
		Taper	

Comments: CM-1-SS BC-SS

	REFRESH	**REENGINEERED**	
	REV1	*** Revision 1 ***	
	LTOTOS15G	LTO Tail Outer Shell -7.8 osy Omni Vantage - Golden Brown	1
	LTOTTLI	LTO Tail Thermal Liner -7.1 osy Synergy II 2 Layer	
	LTOTMB3	LTO Tail Moisture Barrier -4.7 osy Type 2F Crosstech Black	
	CCSTD-15G	(Q01) Std -LTO Chinstrap	
	CFCCS-15G	Std -Coat Cuffs	
	IPLC	Std -Inspection Port Liner	
	LNDC	Std-Liner detachable	
	LNSETTE	Std -SET Thermal Enhancement	
	PKTLSTD	Std -Liner Label Pocket	**
	TR-DSS	Std -Trim Double-Stitched	
	RS-RRSAC	(R01) Std-Articulating Rapid Rescue Strap	
	TRC302M-TL	Trim -(2) NFPA Hi-viz -lime 2-tone Scotchlite (3")	
	TRSSC3-TL	(T04) Trim -Split cuff bands -lime 2-tone Scotchlite (3")	
	LTBACK-15G	Back Patch - Omni Vantage - Golden Brown	
		<H C F R> - no periods - square patch	
	LT3S04-SL	4 -3" sewn letters -lime Scotchlite	
	LTHEMV-15G	Hem Patch w/Velcro - Omni Vantage - Golden Brown	
		FF LAST NAME (1st INITIAL when specified) - avg 7 letters	
	LT2S07-SL	7 -2" sewn letters -lime Scotchlite	
	CLCH-15G	(E08) Chicago Closure -2" Velcro/Hooks & Dees	
		shield lined with Crosstech	
***	CL-SML	(S18) Shield Mounted Left	
	LNDAPCE	Dead Air Panels Extended	
	SATU-NONE	Delete Standard Take Up Straps	
	PKDR	D-Ring -Pointing Down - No Patch	
		On Outside of Radio Pocket on leftt Chest -On The Top right Side (On Depth)	
	PKHBLN-15G	Half Hi Bellows Pockets - Omni Vantage - Golden Brown	
		*** 6" x 9" x 4" ***	

Print Date ROC2 02/15/2017 10:35:49 PM

Morning Pride Mfg
1 Innovation Court
Dayton, OH 45414
Telephone 937/454-4925

C T 9767

Production Order #1701009767

Customer: FCFE01 Howard County Dept of Fire & Rescue
SO #: 699854 **PO #:** DB/2000018214
Specid: MDHWCO00223 **Model:** LTO15I3TG
Descrip.: LTO-15I3 Tail Golden Brown -Howard Co Dept of Fi, MD
Name: N. FLYNN
Patch1: < FLYNN >

Date written up 02/15/2017 **170219RED**
Date Due Out 03/07/2017 **CONTRACT**
Garment #: 8 of 34

Sizes:			
Chest	42	Shoulder	
Front	28	Neck	
Back	34	Forearm	
Sleeve	33.0	Bicep	
		Stomach	
		Taper	

Comments:

	PKBLC-FW	Flap .5" Wider than Bellows Pockets, Both Sides
	PKRCF-KV	Lined with Kevlar
	PKDIVC-KEV	Bellows Pocket Divider -Kevlar
		left bellows pocket divided 2" from rear
	PKBLC-V1	3 Vertical Strips Velcro on Flap/Full Velcro on Pocket
	PKMT-15G	Mic Tab - Omni Vantage - Golden Brown
		*** on shield (stormflap) (XONSLD)
		*** 1.5" x 3.5" ***
		Centered on shield - 4" below top of shield
	PKRD-SP-15G	Radio Pocket - Special Placement -Omni Vantage -GB
		*** left chest (LCHEST)
		*** 7 x 3 x 2 ***
		8" below shoulder seam or as close to this position as possible - as close shield as possible
	PKRD-FNL	Notch Flap -Left
	PKRD-F01	Flap .5" Wider than Pocket, Both Sides
***	PKRDL-KV3	Lined with Kevlar & Black Crosstech Black
	PKSLC-15G	SL-90 Flashlight Clip - Omni Vantage - Golden Brown
		*** right chest (RCHEST)
		Tab to be 1.5" x 3.5" - Placed directly above Chest Trim band - Strap to be 1" x 10" - 3" Velcro - Placed directly below chest trim band
	HWC02-AR	(S10) - 2 additional snap tabs on Bottom of Tail
	WWSTLN	Sub Wristlets -Long with tabs -Nomex

********** Continue..... **********

Print Date ROC2 02/15/2017 10:35:49 PM

HOWARD COUNTY DEPARTMENT OF FIRE and RESCUE SERVICES

TURNOUT GEAR TRACKING INFORMATION.

NAME: flynn, Nathan EID#: 3633

STATION: 5 SHIFT: B DATE: 10-20-16

This form shall be use to collect information of Turnout Gear.

Requested ☐ **Issued** ☐ **Returned to service** ☑ **Returned to QM** ☐

Replacement ☐ Loaner ☐ Used ☐ New ☐ Clean/Repair ☑ Condemned ☐ Expired ☐

DESCRIPTION	SERIAL #	SIZE	MFG. DATE
T.O. COAT		X 1 X	/ /
T.O. PANTS	121101193	36 X 30	12/5/2012

Additional comments:

Received By: X *Date:* X

Compiter filing location: *Destroyed Gear* ☐ *Returned Gear* ☐ *Cleaning Gear* ☑ *Master Log* ☐

HOWARD COUNTY DEPARTMENT of FIRE and RESCUE SERVICES

TURNOUT GEAR TRACKING INFORMATION.

NAME: Nathan Flynn EID#: 3633

STATION: 5B SHIFT: B DATE: 10/4/2016

This form shall be use to collect information of Turnout Gear.

Requested ☐ **Issued** ☒ **Returned to service** ☐ **Returned to QM** ☒

Replacement ☒ Loaner ☐ Used ☐ New ☐ Clean/Repair ☐ Condemned ☐ Expired ☒

DESCRIPTION	SERIAL #	SIZE	MFG. DATE
T.O. COAT	050400 9844	40 X 27 / 33 X 31	4/25/2008
T.O. PANTS		X	/ /

Additional comments:

Received By: X [signature] *Date:* 10/4/16

Computer filing location: *Destroyed Gear* ☐ *Returned Gear* ☒ *Cleaning Gear* ☐ *Master Log* ☐

HOWARD COUNTY DEPARTMENT of FIRE and RESCUE SERVICES

TURNOUT GEAR TRACKING INFORMATION.

NAME: Nathan Flynn EID#: 3633

STATION: 5B SHIFT: B DATE: 10/4/16

This form shall be use to collect information of Turnout Gear.

Requested ☐ **Issued** ☒ **Returned to service** ☐ **Returned to QM** ☐

Replacement ☐ Loaner ☐ Used ☒ New ☐ Clean/Repair ☐ Condemned ☐ Expired ☐

DESCRIPTION	SERIAL #	SIZE	MFG. DATE
T.O. COAT	140401275	42 X 27 / 33 X 33	5/22/2014
T.O. PANTS	131200 6002	38 X 30	11.9/2014

Additional comments:

Received By: X [signature] *Date:* 10/4/16

Computer filing location: *Destroyed Gear* ☐ *Returned Gear* ☐ *Cleaning Gear* ☐ *Master Log* ☒

Morning Pride Mfg
1 Innovation Court
Dayton, OH 45414
Telephone 937/454-4925

d T 0275

Production Order #**1404010275**

Customer: **FCFE01** Howard County Dept.of Fire & Rescue
SO #: **627756** **PO #:** DB/2000012235
Specid: MDHWCO00180 **Model:** LTO15I3TG
Descrip.: LTO-15I3 Tail Golden Brown -Howard Co Dept of Fi, MD
Name: ~~<NORMAN>~~ Flynn, Nathan #3633 10-4-16

Date written up 05/21/2014 **140522GLD**
Date Due Out 05/29/2014 **CONTRACT**
Garment #: 39 of 58

Sizes:			
Chest	42	Shoulder	
Front	27	Neck	
Back	33	Forearm	
Sleeve	33.0	Bicep	
		Stomach	
		Taper	

	LTOTOS15G	LTO Tail Outer Shell -7.5 osy Omni Vantage - Golden Brown	1
	LTOTTLI	LTO Tail Thermal Liner -7.1 osy Synergy II 2 Layer	1
	LTOTMB3	LTO Tail Moisture Barrier -4.7 osy Type 2F Crosstech Black	
	CFCCS-15G	Std -Coat Cuffs	
	IPLC	Std -Inspection Port Liner	
	LNDC-15G	Std -Liner Detachable	
	LNSETTE	Std -SET Thermal Enhancement	
	PKTLSTD	Std -Liner Label Pocket	**
	SATUPST-15G	Std -Take Up Straps - 2 Postman	
	OPCHCL	Howard County Label	16
	RS-RRSAC	Std-Articulating Rapid Rescue Strap	
	TRC302M-TL	Trim -(2) NFPA Hi-viz -lime 2-tone Scotchlite (3")	
	TRSSC3-TL	Trim -Split cuff bands -lime 2-tone Scotchlite (3")	
	LTBACK-15G	Back Patch - Omni Vantage - Golden Brown	
		<H C F R> - no periods - square patch	
	LT3S04-SL	4 -3" sewn letters -lime Scotchlite	
	LTHEMV-15G	Hem Patch w/Velcro - Omni Vantage - Golden Brown	
		FF LAST NAME (1st INITIAL when specified) - avg 7 letters	
	LT2S07-SL	7 -2" sewn letters -lime Scotchlite	
	PO-IC	Integral Customization	
		*** left sleeve (LSLEEV)	
		Howard Cnty Dept. of F&R Patch	
	CLCH-15G	Chicago Closure -2" Velcro/Hooks & Dees	
		shield lined with Crosstech	
***	CL-SML	Shield Mounted Left	
	CCSTDL-15G	LTO Long Chinstrap	
	LNDAPCE	Dead Air Panels Extended	
	PKDR	D-Ring -Pointing Down - No Patch	
		On Outside of Radio Pocket on leftt Chest -On The Top right Side (On Depth)	
	PKHBLN-15G	Half Hi Bellows Pockets - Omni Vantage - Golden Brown	
		*** 6" x 9" x 4" ***	

Print Date ML 05/21/2014 10:47:50 AM

HOWARD COUNTY DEPARTMENT OF FIRE AND RESCUE SERVICES

UNIFORM - PROTECTIVE EQUIPMENT
REQUISITION / RECEIPT

Name: N. Flynn Station 73
EID: 3633 Approved
Date 1-24-13

SN# 060700080 8

Cat. #	Qty.	Description	Size	Color	Cost
N/A	1	T.O. Pants	34x31		

NOTE
This form shall be used for ONE catalog item only

Date entered: 1-24-13 Ordered ☐ Credit Trans No.
Trans. no.: Issued ☑

Received by: Date: 01.29.2013

COPIES: White-File Yellow - Dept. Revised 2/15/90

HOWARD COUNTY DEPARTMENT OF FIRE AND RESCUE SERVICES

UNIFORM - PROTECTIVE EQUIPMENT
REQUISITION / RECEIPT

Name: NATHAN FLYNN Station 73
EID: 1-24-13 Approved
Date 3633

SN# 121011193

Cat. #	Qty.	Description	Size	Color	Cost
N/A	1	T.O. Pants	36x30		

NOTE
This form shall be used for ONE catalog item only

Date entered: 1-24-13 Ordered ☐ Credit Trans No.
Trans. no.: Issued ☑

Received by: Date: 01.21.2013

COPIES: White-File Yellow - Dept. Revised 2/15/90

HOWARD COUNTY DEPARTMENT OF FIRE AND RESCUE SERVICES

UNIFORM - PROTECTIVE EQUIPMENT REQUISITION / RECEIPT

Name: Nathan Flynn **Station** 7-B
EID: 3633 **Approved** _____
Date 07/05/12

Cat. #	Qty.	Description	Size	Color	Cost
	1	T.O. Pants	32x31		

Serial # 03@1000136?

NOTE

This form shall be used for ONE catalog item only

Date entered: _____ **Ordered** ☐ **Credit Trans No.** _____
Trans. no.: _____ **Issued** ☑

Received by: X [signature] **Date:** X 7.5.12

COPIES: White-File Yellow - Dept. Revised 2/15/90

Nathan Flynn Turnout Gear Record 072318.xlsx

Serial Number	Mfg Date	Size	Item		Issued to
1211011193	4/25/2005	36 x 30	Pants	standard	Flynn, Nathan E. (EID # 3633)
1404010275	5/22/2014	42 x 27/33 x 33	Coat	standard	Flynn, Nathan E. (EID # 3633) (10-4-2016)
1312006002	1/9/2014	38 x 30	Pants	standard	Flynn, Nathan E. (EID # 3633) (10-4-2016)
1701009767	2/17/2017	42 x 28/34 x 33	Coat	standard	Flynn, Nathan E. (EID # 3633) (6-22-2017)

Cleaning Log

Flynn N.	Coat	0609003391	01/05/2012
Flynn N.	Coat	0504009344	12/21/2012
Flynn N.	Pants	0609003956	12/21/2012
Flynn, N.	Pants	1211011193	6/11/2013
Flynn, N.	Pants w/susp.	1211011193	10/5/2016

Appendix H: Elkhart Brass Nozzle Testing Report

ELKHART BRASS
FIRE FIGHTING EQUIPMENT A SAFE FLEET BRAND

1302 West Beardsley Ave. | Elkhart, IN 46514 | 574 . 295 . 8330 | www.elkhartbrass.com

Subject: Howard County (Maryland) Fire Department Nozzle Investigation

Date: February 15, 2019

Prepared by: Chris Martin, Municipal Product Manager / Testing conducted by Chris Martin, Municipal Product Manager and Kile Swearengin, Engineering Technician

The following is the summary of the findings of the testing of an Elkhart Brass Combination Fog nozzle related to a fire incident resulting in the death of a Howard County Fire Department member on July 23, 2018.

Nozzle Model Identification:
The nozzle received was a Model 4000-24 Chief Fixed Flow Combination Fog Nozzle Tip rated for a 200 gpm @ 75 psi flow rate. The tip was affixed to a Model B-275A ball shutoff with a 1-3/8" waterway. Both were stamped with the letter code "EE" which refers to the year of manufacture which was 2006 (Image 21-22).

Initial Nozzle Observations upon receipt:
Nozzle was in a wide fog pattern and was covered with debris commonly found in firefighting including what appeared to be some drywall material that was on caked on parts of the nozzle including the swivel and side of the shutoff. It arrived to us in the closed position (Image 5) and was also photographed in the open position (Image 6). Images 1-15 are of the nozzle as it was received to us except for Image 6 as noted.

Test Results:
The nozzle was affixed to our flow test stand in the pattern position that it arrived to us. The stream pattern was positioned in wide fog and the angle was calculated with a protractor to reveal an approximate angle of 133 degrees. (Image 16-17)

The nozzle was brought up to a pressure of 75 psi at the nozzle inlet base and the output flow was 227 gpm. (Image 18)

The nozzle moved freely from straight stream to full fog, and into the flush position OK. (Image 19)

The shutoff moved freely and no leaks were observed when the nozzle was in a closed position with pressure behind it. (Image 20)

ELKHART BRASS
FIRE FIGHTING EQUIPMENT · A SAFE FLEET BRAND
1302 West Beardsley Ave. | Elkhart, IN 46514 | 574 . 295 . 8330 | www.elkhartbrass.com

Image 1



Image 2



Image 3



Image 4



Image 5



Image 6



Image 8



Image 9



Image 10



Image 11



Image 12



Image 13



Image 14



Image 15



Image 16



Image 17



Image 18



Image 19



Image 20



Image 21



Image 22



Appendix I: HCDFRS General Orders

General Order 100.04: Position Requirements

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

100.04

Originating From	Issue Date	Revision Date	Attachments
Bureau of Administrative Services	**06/14/1984**	**04/20/2012**	**A**

SUBJECT: **Position Requirements – Licenses, Certifications, Experience and Education Prerequisites**

APPLICABILITY: **Career, Uniformed Personnel**

POLICY

Most uniformed positions within Howard County Department of Fire and Rescue Services (DFRS) may require the incumbent to maintain specific licenses and certifications in accordance with employee classification, employee position description, and/or operational standards. These positions also include minimum experience and education requirements. This order outlines the revised minimum requirements and serves as notification to uniformed employees who are preparing for promotion on/after November 1, 2016. Updates to the Howard County Classification Plan will be legislated prior to 2016 to reflect these new minimum standards for experience and education requirements.

This order summarizes minimum requirements and preferred elements for promotable ranks of the uniformed career staff, as well as includes general guidelines and responsibilities regarding license/certification maintenance.

1. GUIDELINES FOR REVISED POSITION EXPERIENCE AND EDUCATION PREREQUISITES
   1.1. Implementation of the Leadership Education and Development (LEAD) program's *Officer Certifications & Development Objectives* (Attachment A) will increase the effectiveness of leadership within DFRS by defining specific and available objectives for officer development. These pathways include a broad set of both required and preferred prerequisites that are important to becoming a good leader.

   1.2. DFRS will incorporate the *Officer Certifications & Development Objectives* of the LEAD program into the promotion requirements for officer positions among the uniformed career staff. The implementation timeline for these objectives to become required promotional elements are as follows:
      1.2.1. Candidates for Lieutenant and Captain: Eligibility lists effective November 1, 2016 and afterward.
      1.2.2. Candidates for Battalion Chief and Assistant Chief: Eligibility lists created in 2017 and afterward.

2. INDIVIDUAL RESPONSIBILITY FOR LICENSE/CERTIFICATION MAINTENANCE
   2.1. Uniformed career personnel must possess specific, valid licenses and certification as denoted in the appropriate position description. Some personnel may be required to maintain advanced certifications associated with their current job assignment. These advanced certifications could include, but are not limited to: ALS-Intermediate, ALS-Paramedic, hazmat technician, etc. It is the individual's responsibility to obtain and maintain current and valid licenses, certifications, and/or registrations.

2.2. Personnel must make notification to their immediate supervisor when the status of any required license or certification has changed. Written notification must be completed no later than the start of the next regularly scheduled work period, if not earlier. A non-exhaustive list of events requiring notification contains:

2.2.1. Changes to driver's licenses status, to include but not limited to:

2.2.1.1. Driver's license is expired, revoked or suspended;

2.2.1.2. DOT/CDL card is expired, revoked or suspended;

2.2.1.3. Individual has received a citation or is charged with driving under the influence, and/or driving while impaired;

2.2.1.4. Individual's physician has ordered the individual not to drive while under treatment. Doctor's certificate shall be attached to the written report;

2.2.1.5. Individual is in a probationary driving status as determined by a court of law or the motor vehicle administration; or,

2.2.1.6. Any other reportable occurrence as listed in the Howard County Employee Manual.

2.2.2 Loss, suspension, or revocation of any required licenses, certifications, and/or registrations.

2.2.3 Filing of charges against an individual by any enforcement/compliance organization and/or certification agency,

2.2.4 Any other status change regarding licenses or certifications.

3. SUPERVISORY RESPONSIBILITY REGARDING LICENSE/CERTIFICATION MAINTENANCE

3.1. For uniformed career personnel, the immediate supervisor shall sign the individual's written report (to indicate that the supervisor has read the document) and forward it through the chain of command to Assistant Chief, Bureau of Administrative Services. Same day notification by the supervisor to the field battalion chief is mandatory when the individual is operational in the field.

3.1.1. An employee may be immediately placed on administrative assignment pending review and resolution of the situation. Each situation will be reviewed and appropriate action initiated. Any disciplinary action shall be in concert with DFRS GO #110.13, General Disciplinary Policy and/or the Howard County Employee Manual.

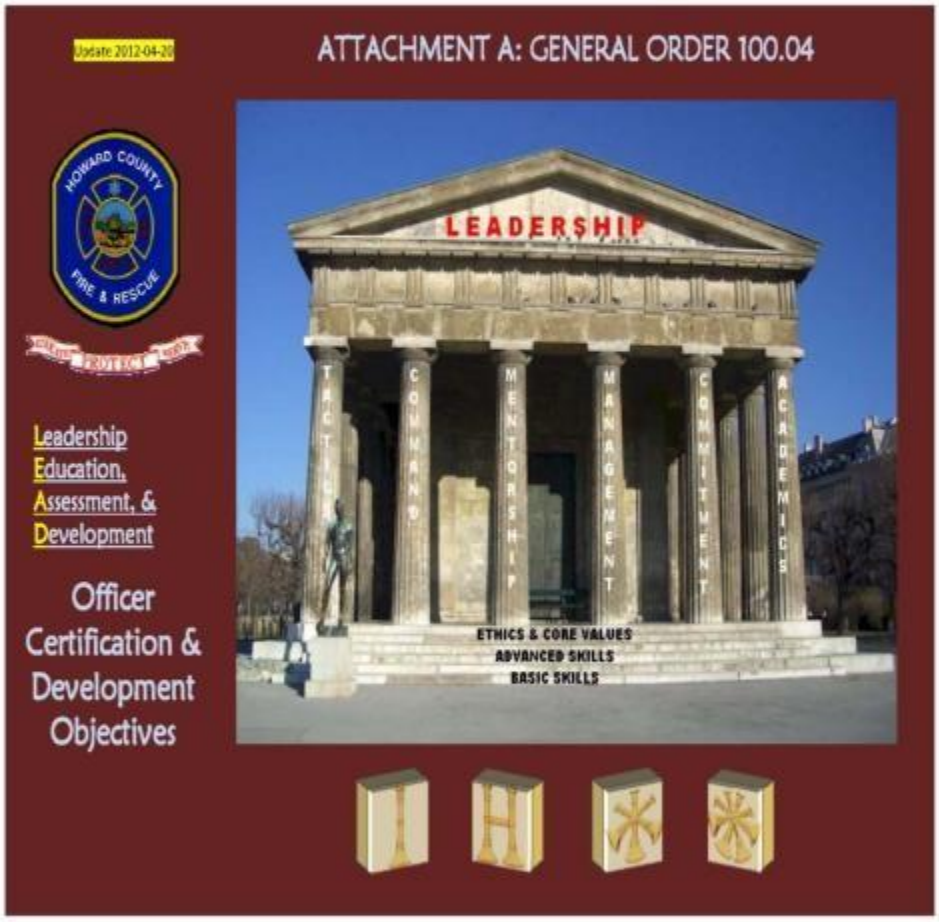
3.2. Supervisors shall ensure that personnel with expired licenses/certifications are not allowed to perform in an operational status or operate any fire service vehicles without the required valid licenses, certificates and/or registrations.

Approved:



William F. Goddard, III
Chief

Attachment A



DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

100.04

DFRS LEADERSHIP EDUCATION AND DEVELOPMENT: OBJECTIVE AND BASIS FOR THE PROGRAM Update 2012-04-20



The objective of the Howard County Department of Fire and Rescue's (DFRS) Leadership, Education, Assessment, and Development (LEAD) program's Officer Certification & Development Objectives is to increase the effectiveness of leadership within our organization by defining specific and available objectives for officer development. These pathways include a broad set of both required and preferred elements that are important to being a good leader throughout the coming decade. It is the intention of the Department to incorporate these defined objectives into the promotional requirements for officer positions within the career department.

The concept of these charts is six pills is built atop a foundation, in this case with three steps. The three steps, for DFRS, represent knowledge that builds the foundation for the organization (basic skills, advanced skills, and ethics & core values). The six pills represent core areas that are each essential to being a well-rounded officer and organizational leader (Tactical/Ops, Incident Command, Mentorship, Management, Commitment to the Organization, and Academics). The symbolism was chosen to communicate that, with a good foundation and strong pillars, our organization can withstand all challenges and stand strong forever.

There are several important documents that have served as guiding forces for the development of this OFFS program. Extensive efforts have been made to maintain consistency with the recommendations contained in the below resources. Each is based on a significant body of research and analysis of the levels of decision making and required leadership, and compared both public and private sector factors. Together they provide a reliable basis for program development. These documents are at the core of a consensus standard for fire service officer development:

- NFPA 1021 Standard for Fire Officer Professional Qualifications, 2009 Edition developed by National Fire Protection Association
- Current Howard County Job Descriptions and classification plan
- International Association of Fire Chiefs (IAFC) Officer Development Handbook
  - The pyramid contained in their document is the FESHE outline, explained below. The document is the result of a three-year work effort of the IAFC Professional Development Committee. The committee went to great lengths to meld diverse points of view. The basis for their vision came from the recurrent Wingspread conferences, where top fire-service leaders convene every ten years to address the need for professional development of future leaders so there is capacity for continued development and management of fire service organizations and capacity for fire service leaders to be credible community policy makers.
- Fire & Emergency Services Higher Education (FESHE) curriculum model
  - The U.S Fire Administration's effort to establish a strategic direction for a collaborative process involving the fire service professional development community to develop a national model for an integrated system of professional development and higher-education, in order to ensure that future fire service leaders are developed to be a well-trained and academically-educated local and national protective resource.

As always, local factors must be, and were, considered. It is imperative to DFRS that an adequate pool of qualified applicants for each rank be available for promotional consideration. The number of qualified applicants for promotion is still fairly small at the higher ranks, and the required specialization for many of the higher positions, and the quantity of specialized education and experience needed to effectively fill those positions, continues to grow, making the pool even smaller.

In consideration of the increased education and experience outlined in this program, the recommended implementation dates for these objectives to become required promotional elements are as follows:

- Candidates for Lieutenant and Captain, November 1, 2016.
- Candidates for Battalion Chief and Assistant Chief, the 2017 promotional process.

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
100.04

Update 2012-04-20

Note Regarding Proposed Academic Education Requirements: In these DFRS Officer Certification & Development Objectives, the recommended academic requirements have been reduced a step from the IAFC and FESHE recommendations. This was done as it was felt that the DFRS qualified pool would be unacceptably small otherwise. The wisdom of this effort to increase the number of qualified applicants will need to be regularly evaluated, as the clear trend is for greater education with many of the higher-ranked positions.



RANK	CURRENT	PROPOSED	NATIONAL MODEL
Lieutenant	*15 college semester credits*	*45 matriculated semester credits * (or 67 quarterly credits)*	
Captain	*30 college semester credits*	*Associates degree ** (usually 60 semester or 90 quarterly credits) OR Active student in a four-year degree program WITH 75 semester-based credits (or 115 quarter-based credits)*	*Associates degree*
Battalion Chief	*60 college semester credits*	*90 matriculated semester credits * (or 135 quarterly credits)*	*Bachelor's degree*
Assistant Chief	*90 college semester credits*	*Bachelor's degree ** (usually 120 semester or 180 quarterly credits)*	*Master's degree*

**College credits matriculated at a Regionally Accredited Post-Secondary institution* ***Degree from a Regionally Accredited Post-Secondary institution*

Regarding the academic college credits, to provide one example of what is possible, in 2011, one nationally accessible online university (that is a regionally accredited post-secondary institution) evaluated the current DFRS Trainee Class curriculum and has indicated they would transfer 40 of 90 required quarter-based credits for an AA degree (they use a quarterly credit system), with most of those credits being used to satisfy their degree electives. That equates to about 26 semester-based credits, or ***44% of the credits required for the AAS Degree, right out of the Academy***. To provide a further example of what is possible, that university also evaluated a MFRI spread of classes that a Captain candidate might have for 51 of 181 required quarter-based credits towards their BA degree, with most of those credits being used to satisfy their degree electives. This is roughly equivalent to 34 semester credits, or ***28% of the credits required for a Bachelor's Degree***. There may be potential for even a few more credits with some negotiation between the prospective student and the institution. Other institutions offer similar, if not more advantageous, credit transfer scenarios.

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
100.04

Update 2012-04-20

Note Regarding Proposed Length of Service/Experience Requirements: In these DFRS Officer Certification & Development Objectives, the recommended length-of-service requirements have been increased over what is currently required. However, in efforts to avoid an unacceptably small qualified pool, some officer years-of-experience requirements were kept on the shorter side, but still within the recommended range, of the IAFC recommendations. The current job classification for Assistant Chief also addresses this same issue by allowing a Captain to be minimally eligible for Assistant Chief. To avoid an unacceptably small qualified pool and address the need for increased specialized education at this rank, the included recommendation is to continue this strategy. *The included recommendations still represent a meaningful increase over currently required years of experience:*

RANK	CURRENT	PROPOSED	NATIONAL MODEL
Lieutenant	*4 years to be a Lieutenant*	*4 years credible service classified as a HCDFRS Firefighter (5.5 total years)*	*3-5 years as a qualified responder*
Captain	*5 years (1 year as a Lieutenant)*	*2 years credible service classified as a HCDFRS Firefighter Lieutenant (7.5 total years)*	*5-9 years (2-4 years as a Lieutenant)*
Battalion Chief	*6 years (1 year as a Captain)*	*3 years credible service classified as a HCDFRS Fire Captain (10.5 total years)*	*8-12 years (3-5 years as a Captain)*
Assistant Chief	*6 years (1 year as a Captain)*	*7 years at the level of a HCDFRS Fire Captain and/or at the level of a HCDFRS Battalion Chief (14.5 total years)*	*12-16 years (4 years as a BC)*

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
100.04

DFRS LEADERSHIP EDUCATION AND DEVELOPMENT: OFFICER CERTIFICATION & DEVELOPMENT OBJECTIVES OVERVIEW Update 2012-04-20

There are two areas of the LEAD program's Officer Certification & Development Objectives:

- Required Officer Elements
- Preferred Officer Elements

The Required Officer Elements chart outlines the courses and elements that will be absolutely required for promotion. There were several considerations in choosing which items are to be absolutely required. It is very important that our personnel have adequate opportunities to attend and complete these elements, that the completion can be absolutely verified, and that the curriculum or content of these elements will be stable over the medium term. For the most part, elements in this section are certifiable (by the Maryland Fire Service Professional Qualifications Board and/or the Pro Board). Courses with an established and stable curriculum are also suitable.

The Preferred Officer Elements must still be established, but can be more flexible. These are measurable courses or projects that DFRS declares as valuable for the specific officer rank. Personnel desiring to attain those ranks would be guided toward these elements, and opportunities provided. Consideration of whether they achieved them or not may be afforded during the interview process for promotion, as there is now be a defined educational and experience matrix upon which objective comparisons can be made. It is in this section where specific local option or locally developed content is included, including non-certifiable content that might be considered "Officer Candidate School", and training such as RMS, iMobile, HR situations, Department Policy, Staff Studies (structured analysis of department issues with proposed solutions), etc.

Included in the section are requirements to complete Staff Study reports, one at each rank. The staff study report is a constructive problem-solving model that is used by many organizations. As stated in the U.S. Air Force's *Joint Staff Officer's Guide*, "Since the purpose of a staff is to assist the commander in the exercise of command, the work of the staff revolves around the solution of problems... The staff study is one of the more flexible problem-solving procedures available to a staff." The process of authoring a staff study report will guide participants to research a departmental challenge to clearly identify issues, develop and evaluate alternatives, and recommend effective action based on relevant facts. The result is a document that can be used as a briefing in the decision-making process for the Department. These projects will serve to reinforce the commitment to improving the organization through positive contribution and constructive problem-solving, and to foster an informed perspective for issues in all areas of the organization.

LEAD Officer Certification & Development Objectives – Required Officer Elements

These elements are absolutely required to be eligible for promotion

	Tactical & Ops	Incident Command	Mentorship	Management	Commitment to Organization	Academics
AC Exec	DFRS Experience: 7 yrs as CAP and/or BC[2]			*Fire Officer IV OR EFO certificate (N) OR CFO designation (CFSE)		Bachelor's Degree[1]
BC Admin	DFRS Experience: 3 yrs service as CAP[2]			*Fire Officer III *Fire Inspector II Course – Leadership III (N)		90 semester-based credits[1] (or 135 quarter-based credits)
CAPT Managing	DFRS Experience: 2 yrs service as LT[3] Course – Building/Const-NonComb (M) Course - Decision Making for ICO (W) Course - Preparation for ICO (W) Course - Strategy-Tact for ICO (M)	ICS-400 Advanced ICS[4] ICS-701.a MACS ICS-702.a PIO ICS-703.a Resource Mgmt ICS-704 Communications	*Fire Service Instructor II	*Fire Officer II Course – Leadership II (N)		1) Associate's Degree[1] OR 2) 75 semester-based credits[1] (or 115 quarter-based credits) WITH Active student in a four-year degree program[7]
LT Single Resource Officer	DFRS Experience: 4 yrs service as FF[3] *Inc Safety Officer – Fire Supp *Inc Safety Officer – EMS *Inc Safety Officer – Tech Rescue *Fire App Driver Operator – Pump *Fire App Driver Operator - Aerial Course – Building/Const-Comb (M)	ICS-300 ICS[5] ICS-400 Response Framework	*Fire Service Instructor I	*Fire Officer I *Fire Inspector I *EMS Officer I Course – Leadership I (N)		45 semester-based credits[1] (or 67 quarter-based credits)
FF	Probationary Firefighter Curriculum (D)					
FFR	*Trainee Academy Curriculum* *EMT-B State License* *Firefighter II *HazMat Ops *Rescue Tech VMR Course – Rescue Tech CS	ICS-100 Intro ICS[5] ICS-200 Single Resource[5] ICS-700 Intro NIMS				

*(Curriculum Guide D-DFRS M-MFRI N-NFA) EFO-Executive Fire Officer (NFA) CFO-Chief Fire Officer (CFSE) * Denotes MD state (MFSPQB) or national (NAQS, IFSAC, or DOD IFSAC) certification required.*

[1] *4 years credible service classified as a MCDFRS Firefighter (5.5 total years)* [2] *2 years credible service classified as a MCDFRS Firefighter Lieutenant (7.5 total years)*

[3] *3 years credible service classified as a MCDFRS Fire Captain (10.5 total years)* [4] *7 years service at the level of a MCDFRS Fire Captain and/or at the level of a MCDFRS Battalion Chief (14.5 total years)*

[5] Equivalents are listed in Footnote 1. [6] *Degree from (or college credits matriculated through) a Regionally Accredited Post-Secondary Institution.*

[7] *Evidence of active student status in a four-year degree program at a Regionally Accredited Post-Secondary Institution required.*

Ethics & Core Values Commitment
Advanced Skills (EMT-Paramedic State License, Special Ops Technician Courses, MICRB certification, or other specialized focus.)
Minimum Operational Skill Set (Training Academy Curriculum and Probationary Year Curriculum)
FOUNDATION FOR ALL PROVIDERS

Attachment A: General Order 100.04 Update 2012-04-20

LEAD Officer Certification & Development Objectives - Preferred Officer Elements

These courses and elements are required to maintain compliance with the LEAD Officer Certification & Development Objectives, but not absolutely required for promotion.

	Tactical & Ops	Incident Command	Mentorship	Management	Commitment to Organization	Academics
AC Exec		#Exec Analysis EOC Fire Ops (A) #All-Haz IMT (M)		Course - Leading Diverse Communities, Beyond Conflict (M)		Master's Degree***
BC Admin		#Command & General Staff (M) #Unified Command (M)		Any Required Elements for AC *Public Information Officer Course - FD Equal Op Officer II (M)	DFRS Senior Officer Development Program Completion (D) Two years assigned in an organizational support position. ## Two years assigned as a company officer in an operational position. ## Strategic Planning Staff Study 3 ###	Required Elements for AC
CAPT Managing	EmResp/Terror: Strategic (M) EmResp/Terror: Tactics (M)		DFRS Preceptor or Mentor CPR Instructor *Public Educator I	Any Required Elements for BC *Fire Investigator I Course - FD Equal Op Officer I (M) Course - Managing in a Changing Env (M)	Strategic Planning Staff Study 2 ###	Required Elements for BC
LT Single Resource Officer	Any Required Elements for Captain Advanced Skill Set of Some Kind Driver's License for Heavy Vehicle operation [1]		Any Required Elements for Captain	Any Required Elements for Captain	DFRS Officer Candidate Program Completion (D) Strategic Planning Staff Study 1 ###	Required Elements for Captain
FF						
FFR						

(Curriculum Guide D–DFRS M–MFRI N–NFA) * *Denotes Maryland state (MFRSPQB) or national (NREQS, IFSAC, or DOD IFSAC) certification required.*
** *Degree from a Regionally Accredited Post-Secondary institution.* [1] *See Footnote 3* # *Department may facilitate training.*
As determined by the Fire Chief ### *Over the three reports, topics must address one issue in each area: All-Hazard Ops, EMS Ops, and Support Services*

Ethics & Core Values Commitment

Advanced Skills (EMT-Paramedic State License, Special Ops Technician Courses, MICRR certification, or other specialized focus.)

Minimum Operational Skill Set (Training Academy Curriculum and Probationary Year Curriculum)

FOUNDATION FOR ALL PROVIDERS

Attachment A, General Order 100.04

Update 2012-04-20

Footnote 1: Maryland Emergency Management Agency (MEMA) Accepted NIMS Equivalents

Update 2012-04-20

ICS-300: R317 or N317 or O317 - Command and General Staff Functions for Local Incident Management Teams

Footnote 2: Overview of NIMS ICS Courses

IS-100, Introduction to ICS (On-Line, few hours, or can be taught in the classroom and tested On-Line, half day)
IS-200, ICS for Single Resources (On-Line, few hours or can be taught in the classroom and tested On-Line, half day)
IS-700, National Incident Management System (On-Line, few hours or can be taught in the classroom and tested On-Line, half day)
IS-701.a, NIMS Multiagency Coordination System (MACS) (On-Line, few hours)
IS-702.a, NIMS Public Information Systems (On-Line, few hours)
IS-703.a, NIMS Resource Management (On-Line, few hours)
IS-704, NIMS Communication and Information Management (On-Line, few hours)
IS-800, National Response Plan, An Introduction (On-Line, few hours or can be taught in the classroom and tested On-Line, half day)
ICS-300, Intermediate ICS for Expanding Incidents (Classroom Only, 3 Days)
ICS-400, Advanced ICS for Command and General Staff (Classroom Only, 2 Days)

Footnote 3: Driver's License Requirements

1. Drivers license must be state issued and allow driver operation of fire apparatus up to 80,000 pounds as provided for by Maryland law.

General Order 100.17: Standard of Coverage

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

100.17

Originating From	Issue Date	Revision Date	Attachments
Administration	**1/19/2006**	**N/A**	**A**

SUBJECT: **Standard of Coverage**
APPLICABILITY: **All Personnel**

POLICY:
The Howard County Department of Fire and Rescue Services (DFRS) Standard of Coverage document defines the service level objectives of the Department's response to fire and non-fire emergencies.

1 THE STANDARD OF COVERAGE SPECIFICALLY DISCUSSES THE FOLLOWING TYPES OF EMERGENCY RESPONSES:

- 1.1 Emergency Medical Service response
- 1.2 Non-Structural Fire response
- 1.3 Structural Fire response
- 1.4 Hazardous Materials response
- 1.5 Technical Rescue response

Approved:

Joseph A. Herr
Fire Chief

Howard County
Department of Fire and Rescue Services

Standard of Coverage

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GENERAL INFORMATION

Howard County's geographical boundaries are established as part of state and local laws. There is a General Plan, an online geographic information system (GIS), and online Census information, all containing relevant data pertaining to development of organizational goals and objectives. Historical incident data, including computer-aided dispatch (CAD) information – from 1996 though current day and occupancy information are collected and maintained through the Fire Records Management System (FRMS). Additionally, the Department reviews data produced by the HC Economic Development Authority, HC Planning and Zoning, as well as other sources as appropriate. Periodic reports are produced from the various data sources available to the Department. The Department has acquired several software packages specifically designed to analyze Standard of Coverage Performance. They are Deccan International's CAD Analyst and Fire ADAM (Fire Apparatus Deployment and Management).

The Department analyses information relating to community experiences and projected changes in demographics. Risks are identified in accordance with the established criteria and appropriate response plans are developed. CAD response plans have been defined by incident type and have also been established for specific occupancies or areas as appropriate.

The Department has established two major planning zones the Metro and Rural districts. These are distinguished by the availability of public water and by the fire tax rate that is applied to real and personal property. The Department has further subdivided the planning zones into operational response areas of smaller units (from largest to smallest): 1) Battalion 1 and Battalion 2; 2) 134 box areas; and 3) 1,183 fire response zones (FRZ). Based upon conditions within each FRZ, we have assigned a level of fire and non-fire risks - High, Medium or Low.

Risk assessments have been performed for EMS responses, fire responses, hazardous materials responses, and technical rescue responses. These assessments are periodically reviewed and updated as appropriate.

Howard County Department of Police are responsible for the County's Public Safety Answering Point (PSAP / 911) as well as Fire and Rescue dispatch operations. The Department of Police uses Emergency Medical Dispatch (EMD) as required by Maryland for handling the receipt and entry of emergency medical calls. Fire and Rescue provides a liaison to work with the Department of Police to assure Fire and Rescue needs are properly addressed.

Staffing on Department apparatus is as follows:

- Special Services – includes aerial apparatus, squads: four (4) personnel
- Extrication Unit – includes aerial apparatus with extrication equipment, squads, and rescues: four (4) personnel
- Engines: three (3) personnel
- Tankers – unit carrying 1,500 gallons or greater of water: two (2) personnel
- EMS Transport Units : two (2) personnel
- Chief Officers and Staff Personnel: one (1) personnel

EMS RESPONSE

Standard EMS Response

The Standard of Care provided by the Department for Advanced Life Support (ALS) incidents within Howard County is Emergency Medical Technician – Paramedic (EMT-P) (DOT Standard). The Standard of Care provided by the Department for Basic Life Support (BLS) for incidents within Howard County is Emergency Medical Technician – Basic (EMT-B).

To address the EMS needs of Howard County, Fire & Rescue has developed several EMS dispatch categories. Each category receives a different response level. Only the minimum response levels are listed. The Incident Commander has full authority to request any equipment they deem necessary to contain such incidents. They are as follows:

- Basic Life Support – one BLS Transport unit
- Advanced Life Support – one ALS Transport unit
- Advanced Like Support with Assist – one ALS Transport unit, one Support Piece
- Advanced Life Support Critical – one ALS Transport unit, one Support Piece, and an EMS Officer
- Rescue with Unknown Injuries – one Engine, one BLS Transport unit
- Rescue with Injuries – one Engine, one Support Piece with rescue capabilities, and one ALS Transport unit
- Rescue with entrapment – two Engines, one Rescue unit, two ALS Transport units, one Battalion Chief, and one Medical Duty Officer.

STANDARD STAFFING ON EMS RESPONSE'S

- BLS only Response 2 personnel
- ALS only Response 2 personnel
- ALS with Support 5 personnel
- ALS Critical Response 6 personnel

STANDARD STAFFING ON RESCUE RESPONSE'S

- Rescue Unknown Injury(s) 5 personnel
- Rescue with Injury(s) 8 personnel
- Rescue with Entrapment 16 personnel

*** Totals may vary due to volunteer and staff response**

All non-EMS response units - fire engines, squads, and aerial apparatus - are equipped with Automated External Defibrillators (AED). Staff vehicles are equipment with AEDs as necessary.

At least one fire engine, squad, or aerial unit at each station is equipped with ALS equipment. These units are staffed with ALS providers as required to meet service needs.

Standard of Coverage for EMS Incidents

Performance measurement is from time call is first created in CAD – either ANI/ALI time stamp or Time Create time stamp. Goal is 80% of the time or better.

C/P	Performance Measure	Metro	Rural
P	(A) 911 Call Processing Receipt to Entry	<= 01:30	<= 01:30
P	(B) 911 Call Processing Entry to Dispatch	<= 00:30	<= 00:30
C	(C) 911 Total Processing Time	<= 02:00	<= 02:00
C	(D) First Unit Turnout	<= 02:30	<= 04:30
P	(E) First Unit on Scene	<= 10:00	<= 12:00
C	(I) First BLS on Scene	<= 10:30	<= 14:00
C	(J) First ALS on Scene	<= 10:30	<= 14:00
P	(K) First Transport on Scene	<= 11:00	<= 15:30
P	(L) First Unit-on-scene travel time	<= 06:45	<= 09:00
C	(M) First ALS APS	<= 12:00	<= 15:30
C	(N) First BLS APS	<= 12:00	<= 15:30
P	(S) To Hospital Transport Time	<= 13:00	<= 19:00
P	(0) BLS EMS-Call Time Spent at Scene	<= 18:00	<= 18:00
P	(1) ALS EMS-Call Time Spent at Scene	<= 18:00	<= 18:00

EMS Risk Classification Criteria

The following risk levels – High, Medium and Low – are for data analysis and planning purposes.

- *HIGH* Occupancies that have a potential for high acuity level of patients or fall under high usage (150 calls per year). Examples are hospitals, nursing homes, high rise structure (4 or greater stories), penal institutions and multiple assisted living facilities located in close proximity to each other.
- *MEDIUM* FRZ's that contain occupancies that house, accommodate or have the potential for sick or injured persons with a lesser acuity level or fall under medium usage 35-150 calls per year. This would include places such as schools, public assemblies, apartment complexes and isolated assisted living facilities.
- *LOW* Areas not meeting the description of high or medium. This would be the typical residential areas, business parks, and rural areas.

NON-STRUCTURAL FIRE RESPONSE

Standard Non-Structure Fire Response

Brush and Grass Fires

The frequency of large brush and grass fires continues to decline in Howard County. This is due, primarily, to the rapid growth that the County is experiencing. The growth has left less open space. A minimum response to a call of this nature is one engine and one brush vehicle. The Incident Commander has full authority to request any equipment they deem necessary to manage such incidents.

Vehicle Fires

Howard County has two major interstates, I-95 and I-70, which run through large areas of the County. There is also an extensive network of primary and secondary roads within the County. The Department handles passenger vehicle fires with an approximate annual loss of $1,000,000. Non-interstate response to a passenger vehicle fire is one engine. The interstate response for a passenger vehicle is two engines. Response to larger conveyances – not involving hazardous materials, such as recreational vehicles, tractor-trailers, and the like, is two engines. The Incident Commander has full authority to request any equipment they deem necessary to contain such incidents.

Miscellaneous Alarms

The Department responds to a multitude of miscellaneous alarms types to meet the needs of the community. Miscellaneous alarms include, but are not limited to, the following: lockouts/ins; inside flooding conditions; unusual odors; smoke and CO detector questions and replacements; the assisting of our elderly residents; and alarm system malfunctions. Although this list consists of only a small part of our miscellaneous alarm types, miscellaneous incidents are handled in a timely, professional manner.

STRUCTURAL FIRE RESPONSE

Standard Structural Fire Response

Howard County Fire and Rescue is divided into two major response areas. These areas are known as the rural and metro regions. A key difference between the two areas is the availability of water. Within in the Metro region there is a public water system (hydrant), within the Rural region there is no public water system. Fire response into these areas acknowledges the availability of a public water system or lack thereof. In the Rural area, Fire and Rescue maintains a list of available water sources so responding unit can rapidly establish a water supply system. Structural fire response is broken down into two (2) categories: Residential Structures (Single family dwelling, wood frame construction); and Multi-Residential and Commercial Structures.

Residential Structures

Equipment and Response:

Unit Type	**Metro**	**Rural**
Engines	4 (12 personnel)	4 (12 personnel)
Special Services	2 (8 personnel)	2 (8 personnel)
Aerial	1 (4 personnel)	1 (4 personnel)
Water Tankers		2 (4 personnel)
Transport unit	1 (2 personnel)	1 (2 personnel)
Battalion Chief	1 (1 personnel)	1 (1 personnel)
Personnel Totals	*27 personnel*	*31 personnel*

Task Analysis: Fireground Operations

Task	**Metro**	**Rural**
Fire Attack Line	2 personnel	2 personnel
Backup Line	2 personnel	2 personnel
R.I.T	4 personnel	4 personnel
Search & Rescue	2 personnel	2 personnel
Pump Ops/Water Supply	4 personnel	8 personnel
Tower Operations	2 personnel	2 personnel
Ground Ladders	2 personnel	2 personnel
Ventilation / Utilities	2 personnel	2 personnel
Safety	1 personnel	1 personnel
Incident Command	1 personnel	1 personnel
FF Rehab	2 personnel	2 personnel
EMS / Patient Care	2 personnel	2 personnel
Personnel Totals	*26 personnel*	*30 personnel*

Multi-Residential and Commercial Structures

Equipment and Response:

Unit Type	Metro	Rural
Engines	4 (12 personnel)	4 (12 personnel)
Special Services	1 (4 personnel)	1 (4 personnel)
Aerial	2 (8 personnel)	2 (8 personnel)
Water Tankers		2 (4 personnel)
Transport unit	1 (2 personnel)	1 (2 personnel)
Battalion Chief	1 (1 personnel)	1 (1 personnel)
EMS Officer	1 (1 personnel)	1 (1 personnel)
Personnel Totals	*28 personnel*	*32 personnel*

Task Analysis: Fireground Operations

Task	Metro	Rural
Fire Attack Line	2 personnel	2 personnel
Backup Line	2 personnel	2 personnel
R.I.T	4 personnel	4 personnel
Search & Rescue	2 personnel	2 personnel
Pump Ops/Water Supply	4 personnel	8 personnel
Tower Operations	4 personnel	4 personnel
Ground Ladders	2 personnel	2 personnel
Ventilation / Utilities	2 personnel	2 personnel
Safety	1 personnel	1 personnel
Incident Command	1 personnel	1 personnel
FF Rehab	2 personnel	2 personnel
EMS / Patient Care	2 personnel	2 personnel
Personnel Totals	*28 personnel*	*32 personnel*

Standard of Coverage for Structural Fire Incidents

Performance measurement is from time call is first created in CAD – either ANI/ALI time stamp or Time Create time stamp. Goal is 80% of the time or better.

C/P	Performance Measure	Metro	Rural
P	(A) 911 Call Processing Receipt to Entry	<= 01:30	<= 01:30
P	(B) 911 Call Processing Entry to Dispatch	<= 00:30	<= 00:30
C	(C) 911 Total Processing Time	<= 02:00	<= 02:00
C	(D) First Unit Turnout	<= 02:30	<= 04:30
P	(E) First Unit on Scene	<= 10:00	<= 12:00

Howard County Department of Fire and Rescue Services

Standard of Coverage

C/P	Performance Measure	Metro	Rural
C	(F) First Engine on Scene	<= 11:00	<= 14:00
P	(G) First Tower on Scene	<= 12:30	<= 15:00
P	(H) First Squad on Scene	<= 12:30	<= 15:00
P	(L) First Unit-on-scene travel time	<= 06:45	<= 09:00
C	(O) Init Atk (1E+5Pers) Low Haz	<= 11:30	<= 14:30
C	(P) Init Atk (1E+5Pers) Med Haz	<= 11:30	<= 14:30
C	(Q) Init Atk (1E,1T+8Pers) High Haz	<= 14:00	<= 18:30
P	(R) First Chief	<= 14:00	<= 18:00
C	(T) EFF(E,14Pers)	<= 18:00	
C	(V) EFF(E,14Pers,6Water)		<= 22:00

Fire Risk Classification Criteria

The following risk levels – High, Medium and Low – are for data analysis and planning purposes.

- *HIGH* High life hazard occupancies (hospital, nursing home); chemical processing industries, significant quantities of hazardous chemicals, high dollar value, high rise buildings, high historical value, penal institutions
- *MEDIUM* Response history indicates an incident volume exceeding 150 calls per year, schools, general industrial parks, public assembly, apartment complexes, condominiums, senior assisted living units.
- *LOW* Rural (farms, open space), single family residences, townhouses, not otherwise classified.

HAZARDOUS MATERIALS RESPONSE

Standard Hazardous Material Response

Howard County has two major interstates, I-95 and I-70, which run through large areas of the County. All Fire and Rescue personnel are trained at the Hazardous Material Operations level in compliance with NFPA 472. Fire Station 10 houses our special operations (SO) personnel and equipment. There are a minimum of 9 hazardous materials technicians on-duty 24 / 7. All Hazardous Materials incidents include the response of SO. Mutual aid and off-duty resources can be requested as necessary. The SO team has two (2) specialized vehicles carrying equipment appropriate to handle a variety of hazardous material incidents. Hazardous materials training and re-certification is done following NFPA guidelines.

Response to all hazardous materials incidents includes the assignment of the closest engine company for initial size-up and actions. Mutual aid resources are available in the event Department's Special Operations team is unavailable.

S.A.R.A II helps assure that Fire and Rescue receive this information through our Emergency Management Office. Furthermore, L.E.P.C requires a periodic survey of the number of conveyances that carry Hazardous Materials through our county. This information assists Fire and Rescue in developing response plans for potential hazardous materials incidents.

Fire and Rescue categorizes hazardous material incidents in into three (3) levels.

- Level One – low risk
- Level Two – moderate risk
- Level Three – High risk

To address the needs of Howard County, Fire & Rescue has developed several hazardous materials dispatch categories. Each category receives a different response level. Only the minimum response levels are listed. They are as follows:

- Suspicious Package – Special Operations (ESV, one SO Engine, one SO aerial and one SO ALS transport unit), one Engine, one Battalion Chief

- Hydrocarbon Spill > 50 gallons - Special Operations (ESV, one SO Engine, one SO aerial and one SO ALS transport unit), two Engines

- Crash with HAZ-MAT - Special Operations (ESV, one SO Engine, one SO aerial and one SO ALS transport unit), one Extrication Unit, four Engines, one Special Service, two ALS Transport units, one Medical Duty Officer, one Battalion Chief, one Foam unit, one Tanker, one Safety Officer

- Confirmed HAZ -MAT with/without Fire or Rail Car Leak with/without Fire – Special Operations (ESV, one SO Engine, one SO aerial and one SO ALS transport unit), four Engines, one Special Service, two ALS Transport units, one Medical Duty Officer, one Battalion Chief, one Foam unit, one Tanker, one Safety Officer.

The Incident Commander has full authority to request any equipment they deem necessary to contain such incidents.

Standard of Coverage for Hazardous Material Incidents

Performance measurement is from time call is first created in CAD – either ANI/ALI time stamp or Time Create time stamp. Goal is 80% of the time or better.

C/P	Performance Measure	Metro	Rural
P	(A) 911 Call Processing Receipt to Entry	<= 01:30	<= 01:30
P	(B) 911 Call Processing Entry to Dispatch	<= 00:30	<= 00:30
C	(C) 911 Total Processing Time	<= 02:00	<= 02:00
C	(D) First Unit Turnout	<= 02:30	<= 04:30
P	(E) First Unit on Scene	<= 10:00	<= 12:00
C	(F) First Engine on Scene	<= 11:00	<= 14:00
P	(L) First Unit-on-scene travel time	<= 06:45	<= 09:00
P	Special Ops On-Scene Hazmat	<= 19:00	<= 19:00

Hazardous Materials Risk Classification Criteria

The following risk levels – High, Medium and Low – are for data analysis and planning purposes.

- *HIGH* Facilities or areas where safety to people is first consideration because of the nature and/or volume of the hazardous material involved, and public action is required (Evacuation or shelter-in-place population protection. Facilities or areas with reportable substance under SARA Title III).

- *MEDIUM* Hazardous Materials are involved which pose a potential threat to life and property, and planning for public actions is considered. Petroleum transfer stations and major thoroughfares.

- *LOW* Areas where public action is considered unlikely and the incident can be handled by a minimum number of responding agencies. No known hazard exists.

Hazardous Material risks levels are assigned to each FRZ based on information provided by HC GIS, a review of fixed hazardous materials sites reportable under requirements of SARA Title III and evaluation by members of the Special Operations team.

TECHNICAL RESCUE RESPONSE

Standard Technical Rescue Response

All Fire and Rescue personnel are provided training necessary to respond to technical rescue incidents to perform size-up and initiate appropriate actions. Fire Station 10 houses our special operations (SO) personnel and equipment. There are a minimum of 9 technical rescue personnel on-duty 24 / 7. All Technical Rescue incidents include the response of SO. Mutual aid and off-duty resources can be requested as necessary.

SO personnel are trained in the following technical rescue disciplines: confined space, swift water operations, rope systems, overland search, ice rescue, trench rescue, structural collapse and technical vehicle and machinery rescue. All SO members must be compliant with NFPA 1670, Standard on Operations and Training for Technical Rescue. The SO team has two (2) specialized vehicles carrying equipment to handle a variety of technical rescue incidents.

Response to all technical rescue incidents includes the assignment of the closest engine company for initial size-up and actions. Mutual aid resources are available in the event Department's Special Operations team is unavailable.

To address the needs of Howard County, Fire & Rescue has developed several technical rescue dispatch categories. Each category receives a different response level. Only the minimum response levels are listed. They are as follows:

- Water Rescue– one S.O. Unit, one S.O. Engine, one S.O. Aerial, one Engine, one S.O. ALS transport unit, one Safety Officer, one ALS transport unit, one Medical Duty Officer, one Battalion Chief, one Boat, one Dive Team and one Special Service.

- Confined Space- S.O. Unit, one S.O. Engine, one S.O. Aerial, two Engines, one S.O.ALS transport unit, one Safety Officer, one ALS transport unit, one Medical Duty Officer ,one Battalion Chief, one BLS Transport unit and one Special Service.

- Trench Rescue - S.O. Unit, one S.O. Engine, one S.O. Aerial, two Engines, one S.O.ALS transport unit, one Safety Officer, one ALS transport unit, one Medical Duty Officer ,one Battalion Chief, one BLS Transport unit and one Special Service.

- Structural Collapse - S.O. Unit, one S.O. Engine, one S.O. Aerial, two Engines, one S.O.ALS transport unit, one Safety Officer, one ALS transport unit, one Medical Duty Officer ,one Battalion Chief, one BLS Transport unit and one Special Service.

- Technical Rescue - S.O. Unit, one S.O. Engine, one S.O. Aerial, two Engines, one S.O.ALS transport unit, one Safety Officer, one ALS transport unit, one Medical Duty Officer ,one Battalion Chief, one BLS Transport unit and one Special Service.

The Incident Commander has full authority to request any equipment they deem necessary to contain such incidents.

Standard of Coverage for Technical Rescue Incidents

Performance measurement is from time call is first created in CAD – either ANI/ALI time stamp or Time Create time stamp. Goal is 80% of the time or better.

C/P	Performance Measure	Metro	Rural
P	(A) 911 Call Processing Receipt to Entry	<= 01:30	<= 01:30
P	(B) 911 Call Processing Entry to Dispatch	<= 00:30	<= 00:30
C	(C) 911 Total Processing Time	<= 02:00	<= 02:00
C	(D) First Unit Turnout	<= 02:30	<= 04:30
P	(E) First Unit on Scene	<= 10:00	<= 12:00
C	(F) First Engine on Scene	<= 11:00	<= 14:00
P	(L) First Unit-on-scene travel time	<= 06:45	<= 09:00
P	Special Ops On-Scene Technical Rescue	<= 22:00	<= 22:00

Technical Rescue Risk Classification Criteria

The following risk levels – High, Medium and Low – are for data analysis and planning purposes.

- *HIGH* Rescues involving recreational static water (large lakes and ponds), moving water (rivers), rugged terrain (parks), super structures (radio and water towers) and all railways within the county which could pose a high hazard for a technical rescue.
- *MEDIUM* This would include smaller lakes and ponds, the interstate highways, and power line transmission towers which pose a potential threat to life and property
- *LOW* All other areas fall into this category. These areas pose a low hazard and are unlikely to cause fire department action.

Technical Rescue risks levels are assigned to each FRZ based on information provided by HC GIS and evaluation by members of the Special Operations team.

APPENDIX A – PERFORMANCE MEASURES

C/P	Performance Measure	Metro	Rural
P	(A) 911 Call Processing Receipt to Entry	<= 01:30	<= 01:30
P	(B) 911 Call Processing Entry to Dispatch	<= 00:30	<= 00:30
C	(C) 911 Total Processing Time	<= 02:00	<= 02:00
C	(D) First Unit Turnout	<= 02:30	<= 04:30
P	(E) First Unit on Scene	<= 10:00	<= 12:00
C	(F) First Engine on Scene	<= 11:00	<= 14:00
P	(G) First Tower on Scene	<= 12:30	<= 15:00
P	(H) First Squad on Scene	<= 12:30	<= 15:00
C	(I) First BLS on Scene	<= 10:30	<= 14:00
C	(J) First ALS on Scene	<= 10:30	<= 14:00
P	(K) First Transport on Scene	<= 11:00	<= 15:30
P	(L) First Unit-on-scene travel time	<= 06:45	<= 09:00
C	(M) First ALS APS	<= 12:00	<= 15:30
C	(N) First BLS APS	<= 12:00	<= 15:30
C	(O) Init Atk (1E+5Pers) Low Haz	<= 11:30	<= 14:30
C	(P) Init Atk (1E+5Pers) Med Haz	<= 11:30	<= 14:30
C	(Q) Init Atk (1E,1T+8Pers) High Haz	<= 14:00	<= 18:30
P	(R) First Chief	<= 14:00	<= 18:00
P	(S) To Hospital Transport Time	<= 13:00	<= 19:00
C	(T) EFF(E,14Pers)	<= 18:00	
P	(U)First Alarm (4E,T,SS,A,Ch,23Pers) Low Haz	<= 14:00	
C	(V) EFF(E,14Pers,6Water)		<= 22:00
P	(W) First Alarm (4E,2T,SS,TNK,A,Ch,MDO,24Pers) Med Haz	<= 19:00	
P	(X) First Alarm (4E,2T,SS,TNK,2A,P,Ch,MDO,32Pers) High Haz	<= 22:00	
P	(Y) First Alarm (4E,T,SS,TNK,A,Ch,24Pers) Low Haz		<= 22:00
P	(Z) First Alarm (4E,T,SS,TNK,A,Ch,MDO,25Pers) Med Haz		<= 23:00
P	(0) BLS EMS-Call Time Spent at Scene	<= 18:00	<= 18:00
P	(1) ALS EMS-Call Time Spent at Scene	<= 18:00	<= 18:00
P	Special Ops On-Scene Hazmat	<= 19:00	<= 19:00
P	Special Ops On-Scene Technical Rescue	<= 22:00	<= 22:00

C/P Column
C – Critical performance measures. These measures need to be meet 80% of the time or better.
P – Planning performance measures. These measures are used to evaluate specific areas of performance and are not required to be met 80% of the time or better.

General Order 100.19: Critical Incident Stress Management (CISM)

Howard County Department of Fire and Rescue Services

GENERAL ORDER

GENERAL ORDER 100.19

Critical Incident Stress Management (CISM)

OFFICE OF THE FIRE CHIEF

Issue Date: 1/5/2009
Revision Date: 11/13/2013

APPLICABILITY

All Personnel

POLICY

Mission

The Department will maintain a Critical Incident Stress Management (CISM) Team to deliver a CISM initiative to personnel of the Fire & Rescue Service and other Public Safety personnel who operate in Howard County. This will be accomplished via the use of a specially trained Department CISM Team which partners Behavioral Health Specialists (BHS) with Peer Support Personnel (PSP).

The CISM Team will provide pre-incident education and preparation to enhance the stress resistance of department members. The Team will provide a broad spectrum of crisis support services during and after critical incidents. Finally, when necessary, the Team will assist members in their recovery processes by means of referrals to appropriate resources.

Where appropriate, this policy meets or exceeds the recommendations identified in NFPA 1500 (Fire Department Occupations Safety & Health Program), Chapter 12 (Critical Incident Stress Program), 2007 edition. Membership will consist of a cross-section, volunteer and career, from all levels of HCDFRS and other public safety agencies that operate in Howard County. The strategic goals of the CISM program are:

- The enhancement of stress resistance in the department's member by means of stress education and preparation for traumatic exposures.
- The restoration of unit cohesion and unit performance in the aftermath of traumatic events.
- The reduction of individual distress and the restoration of personal well being.
- The facilitation of recovery processes in members who are severely impacted by a traumatic event.

DEFINITIONS

PROCEDURES

Statement of Administrative Support

The Administration of HCDFRS (the Department) recognizes that a healthy department is one in which its personnel are mentally and physically fit. The Department, therefore, endorses and supports several programs that enhance the physical and mental health of its personnel and that maintain a high level of departmental readiness. The Critical Incident Stress Management system, which provides stress education and comprehensive staff support, is one such program endorsed by the Department Administration.

Purpose

Effective management of traumatic stress involves a comprehensive, integrated, systematic, and multi-tactic approach. This is the approach of the Department CISM Team, which is comprised of peer support members of the Department, Chaplains, qualified Behavioral Health Specialists, and may include personnel from other public safety agencies. The purpose of the Team is not to provide psychotherapy or other mental health functions. Critical Incident Stress Management is not psychotherapy nor is it a substitute for psychotherapy. It is not a treatment or a cure. It is, instead, an organized, comprehensive and confidential staff support package that provides only stress management education and crisis intervention support services. The Department has the primary responsibility of providing crisis support service to the department's members following exposures to traumatic events. The Department will refer anyone needing psychological services outside of the scope of crisis intervention to appropriate professional resources.

- The Department CISM program adheres to the standards, protocols, and procedures detailed in the following books or document:
    - Everly GS, Mitchell, J.T. 2008. *Integrative Crisis Intervention*. Ellicott City, MD: Chevron Publishing Corporation.
    - Mitchell, J.T. (2004). Characteristics of Successful Early Intervention Programs. *International Journal of Emergency Mental Health,* 6 (4), 175-184.
    - Mitchell, J. T. (2007). Group Crisis Support: Why it works, When and How to provide it. Ellicott City, MD: Chevron Publishing.
    - Mitchell, J.T. and Everly, G.S., Jr., (2001). Critical Incident Stress Debriefing: An operations manual for CISD, Defusing and other group crisis intervention services, Third Edition. Ellicott City, MD: Chevron.

The purposes of the Department CISM initiative are:

- To prepare the department's personnel to resist and manage the psychological aspects of traumatic events by means of stress education and staff support. Stress resistance, however, is not only provided on an individual basis. The entire department requires stress management awareness and specific protocols to employ when disruptive and disturbing events interfere with unit cohesion and unit performance. Assistance, in the form of consultation, to the HCDFRS Administration on planning, policy and protocol development issues that relate to stress management is an important CISM Team function. To achieve the end of developing individual

and departmental stress resistance, a HCDFRS CISM Team has been formed and has received appropriate training.

- To provide a strategic and timely response to distressing "trigger" or critical incidents with a properly trained and equipped CISM Team consisting of Peer Support Personnel and Behavioral Health Specialists. ("Trigger" incidents or events are detailed in the section below entitled, "The Critical Incident").

- To apply a wide range of supportive crisis tactics that are in concert with the core principles of crisis intervention and which are provided with clinical oversight by Behavioral Health Specialists.

- To:
  - Assess the effects of traumatic events on the HCDFRS personnel
  - Make every reasonable effort to mitigate their impact
  - Reduce the symptoms of distress
  - Restore individuals or even entire units to effective performance

- To assist other emergency services organizations, upon request and as circumstances require, in minimizing the effects of traumatic stress on their personnel.

- To provide consultation, information, and ongoing staff support in large scale and prolonged events such as searches for missing subjects, multi-casualty events, hazardous materials events that are threatening the civilian community, complicated rescues, floods, or major fires.

- To contribute support services to other departments when their own CISM Teams are impaired by a highly distressing traumatic event such as a firefighter death, a disaster, or other overwhelming situation.

- To prepare to assist, when required, the federal department of Homeland Security with an appropriate response to large scale incident of national importance.

- To provide follow-up services to assure that the personnel are achieving the best possible restoration of personal wellbeing and a return to service.

- To provide links to and referrals, as required, to resources beyond the Critical Incident Stress Management (CISM) Team including, but not limited to, the Employee Assistance Program (EAP), legal advisors, Behavioral Health Specialists, and medical specialists.

The Critical Incident

A Critical Incident may be defined as "stressful events which have the potential to overwhelm one's usual coping mechanisms, resulting in psychological distress and an impairment of normal individual, as well as collective, adaptive functioning" (Everly & Mitchell, 2008).

All Department personnel are served by the CISM Team. The occurrence of certain events may trigger an automatic response from the Team. In other cases, members of the department may request assistance. Individuals may always request personal support. Unit leaders and other command personnel may request assistance for themselves, their units, or for the department in general. The on-call CISM Team Peer Support Coordinator (PSC) should be notified at the occurrence of a critical incident. The following section presents a non-exhaustive list of the types of incidents that may activate a CISM response.

- A notification of the on-call CISM Team Peer Support Coordinator may be initiated by an officer or by any member of the HCDFRS when a trigger incident or event occurs. *Examples* of trigger incidents or events may include:
  - Line of duty death (LODD) of public safety personnel
  - Serious line of duty injury of public safety personnel
  - Serious line of duty exposure to harmful contaminant (HAZ-MAT, Infectious substance/environment)
  - Death of, grotesque injury to, and/or violence to child/children
  - Threat of/or suicide or homicide of a colleague
  - Injury/Death of a civilian or emergency care worker by another emergency care provider
  - Terrorist/WMD Incident
  - Mass Casualty Incidents (MCI's)
  - Protracted incidents, such as natural disasters or special operations incidents
  - Actual or threats of physical/emotional harm (real or perceived) to an emergency care worker
  - Any meaningful event (real or perceived) affecting the emergency care provider
  - Direct observation of a traumatic event such as, a person engulfed in flames, an individual crushed to death, a violent act while in progress, or a person falling from a height.
  - The victim/observance of workplace violence
  - Multiple significant incidents within a short time frame
  - Knowing the victims involved in the incident
  - Serious injury or death of a civilian resulting from operations, e.g., collision of emergency units responding to a call
  - Loss of life following extraordinary and prolonged expenditures of physical and emotional energy during rescue efforts
  - Incidents that attract extreme, unusual or extensive media coverage
  - Incidents in which circumstances are unusually bizarre and/or trigger profound emotional reactions.

On-Scene Traumatic Stress Management

The department's officers play a crucial role in minimizing the impact of critical incident stress by limiting exposure of personnel. This is often accomplished by rotation of work crews to different assignments, by providing rest breaks for working personnel, and by relieving fatigued personnel. Unnecessary personnel should be removed from the immediate scene and stationed in a staging area or returned to their quarters as soon as reasonably possible.

In the case of protracted incidents or incidents of extreme magnitude, it is helpful to have CISM Team representative(s) on scene in a standby capacity. They should be automatically dispatched as part of a

task force assignment. In other cases, the officer in charge or a designee may request a CISM presence at the scene.

- CISM Team members serve in advisory and support capacities only. The CISM Team member at the scene is an advisor to the IC and will make no decisions or take any actions that interfere with current or future operations. Any decision or action that impacts staffing or operations must be cleared by Command. At no time will operations be curtailed in order to conduct any type of CISM intervention.

- CISM Team members will not engage in on-scene operations while functioning in an assigned CISM role, unless there are "lawful duty to act" requirements in a situation.

Team Access & Activation of the CISM Services

Access to CISM services may be made on or off duty, 24 hours a day, 365 days a year, through one of the methods noted below. These access points were developed to ensure that any user will have ease of access, anonymity, and confidentiality. Full Team CISM activation, such as may be required in a large scale disaster, will occur only after careful pre-deployment assessment and strategic planning by the CISM Team Leadership.

The Department will provide communications equipment to CISM Team participants

- Access through the Communications Supervisor on 410-313-2950 (urgent or emergency). Once requested, Communications will page the on-call CISM Peer Support Coordinator and the on-call Behavioral Health Specialist. Radio communication placing CISM Team members on the air, in service, responding, and the like are acceptable forms of CISM radio communication. To ensure confidentiality, all other CISM communication should ordinarily be conducted in person or by telephone.

- CISM Peer Support Hotline on 410-313-2476 (410-313-CISM) (non-emergency). Messages left will be returned by the on-call CISM Team Peer Support Coordinator as soon as possible. Access to these services is available to any Department member. Note-Only a valid call-back number is required; however, more information may be left if desired.

- Access services through direct contact of individual Peer Support Personnel on the CISM Team (any time, by anyone). Department members may directly contact the Peer Support Personnel of their choice if they desire to discuss a concern.

- The following information must be obtained to ensure that the Team representative may reach the requesting person for appropriate follow-up. This information will be immediately relayed to the on-call Team Peer Support Coordinator for follow-up and will be used for establishing contact and determining CISM needs.
  - Requestor's name
  - Contact name (unless anonymous)
  - Type of incident

- Number of personnel involved; or possibly affected
- Call back phone number

A supervisor/company officer who observes or believes that a member may be experiencing or exhibiting a physical or psychological response to a traumatic event should immediately consult with that individual and offer the services of one of the CISM Team members. Determining the need for actual support services is difficult for officers who have not been trained in CISM. They cannot do effective assessments. They need to encourage the person to accept the support from a CISM Team member and to assist that person in contacting a CISM Team member.

If an individual accepts the suggestion of support from a CISM Team member, the members' supervisor / company officer should assist that person in connecting with the desired services. In the event of an abnormally extreme response to a traumatic event, where in the opinion of the company officer, a person or personnel need(s) to be removed from duty, the company officer is to immediately notify the on duty Battalion Chief and proceed according to this policy. A CISM Team member should be contacted in such a case to assist in the assessment and support of the seriously impacted individual.

Under most major operations the Medical Duty Officer/Battalion Chief will serve as the party to initiate the CISM response. This is not to say, however, that others cannot do so. Often, the Incident Commander (IC), or other ranking officer, may also see the need to initiate this program for either assistance in evaluating the need, or for further CISM services.

- Any Department member may access the CISM program for themselves or out of concern for other personnel. No supervisor or commanding officer approval is required to contact the on-call Peer Support Coordinator by line personnel.

- In certain situations members of the Department may need psychological services beyond the scope of the crisis intervention support that can be provided by CISM. The on-duty CISM Peer Support Coordinator should consult with a Behavioral Health Specialist or the Clinical Director (CD) of the CISM program and assess the need for referral for further care. They should assist the individual in arranging the referral resources.

Traumatic Stress Management Education & Support

The majority of traumatic stress reactions are normal reactions of normal, healthy people to abnormal events. They often resolve spontaneously with limited support from colleagues, and with rest, and the passage of time. Informal support from coworkers, supervisors, family, and friends can often help an individual regain his or her perspective and return to normal, adaptive function in a short period of time. In many of these cases, intervention of the CISM Team will not be required.

Trained Peer Support Personnel, using informal crisis intervention processes, can be very effective in assisting Department personnel in positively rebounding from a traumatic event. In many cases, no external Behavioral Health Specialists and no formal activation of the CISM Team are required.

In addition to individual support, which is the most frequently used crisis intervention tool, the Department CISM Team has been trained to apply many other supportive interventions and procedures.

The following list outlines the components of a comprehensive, integrated, systematic, and multi-tactic staff support program.

- Pre-Incident Education and Preparation
- Stress Assessment Techniques
- Strategic Crisis Intervention Planning
- Individual Support
- Large Group Crisis Intervention Services
- Small Group Crisis Intervention Services
- Family Support Services
- Pastoral Crisis Intervention Services
- Post Incident Staff Support and Education
- Follow-up and referral services

Confidentiality

A key to the success of the CISM initiative is the assurance of strict confidentiality. All members of this Team will adhere to absolute confidentiality and will sign a confidentiality agreement annually. Any statements or discussion with a CISM member, while fulfilling their respective CISM Team member role, will remain confidential except for the following exclusions:

- Threats of suicide or homicide
- Admissions of child or elder abuse
- Admissions to, or threats of, serious unlawful conduct
- When under the order of the Court

No mechanical recording or written notes will be made during any CISM intervention session. Only statistical information for the CISM intervention, its location, and/or recommendations will be completed by a Peer Support Coordinator following the session.

- All information shared by Department members during contacts with CISM Team members, either in individual conversations or within the context of group support discussions, is to be held in the strictest confidence. CISM Team members must be particularly careful regarding the identity of individuals and their personal descriptions of experiences and emotions. The CISM Team, however, must engage in clinical case reviews of their interventions with CISM Team Behavioral Health Specialists. These reviews, on occasion, may take place during Team meetings, which are closed to anyone other than current CISM Team members.

- Communication between CISM Team members and the individual is considered privileged by the Department. It is the policy of the Department not to question CISM Team members concerning any critical incident intervention or to inquire as to which individuals attended. The CISM Team has an obligation to provide advice and counsel to the supervisors and administrators of the Department. These discussions with command and administrative personnel should only be of a general nature. They should enhance the ability of command personnel to lead and assist their personnel. At all times, CISM Team members should protect both the identity of and the confidential information shared by individuals during individual or group support sessions unless specific permission was obtained from the person prior to a specific discussion of that individual.

- It is the policy of the "Team" that any CISM Team member who violates confidentiality will immediately be dismissed from the Howard County Department CISM Team, and may be subject to additional disciplinary action as appropriate under Department policy and county employee code(s) of conduct, or of the governing policies of Team members' affiliated organization.

Attendance and Location

While personnel are not required to attend CISM sessions, it is important to remember that each person may have something to add that may be helpful to a colleague in the restorative healing process. Research studies indicate that participation in a group support process after a unit has been exposed to a highly distressing and disruptive traumatic event enhances unit cohesion and performance. There is strong evidence that group support reduces symptoms of distress and restores personnel to normal performance. Furthermore, group support reduces the potential for future psychological disturbance in the individuals who participate.

- Attendance in the post incident CISM intervention processes is strongly encouraged (but not mandatory) for all personnel directly exposed to an incident.

- Only personnel involved in the incident and current CISM Team members are permitted to attend. All personnel and units in attendance at the intervention will be out of service during the session.

- Interventions are conducted anywhere there is ample space, privacy, and freedom from distractions. The site selection for the intervention will be mutually agreeable.

- All radios, cell phones, and pagers are to remain in the off position during the intervention.

Relieving Personnel From Duty

There are rare, extreme cases where exposures to traumatic events may result in a recommendation that individual(s) or companies are relieved from duty. The CISM personnel have no power to remove personnel from duty. They function in a support and advisory capacity only. They should provide appropriate information to the on-duty Battalion Chief or other high ranking officers, who are on the scene at the time. The officer(s) should decide on the necessity to temporarily remove personnel from duty. It should be explained to those removed from duty that the decision is not a punitive one, nor is it one that reflects negatively on them. Instead, the decision has been made in support of the personal wellness of the individual or for the benefit of a fatigued and stressed unit.

- Personnel who are removed from service should be placed on administrative leave for the duration of the workday. The individual(s) or their respective supervisors should fill out the appropriate First Report of Injury documentation in accordance with established General Orders.

- In most cases, a reduction in stimuli, crisis intervention from Peer Support Personnel, food, and rest are all that is necessary for personnel to recover sufficiently to return to their normal duties. In a few cases an individual may benefit from a contact with one of the CISM Team's Behavioral Health Specialists before returning to normal duties.

- The supervisor is to notify the on-duty Battalion Chief of personnel placed on leave following a critical incident. Additionally, the on-call CISM Peer Support Coordinator is to be notified any time that Department personnel are to be relieved from duty due to the negative impact from a critical incident. Whenever possible, prior to the release of any personnel, an initial assessment and the most appropriate intervention should be applied. It is important that the CISM Peer Support Personnel who made the first contact with a distressed individual provide for some form of follow-up. This may be accomplished by such means as a home visit or a phone call.

Composition of the CISM Team

The CISM Team will have approximately 25 members. A few members will be Behavioral Health Specialists. A few will be Chaplains and the bulk of the Team will be made up of Peer Support Personnel. Other members, with different professional training and skills, may be incorporated into the Team at the discretion of the CISM Program Administrator (PA) and the Clinical Director.

- The CISM Team membership will include the following:
  - CISM Program Administrator (PA)
  - Clinical Director (CD)
  - Senior Peer Support Coordinator (SPSC)
  - Peer Support Coordinators (PSC)
  - Peer Support Personnel (PSP)
  - Chaplains
  - Behavioral Health Specialists (BHS)

CISM Team members, who are members of the Department, will be considered "Peer Support Personnel." Peer Support Personnel will be trained in programs provided by the International Critical Incident Stress Foundation (ICISF).

- To be a Behavioral Health Specialist on the CISM Team, prospective members must possess a minimum of a Masters Degree in the fields of psychology, social work or a clinically oriented degree in behavioral health specialty from an accredited university. Behavioral Health Specialists will also be required to attend training provided by the International Critical Incident Stress Foundation (ICISF).

- CISM Team membership is a voluntary membership, with a minimum two year term, open to any HCDFRS member regardless of rank, seniority or assignment. Membership is attained via application, interview, and reference process. A CISM Team that is reflective of the whole Department is the overall goal in Team structure. The minimum training standard must be achieved before serving on the Team. The minimum training standard will be set by the CISM Program Administrator, Clinical Director, and the Senior Peer Support Coordinator (SPSC), and defined on the CISM Team Membership Application.

- Membership on the CISM Team is a privilege and not a right. Any conduct which runs counter to this program, serving its constituents, violating its governing policies, operational directives, or disclosure of any confidential or restricted/privileged information will result in immediate

dismissal from the Team, and possible other actions as appropriate under HCDFRS policy, county employee code(s) of conduct, or of the governing policies of Team members' affiliated organization.

- Any individual who is interested in becoming a member of the CISM should contact the CISM Program Administrator for more information. All applicants must submit a CISM Team Application and will undergo the interview process for membership with at least the CISM Program Administrator, Senior Peer Coordinator and the Clinical Director.

CISM Team Program Administrator Responsibilities

- In order for the CISM Initiative to be most effective in access and application, this program will be placed under the EMS Operations Section of the Department.

- The Deputy Chief of Emergency Medical Services (D/C-EMS), or other appointed individual, is to serve as the CISM Program Administrator.

- The CISM Program Administrator is responsible for the management and oversight of all activities of the CISM Team, including, but not limited to: recruitment and retention of Team members, training, continuing education, quality assurance, record keeping, referrals, Team deployment, and follow-up. The CISM Program Administrator will work closely with the Senior Peer Coordinator and the Clinical Director to determine the qualifications for membership and the operational needs of the Team.

- The CISM Program Administrator, or designee, will serve as the liaison with Behavior Health Specialists, EAP staff and therapists, and the designated occupational health center.

REFERENCES

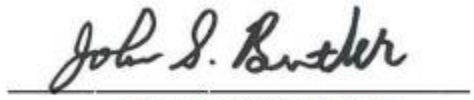
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SUMMARY OF DOCUMENT CHANGES

Converted to newest GO version 5/1/2013 by SG #8232.

FORMS/ATTACHMENTS

APPROVED



Deputy Chief John S. Butler
Operations Command

General Order 120.01: County Volunteer Firefighter EMS Program



Howard County Department of Fire and Rescue Services

GENERAL ORDER

GENERAL ORDER 120.01

County Volunteer Firefighter/EMS Program

EMERGENCY SERVICES BUREAU

Issue Date: 5/20/1995
Revision Date: 9/11/2014

APPLICABILITY

All Personnel

POLICY

The **County Volunteer Firefighter/EMS Program (CVFEP)** is designed to provide volunteer firefighting and Emergency Medical Service (EMS) support to the Howard County Department of Fire and Rescue Services (Department). This program will be discontinued after all current personnel have retired or are no longer able to perform as operational members.

DEFINTIONS

- The **Emergency Services Bureau** (ESB) is responsible for managing and coordinating the CVFEP. ESB will coordinate with the other Departmental Bureaus in providing guidance and resources in support of this program. ESB is responsible to coordinate and oversee the operational functions and schedules of the individuals.

- The **Education & Training Bureau** (E&T) is responsible to manage, maintain, certify and coordinate all training and training records associated with all personnel.

- The **Administrative Services Bureau** (ASB) is responsible for managing all human resource issues regarding the personnel assigned.

- Operational **County Volunteers** actively participate in firefighting and/or EMS duties. These individuals must successfully complete and maintain all required training, in order to be certified and authorized to perform the operational functions within their respective category.

PROCEDURES

All current County Volunteers will be evaluated and approved annually by the ESB no later than December 31st.

Training Requirements for County Volunteers:

All County Volunteers must complete and maintain the following training requirements by November 1, 2014, in order to continue in an operational status:

- Firefighter I (MFRI)
- Hazardous Materials Operations
- EMT-B or Paramedic
- Fit Testing – breathing apparatus face piece and HEPA mask
- Courage To Be Safe
- Infectious Control

All County Volunteers must complete and maintain the following additional training requirements or certifications by April 1, 2016, in order to continue in this program:

- Firefighter II (MFRI)
- Firefighter Survival & Rescue (MFRI)
- Rescue Tech – Vehicle Machinery Technical Rescuer (I & II)
- Emergency Vehicle Operations Course (MFRI)
- Rescue Tech – Confine Space Technical Rescuer (I & II - NBFSPQ)
- Weapons of Mass Destruction (MFRI)
- Swift Water Rescue Awareness (DFRS)
- Trench and Structural Collapse Awareness (DFRS)
- IS-100.b; IS-200.b; IS-700.a; IS-800.b (FEMA EMI) (Online courses)

Failure to complete and maintain these training requirements within the above listed time frames may result in the individual being removed from the County Volunteer Program.

Length of Service Award Program (LOSAP):

- County Volunteer personnel may be eligible for the LOSAP as provided in the Howard County Code.

General Guidelines:

- All County Volunteers must complete the Department's annual fit for duty physical, to include a stress test.
- All County Volunteers shall be assigned to a home station and must report to the station Officer-in-Charge (OIC) upon arrival and departure from a duty station.
- All personnel must be operationally qualified and cleared by the Assistant Chief of ESB before performing as an active County Volunteer responder.
- Sleep-ins are required to notify the station OIC prior to 1800 hours to secure a bunk.

Uniforms:

- All uniforms and Personal Protective Equipment (PPE) shall be issued to the member by the Department quartermaster pursuant to departmental policy. Each member is responsible for the routine care and maintenance of their uniforms and PPE.
- The member shall wear the appropriate uniform while on duty in the fire station. Uniforms shall not be worn for any non-related function outside the Department, without prior approval of the Chief of the Department.
- Mandatory, annual inspections of County Volunteer's PPE will be completed by December 31st, by the designated home station captain and forwarded to the Bureau of Occupational

Safety & Health (BOSH). County Volunteers are responsible for routine inspections and ensuring that their PPE is professionally cleaned each year by the Department's contract vendor.

- All uniform and PPE items shall be returned to the quartermaster by the member immediately upon his/her resignation or removal from the County Volunteer Firefighter/EMS Program.

REFERENCES

- Howard County Code. Title 17: Public Protection Services, § 17.102: *Fire and rescue tax.*
- Howard County Code. Title 17: Public Protection Services, § 17.103: *Payments to volunteer fire corporations.*

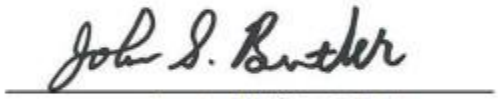
SUMMARY OF DOCUMENT CHANGES

Converted to newest GO version 7/2/2014.

FORMS/ATTACHMENTS

- None

APPROVED



Deputy Chief John S. Butler

Operations Command

General Order 120.02: Volunteer Officer Requirements

Howard County Department of Fire and Rescue Services

GENERAL ORDER

GENERAL ORDER 120.02

Volunteer Officer Requirements

OFFICE OF THE FIRE CHIEF

Issue Date: December 10, 1995
Revision Date: November 18, 2016

APPLICABILITY

All corporate volunteer uniformed personnel.

POLICY

The Howard County Department of Fire and Rescue Services (Department) shall establish and maintain a uniform, county-wide set of training requirements and minimum experience for all volunteer line officer personnel. The Department recognizes the authority of volunteer officer personnel, who have been approved by this program and duly elected or appointed by a volunteer corporation.

DEFINITIONS

Requirements are provided (Attachment A) for the following volunteer officer positions:

- Volunteer Fire Chief
- Volunteer Deputy Fire Chief
- Volunteer Assistant Fire Chief
- Volunteer Captain
- Volunteer Lieutenant
- Volunteer Sergeant
- Volunteer EMS Captain
- Volunteer EMS Lieutenant
- Volunteer EMS Sergeant

PROCEDURES

- All volunteer personnel must meet or exceed the requirements of a level before applying for that level of operational certification.
- The Volunteer Training Board shall receive, review, verify, and recommend all applications for volunteer officer authorization and forward to the Bureau of Education & Training.
- The Bureau of Education & Training shall receive all applications for volunteer officer authorization from the Volunteer Training Board and then review, verify, and make recommendations to the Fire Chief for final approval.
- Volunteer officers that have been authorized to be eligible to serve at a given rank prior

to January 01, 2017 shall be grandfathered for life to be eligible to serve at that authorized rank.

REFERENCES

- General Order 120.03: Operational Standards for Volunteer Personnel
- General Order 700.06: Volunteer Training Board

SUMMARY OF DOCUMENT CHANGES

- Added requirements for Volunteer EMS Lieutenant
- Revised requirements for all volunteer officer levels
- Updated the description of the approval process to include the Volunteer Training Board.

FORMS/ATTACHMENTS

- Attachment A – Volunteer Officer Requirements by Rank

APPROVED

John S. Butler, Fire Chief
Office of the Fire Chief

Attachment A

VOLUNTEER FIRE CHIEF

A Volunteer Fire Chief must meet the following training, certification and experience requirements. Requirements for this position must be maintained for continued operational status for this position.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

Must meet one of the following:

A. Be at least thirty (30) years of age and;
   a. Have twelve (12) or more years of operational fire service experience after meeting Howard County minimum operational standards for a Volunteer Firefighter or equivalent, and;
   b. Served four (4) years in Howard County as an operational provider (can be inclusive of the above 12 years), and;
   c. Served one (1) year as a Volunteer Officer in Howard County (can be inclusive of the above 12 years).

B. Be at least thirty (30) years of age, meet the minimum requirements for Volunteer Deputy Chief or Volunteer Assistant Chief, and have satisfactorily served at the rank of Volunteer Deputy Chief or Volunteer Assistant Chief in Howard County for at least three (3) years.

Must meet all of the following:

1. Fire Officer 3 Certification.

2. Incident Safety Officer – Fire Suppression Certification.
   a. OR course completion of Fire Department Safety Officer (MFRI) prior to 01/01/2018.
   b. OR course completion of Fire Department Incident Safety Officer (MFRI) after 2016
   c. OR course completion of Incident Safety Officer (NFA) prior to 01/01/2018.

3. Vehicle Technical Rescuer I & II Certification.

4. Current Maryland certification as an EMT (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

5. Must meet the Minimum Operational Standard, including:
   a. Meet the approved Howard County Fire Service Medical and Physical Standards.
   b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

** "Certification" implies MD state (MFSPQB) or national (NPQS, IFSAC, or DOD IFSAC) certification.*

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.
- Duties include determining the course of action in an emergency.

VOLUNTEER DEPUTY CHIEF

A Volunteer Deputy Fire Chief must meet the following training, certification and experience requirements. Requirements for this position must be maintained for operational status for this position.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

Must meet one of the following:

A. Be at least twenty-six (26) years of age and;
   a. Have ten (10) or more years of operational fire service experience after meeting Howard County minimum operational standards for a Volunteer Firefighter or equivalent, and;
   b. Served four (4) years in Howard County as an operational provider (can be inclusive of the above 10 years), and;
   c. Served one (1) year as a Volunteer Officer in Howard County (can be inclusive of the above 10 years).

B. Be at least twenty-six (26) years of age, meet the minimum requirements for Volunteer Assistant Chief, and shall have satisfactorily served at the rank of Volunteer Assistant Chief in Howard County for at least one (1) year.

Must meet all of the following:

1. Fire Officer 3 Certification.

2. Incident Safety Officer – Fire Suppression Certification.
   a. OR course completion of Fire Department Safety Officer (MFRI) prior to 01/01/2018.
   b. OR course completion of Incident Safety Officer (NFA) prior to 01/01/2018.

3. Vehicle Technical Rescuer I & II Certification.

4. Current Maryland certification as an EMT (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

5. Must meet the Minimum Operational Standard, including:
   a. Meet the approved Howard County Fire Service Medical and Physical Standards.
   b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

** "Certification" implies MD state (MFSPQB) or national (NPQS, IFSAC, or DOD IFSAC) certification.*

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.
- Duties include determining the course of action in an emergency.

VOLUNTEER ASSISTANT CHIEF

A Volunteer Assistant Fire Chief must meet the following training, certification and experience requirements. Requirements for this position must be maintained for continued operational status for this position.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

Must meet one of the following:

A. Be at least twenty-four (24) years of age and;
   a. Have eight (8) or more years of operational fire service experience after meeting Howard County minimum operational standards for a Volunteer Firefighter or equivalent, and;
   b. Served four (4) years in Howard County as an operational provider (can be inclusive of the above eight years), and;
   c. Served one (1) year as a Volunteer Officer in Howard County (can be inclusive of the above eight years).

B. Be at least twenty-four (24) years of age, meet the minimum requirements for Volunteer Fire Captain, and shall have satisfactorily served at the rank of Volunteer Fire Captain in Howard County for at least one (1) year.

Must meet all of the following:

1. Fire Officer 3 Certification.

2. Incident Safety Officer – Fire Suppression Certification.
   a. OR course completion of Fire Department Safety Officer (MFRI) prior to 01/01/2018.
   b. OR course completion of Incident Safety Officer (NFA) prior to 01/01/2018.

3. Vehicle Technical Rescuer I & II Certification.

4. Current Maryland certification as an EMT (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

5. Must meet the Minimum Operational Standard, including:
   a. Meet the approved Howard County Fire Service Medical and Physical Standards.
   b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

** "Certification" implies MD state (MFSPQB) or national (NPQS, IFSAC, or DOD IFSAC) certification.*

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.
- Duties include determining the course of action in an emergency.

VOLUNTEER FIRE CAPTAIN

A Volunteer Captain must meet the following training, certification and experience requirements. Requirements for this position must be maintained for operational status for this position.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

Must meet one of the following:

A. Be at least twenty-one (21) years of age and;
   a. Have five (5) or more years of operational fire service experience after meeting Howard County minimum operational standards for a Volunteer Firefighter or equivalent, and;
   b. Served two (2) years in Howard County as an operational provider (can be inclusive of the above five years).

B. Be at least twenty-one (21) years of age and meet the minimum requirements for Volunteer Fire Lieutenant and shall have satisfactorily served at the rank of Volunteer Fire Lieutenant in Howard County for at least two (2) years.

Must meet all of the following:

1. Fire Officer 2 Certification.

2. Incident Safety Officer – Fire Suppression Certification.
   a. OR course completion of Fire Department Safety Officer (MFRI) prior to 01/01/2018.
   b. OR course completion of Incident Safety Officer (NFA) prior to 01/01/2018.

3. Vehicle Technical Rescuer I & II Certification.

4. Current Maryland certification as an EMT (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

5. Must meet the Minimum Operational Standard, including:
   a. Meet the approved Howard County Fire Service Medical and Physical Standards.
   b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

** "Certification" implies MD state (MFSPQB) or national (NPQS, IFSAC, or DOD IFSAC) certification.*

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.
- Duties include determining the course of action in an emergency.

VOLUNTEER FIRE LIEUTENANT

A Volunteer Lieutenant must meet the following training, certification and experience requirements. Requirements for this position must be maintained for operational status for this position.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

1. Be at least twenty-one (21) years of age and;
    a. Have three (3) or more years of operational fire service experience after meeting Howard County minimum operational standards for a Volunteer Firefighter or equivalent, and;
    b. Served one (1) year in Howard County as an operational provider (can be inclusive of the above three years).

2. Fire Officer 1 Certification.

3. Incident Safety Officer – Fire Suppression Certification.
    a. OR course completion of Fire Department Safety Officer (MFRI) prior to 01/01/2018.
    b. OR course completion of Incident Safety Officer (NFA) prior to 01/01/2018.

4. Vehicle Technical Rescuer I & II Certification.

5. Current Maryland certification as an EMT (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

6. Must meet the Minimum Operational Standard, including:
    a. Meet the approved Howard County Fire Service Medical and Physical Standards.
    b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

** "Certification" implies MD state (MFSPQB) or national (NPQS, IFSAC, or DOD IFSAC) certification.*

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.
- Duties include determining the course of action in an emergency.

VOLUNTEER SERGEANT

A Volunteer Sergeant must meet the following training, certification and experience requirements. Requirements for this position must be maintained for operational status for this position.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

1. Be at least eighteen (18) years of age and;
    a. Have two (2) or more years of operational fire service experience after meeting Howard County minimum operational standards for a Volunteer Firefighter or equivalent, and;
    b. Served one (1) year in Howard County as an operational provider (can be inclusive of the above two years).

2. Firefighter 2 Certification.

3. Must meet the Minimum Operational Standard, including:
    a. Meet the approved Howard County Fire Service Medical and Physical Standards.
    b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.
    c. Current Maryland certification as an EMR (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

** "Certification" implies MD state (MFSPQB) or national (NPQS, IFSAC, or DOD IFSAC) certification.*

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.

VOLUNTEER EMS CAPTAIN

A Volunteer EMS Captain must meet the following training, certification and experience requirements.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

1. Be at least twenty-three (23) years of age and;
    a. Have five (5) or more years of experience as a pre-hospital ALS provider, and;
    b. Served two (2) years in Howard County as an operational ALS provider (can be inclusive of the above five years).

2. Current Maryland certification as pre-hospital ALS provider.

3. Must meet the Minimum Operational Standard, including:
    a. Meet the approved Howard County Fire Service Medical and Physical Standards.
    b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.

VOLUNTEER EMS LIEUTENANT

A Volunteer EMS Lieutenant must meet the following training, certification and experience requirements.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

1. Be at least twenty-one (21) years of age and;
    a. Have three (3) or more years of experience as a pre-hospital ALS or BLS provider, and;
    b. Served one (1) year in Howard County as an operational BLS or ALS provider (can be inclusive of the above three years).

2. Current Maryland certification as an EMT (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

3. Must meet the Minimum Operational Standard, including:
    a. Meet the approved Howard County Fire Service Medical and Physical Standards.
    b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.

VOLUNTEER EMS SERGEANT

A Volunteer EMS Sergeant must meet the following training, certification and experience requirements.

REQUIRED LICENSES, REQUIREMENTS AND/OR REGISTRATIONS

1. Be at least nineteen (19) years of age and;
    a. Served two (2) years in Howard County as an operational BLS or ALS provider.

2. Current Maryland certification as an EMT (2016 COMAR 30.01.01.02) or higher pre-hospital care provider.

3. Must meet the Minimum Operational Standard, including:
    a. Meet the approved Howard County Fire Service Medical and Physical Standards.
    b. If authorized as an emergency or non-emergency vehicle operator, must possess a valid Maryland Class C driver's license (or an appropriate class) issued by the State of Maryland.

WORKING CONDITIONS

- May be exposed to hazardous working conditions and inclement weather in performing his or her assignments.

General Order 120.03: Operational Standards for Volunteer Personnel

DEPARTMENT OF FIRE AND RESCUE SERVICES

	GENERAL ORDER 120.03	

Originating From	Issue Date	Revision Date	Attachments
Administration	09/03/1997	N/A	N/A

SUBJECT: Operational Standards for Volunteer Personnel
APPLICABILITY: All Personnel

POLICY:
The Howard County Volunteer Firemen's Association and DFRS recognize the need for minimum operational standards for volunteer members in order to provide a safe, quality, uniform level of service. All personnel participating operationally as fire, rescue, and/or emergency medical service providers shall meet the following minimum standards.

1 DEFINITIONS:

1.1 Category of Operational Participation Category that designates the approved level of operational participation. (i.e. full performance, EMS provider only, fire/rescue provider only, fire/rescue/first responder provider only)

1.2 Minimum Standard The minimum amount of training that must be successfully completed within a specific category of operational participation.

1.3 Course Titles: Where course titles are specified, acceptable equivalencies will be considered.

2 GENERAL

2.1 The respective Volunteer Fire Chief shall be responsible for the authorization of their members to become operationally active.

2.2 Operational participation for all members shall be managed in accordance with this Policy.

2.3 All operational personnel shall be covered by Workers Compensation.

2.4 Before being authorized to ride, all personnel will be required to have successfully completed Hazmat Awareness, Blood borne Pathogens, and CPR training.

2.5 Must be 16 years of age or older.

2.6 Personnel currently enrolled in Firefighter I or EMT-B Programs may be granted limited permission to ride provided successful completion of mid-term exam and they have met the requirements of 2.4.

3 FULL PERFORMANCE OPERATIONAL STATUS MINIMUM STANDARDS

3.1 Successful completion of the MFRI Firefighter I Program

3.2 Possess current certification of the Maryland EMT-B Program

3.3 Meets all requirements of AEmergency Medical Service Providers®

3.4 Possess current AED certification

4 FIRE/RESCUE FIRST RESPONDERS OPERATIONAL STATUS MINIMUM STANDARDS

4.1 Successful completion of the MFRI Firefighter I Program

4.2 Possess current First Responder certification

5 EMS SERVICE PROVIDERS OPERATIONAL STATUS MINIMUM STANDARD

5.1 Possess current certification as EMT-B, EMT-I or EMT-P

5.2 Possess current Thumper certification

5.3 Possess current AED certification

6 FIREFIGHTER OPERATIONAL STATUS MINIMUM STANDARDS

6.1 Successful completion of the MFRI Firefighter I Program

6.2 Must meet all requirements of 2.0 General Section

6.3 Personnel entering Fire Service after July 1, 1997 shall be required to complete the First Responders Program or EMT-B within 2 years from the time they begin their first training class.

6.4 Personnel operationally active prior to June 30, 1997 will be required to successfully complete the First Responder Program or EMT-B by June 30, 2000 in order to be operationally active.

Approved:

Joseph A. Herr
Fire Chief

Endorsed by:

Chief Donald E. Watson, Elkridge Volunteer Department, Inc.
Chief John J. Klein, Ellicott City Volunteer Firemen's Associatipn, Inc.
Chief H. Mithcell Day, West Friendship Volunteer Firemen's Association, Inc.
Chief J. Lee Sirk, Lisbon Volunteer Fire Company, Inc.
Chief F. Patric Marlatt, Fifth District Volunteer Fire Department, Inc.
Chief Norman Wines, Savage Volunteer Fire Company, Inc.

General Order 150.02: DFRS Extreme Weather Advi sories

Howard County Department of Fire and Rescue Services

GENERAL ORDER

GENERAL ORDER 150.02

DFRS Extreme Weather Advisories

BUREAU OF OCCUPATIONAL SAFETY AND HEALTH

Issue Date: June 10, 1995
Revision Date: December 23, 2015

APPLICABILITY

All Personnel

POLICY

The Howard County Department of Fire and Rescue Services (Department) recognizes the adverse effects weather extremes may have on operational personnel during emergency incidents and other Department activities.

To reduce the incidence of weather related stress, the Department has created a policy that modifies activities during times of extreme heat or cold. Adjustments shall be made for both nonessential and emergency activities when conditions are severe.

DEFINITIONS

- A **Red-Flag Extreme Weather Advisory** is an advisory issued by Department field command officers that communicates that extreme weather conditions exist, either due to cold or heat. Extreme caution is required for outdoor activities, and non-emergency outdoor activities are restricted as outlined in this policy.

- A **Yellow-Flag Extreme Weather Advisory** is an advisory issued by Department field command officers that communicates that weather conditions are approaching extreme levels, either due to cold or heat. Caution is required for outdoor activities, and modifications shall be made in accordance with this policy.

PROCEDURES

EXTREME HOT WEATHER:

During periods of high heat, the **heat index** (Attachment A) will be used to determine the need to issue an extreme weather advisory.

- When the heat index is between 86 and 95 degrees, a **Yellow-Flag Extreme Weather Advisory** shall be issued.
- When the heat index is 96 degrees or greater, a **Red-Flag Extreme Weather Advisory** shall be issued.

Extreme Cold Weather:

During periods of severe cold, the **wind chill index and ambient temperature** (Attachment B) will be used to determine the need to issue an extreme weather advisory.

- When the ambient or wind chill temperature is between 11 and 25 degrees, a **Yellow-Flag Extreme Weather Advisory** shall be issued.
- When the ambient or wind chill temperature is 10 degrees or below, a **Red-Flag Extreme Weather advisory** shall be issued.

Responsibilities:

All Operational Personnel:

- Taking the necessary preventive steps to be prepared for and reduce the chance of heat/cold related injuries.
- Taking preparatory measures to assure they have immediate access (on the unit to which they are assigned) to a change of clothes, layered cold protection, and appropriate cold-winter clothing/gear should outside operations become necessary. All personnel shall take personal responsibility to be prepared and have appropriate resources with them.
- Advising their crew and immediate supervisor any time they believe that their level of fatigue or exposure may have adverse effects on them, their crew, or the operation.
    - It is equally each person's responsibility to be aware of and report such conditions if noticed in other members of their crew.

Career and Volunteer Officers and Supervisors:

- Operating in accordance with the applicable Work/Rest Cycle Guidance as defined by this policy, and in accordance with the Weather Extreme Advisory "Flag" as declared for a given time period by Field Battalion Chiefs.
- Maintaining an awareness of the condition of all personnel operating within their span of control and ensuring that adequate measures are taken to provide for their safety and health.
- Monitor weather conditions from the National Weather Service (NWS) at BWI Airport or some other more specific official government source pertinent to an incident location, or through the Howard County Public Safety Answering Point emergency dispatchers (Howard Communications) if necessary. It may be necessary for officers and Command to monitor weather conditions continuously in order to stay informed of changing conditions.

Field Battalion Chiefs and Shift Safety Officers:

- Continuously monitor the current Heat/Wind Chill index values throughout the shift.
- The Field Battalion Chief shall authorize the Shift Safety Officer to announce the issue or change of a Department weather extreme advisory via all of the following:
    - A Special Information Broadcast over the radio system (0700-2300 hours)
    - A CAD message via Howard Communications
    - An email to all "Fire All Personnel"
    - Additional announcements throughout this time period will also be made whenever the current Heat/Wind Chill index values change and necessitate a modification to the weather extreme advisory.

The Formal Rehabilitation Function:

As a baseline, formal incident rehabilitation shall be established upon confirmation of a working incident where Department personnel will be engaged in outdoor activity for more than one hour (rescue, fire, hazmat, etc.). When formal incident rehabilitation is instituted:

- A Rehab Division/Group and Rehab Supervisor shall be assigned.
- Units (crews) shall be assigned IN and OUT of the Rehab Division on a regular basis during exposure to outdoor activities.
- A Rehab Division staging area(s) for personnel shall be set up in a sheltered or climate controlled area(s). Crews shall be rotated and rehabilitated, and should include the opportunity for rest, medical assessment, monitoring of vital signs and rehydration with hot/cold beverages. In cold weather, personnel with wet clothing should change into dry clothing, if possible, before returning outside.
- When conditions exist that require the Formal Rehabilitation Function, Incident Commanders may alter running assignments based on available information and weather conditions.

Preventive Measures:

Fluid Replacement:

A cooler of fresh drinking water shall be carried on all station apparatus, excluding utility vehicles.

- Hot Weather:
  - A critical factor in the prevention of heat injury is the maintenance of water and electrolytes.
  - Recommended amounts of water should be consumed before, during and after becoming involved in any work activities (amounts vary in relation to temperature and activity level).
  - A general rule of thumb during times of activity and heat stress is that operational personnel should consume at least (1) quart of water per hour, or one cup of water every 15-20 minutes. Water is still the choice of oral fluid replacement; however, a commercially prepared activity beverage served chilled or cooled is acceptable (mixed with 50 % water).

- Cold Weather:
  - Operational personnel still need to maintain an appropriate level of hydration in cold environments, especially when moderate to heavy work is being done.
  - Hot drinks are not necessary but may be desirable in cold environments.

Work/Rest Cycle Guidance:

Work/Rest Cycle Guidance has been developed to assist emergency personnel and supervisors who may become engaged in non-essential, non-emergency outside activities during times of environmental climatic extremes. The guidance provides information that can be used as part of a mitigation strategy to control the potential adverse effects of these conditions and to provide safe guidelines for personnel working in the described temperatures.

This guidance is calibrated to apply to activities that are conducted while wearing the Class "C" uniform, and will likely need to be adjusted if other levels of PPE are required, such as turnout gear or encapsulating PPE. This guidance is modified for our application, but is based upon the threshold limit values for thermal stress developed by the American Conference of Governmental Industrial Hygienists, who depict four operational levels, temperatures, and the corresponding work/rest cycle that is recommended.

DFRS Advisory	Heat/Wind Chill Index	Work/Rest Cycle Guidance
Red Flag (Cold)	10° F and below	20 +/- 5 min / 10 min
Yellow Flag (Cold)	11° F to 25° F	30 +/- 5 min / 10 min
Non-extreme	26° F to 85° F	45 +/- 5 min / 15 min
Yellow Flag (Heat)	86° F to 95° F	30 +/- 5 min / 30 min
Red Flag (Heat)	96° F and above	20 +/- 5 min / 30 min

Regardless of the Work/Rest Cycle Guidance, it is imperative that individuals know their limits. The effects of heat stress, particularly on the un-acclimatized worker, can be severe. An objective evaluation of an individual's fatigue shall be made frequently by oneself as well as other members of their crew. ***An individual's fatigue level will always supersede any work/rest guidance, and earlier and extended rest periods and rehabilitation shall be initiated whenever necessary.***

Protective Equipment:

Regardless of Heat/Wind Chill Index value, all necessary protective equipment will be donned and employed in accordance with all regulations at all times (e.g. safety glasses/goggles, work gloves, etc.)

Operational Guidelines for Department Extreme Weather Advisories:

Red-Flag (Hot or Cold): Operations during Moderate to Severe Hot/Cold Conditions

(Wind Chill Index 10 degrees F and below or heat index 96 degrees F and above)

- *Extreme Caution* should be exercised for all outside activities.
- Non-essential outside activities shall be suspended and only limited activities that are essential to maintenance, preparation, and operations of the Department shall be undertaken.
    - Routine duties (training, PT, maintenance, etc.) shall be confined to areas with appropriate climate controls.
    - Permitted activities include: snow removal, hydrant/draft tank dig out, snow chains, apparatus fueling, limited building/apparatus maintenance, as well as in-service inspections/fire hazard surveys.

- Necessary precautions to protect personnel shall be taken by emergency personnel, supervisors, and incident commanders when operating during emergency incidents and in outside environments.
    - Formal incident rehabilitation shall be established if operational work cycles exceed 10 minutes.
    - Work/Rest Cycle guidance for activities performed under this advisory is a 20 +/- 5 minute work period to a 10 minute rest period. This rest period should allow for aerobic recovery, rehydration, and temperature normalization.
    - Cool, shaded, sheltered areas out of the elements should be used for rest areas in times of heat. Warm, heated, sheltered areas out of the elements should be used for rest areas in times of cold.
    - Access to hydration and drying should be facilitated in both cases.
    - Access to personal preparation materials should be facilitated.

- Daily uniforms shall be adjusted to provide protection or relief from weather conditions, but shall remain in compliance with Department issued/approved apparel.
    - Personnel operating outside should wear their class "C" uniform with optional clothing items appropriate for the level of cold or heat and physical activity that will be undertaken (e.g. for cold; long underwear, caps, gloves, insulated jackets, coveralls, insulated boots, etc.).

Yellow-Flag (Hot or Cold): Operations during Relative Hot/Cold Conditions

(Wind Chill Index 11 degrees F to 25 degrees F or Heat Index 86 degrees F to 95 degrees F)

- *Caution* should be exercised for all outside activities.
- Non-essential outdoor activities shall be kept to a minimum, limited in duration, and should be limited to those classified with a light to moderate workload.
    - All outside activities are permitted.
    - Formal incident rehabilitation shall be established if operational work cycles exceed 15 minutes.
    - Outdoor training is permitted, but supervisors and training event commanders shall institute appropriate strategies to mitigate increased risk of exposure injury, which shall include a formal incident rehabilitation process during training exercises. Adjustment of the training event may be necessary.
    - Emergency personnel are encouraged to work in climate-controlled areas when possible.
    - Outdoor physical training during this time should be limited in nature.

- Necessary precautions to protect personnel shall be taken by emergency personnel, supervisors, and Incident Commanders when operating during emergency incidents and in outside environments.
    - Work/Rest Cycle guidance for activities performed under this advisory is a 30 +/- 5 minute work period to a 10 minute rest period. This rest period should also allow for re-warming (heated area or shelter to break the wind) and a change of clothing if needed.
    - Operational Personnel should ensure a satisfactory level of hydration before and during all activities.

- Daily uniforms may be adjusted at the discretion of the Field Battalion Chief or Incident Commander in order to provide protection or relief from weather conditions, but shall remain in compliance with Department issued/approved apparel.
    - Personnel operating during this time should wear their class "C" uniform with optional approved clothing items appropriate for the level of cold and physical activity that will be undertaken.

Non-Extreme Weather Conditions: Operations during Normal to Mild Heat and Cold Conditions

(Wind Chill/Heat Index values of 26 degrees F to 85 degrees F)

- All personnel, especially officers and supervisors, should be aware that prolonged exposure, even to non-extreme weather conditions, can result in injury, especially when personnel are wet. Care must be taken, both at an individual and supervisory level, to be accountable for adequate and appropriate preparation for operating in whatever outside conditions might occur.
- No prescribed limitations for activities.
- All outside activities are permitted.
- Work/Rest Cycle guidance for activities performed under this advisory is a 45 +/- 5 minute work periods to a 15 minute rest period each hour. The rest period should be taken in well-ventilated shaded areas and include fluids for re-hydration.
- Daily uniforms and clothing for personnel operating during this time should be their class "C" uniform with optional approved clothing items appropriate for the physical activity that will be undertaken.

REFERENCES

- National Fire Protection Agency 1500: Standard on Fire Department Occupational Safety and Health Programs (2013).
- American Conference of Governmental Industrial Hygienists (ACGIH): Documentation of the Threshold Limit Values and Biological Exposure Indices (1996).
- National Institute for Occupational Safety and Health: Criteria for a Recommended Standard-Occupational Exposure to Hot Environments (1986).
- U.S. Fire Administration: Emergency Incident Rehabilitation (February 2008), available at: https://www.usfa.fema.gov/downloads/pdf/publications/fa_314.pdf.

SUMMARY OF DOCUMENT CHANGES

Established red and yellow flag alerts for cold emergencies
Adjusted the title
Added Non-Essential, Non-Emergency Work/Rest Cycles.
Established NWS as the official temperature source, and BWI as the default location

FORMS/ATTACHMENTS

- Attachment A: Heat Stress Index and Injury Threat Chart
- Attachment B: Wind Chill Chart with Frostbite Injury Times

APPROVED

John S. Butler, Fire Chief
Office of the Fire Chief

Author:

Joann Rund, Assistant Chief
Bureau of Occupational Safety and Health

Attachment A

Heat Stress Index and Injury Threat Chart

NOAA's National Weather Service

Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Attachment B

Wind Chill Chart with Frostbite Injury Times

Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

General Order 150.05: Safety Committee

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

150.05

Originating From	Issue Date	Revision Date	Attachments
Administration	**10/18/1994**	**N/A**	**N/A**

SUBJECT: Safety Committee
APPLICABILITY: All Personnel

POLICY:
To conduct research, study and review matters pertaining to safety and occupational health within the Howard County Department of Fire and Rescue Services (DFRS) and make recommendations accordingly.

1 GENERAL

1.1 The Safety Committee shall serve as an advisory committee to the Fire Chief.

1.2 The Safety Committee is authorized to establish its own rules of procedure and schedule of meetings.

1.3 Regular meetings shall be scheduled on a bi-monthly basis and special meetings may be called on an "as needed" basis. The committee will determine the date, time, and location of each meeting based upon the needs of the committee members.

1.4 Written minutes of each meeting shall be retained and shall be made available to all members of the department. A copy of the minutes will be provided to the Chief Deputies and the Fire Chief.

2 COMPOSITION

2.1 The Safety Committee shall be composed of a maximum of ten (10) personnel, excluding the chairperson.

2.1.1 Membership shall be derived from representatives of the following:

2.1.1.1 Bureau of Operations (Fire and EMS)
2.1.1.2 Bureau of Services (Training)
2.1.1.3 Bureau of Fire Prevention
2.1.1.4 Howard County Fire Officer's Association
2.1.1.5 Local 2000
2.1.1.6 Howard County Volunteer Firemen's Association
2.1.1.7 Volunteer Operations

2.1.1.8 Phoenix Sentinels
2.1.1.9 At-large

2.2 The chairperson shall be selected by the Fire Chief.

3 DUTIES AND RESPONSIBILITIES

3.1 The Safety Committee will issue a report on an annual basis of its findings and recommendations. The report will be due at the end of each calendar year and should include pertinent data such as injury and lost time statistics based on availability.

3.2 Any new (other than standard inventory) device which is proposed to be purchased, and/or placed on any apparatus, shall first be reviewed by the safety committee.

Approved:

Joseph A. Herr
Fire Chief

General Order 150.09: Respiratory Protection

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

150.09

Originating From	Issue Date	Revision Date	Attachments
Administration	**08/04/2000**	**N/A**	**A-E**

SUBJECT: **Respiratory Protection**
APPLICABILITY: **All Personnel**

POLICY:
It is the policy of Howard County Department of Fire and Rescue Services (DFRS) to ensure that all fire and rescue personnel use safe and efficient procedures on all emergency incidents. To ensure their safety, the DFRS will provide properly fitted, tested, and maintained respiratory protective equipment for all fire and rescue personnel. Personnel must be trained in and consistently use these devices in all areas where an IDLH atmosphere may exist. Personnel will be provided with SCBA and/or SAR, as appropriate, which meet the requirements of NIOSH, MSHA, and NFPA applicable standards at the time of purchase.

1 GENERAL

1.1 This policy shall be in compliance with 29 CFR 1910.134, Respiratory Protection Standard, issued by the United States Department of Labor, Occupational Safety and Health Administration (OSHA).

1.1.1 Maryland Occupational Safety and Health (MOSH) has determined that where career and volunteer firefighter/rescuers are deployed together, *all* firefighter/rescuer personnel (both career and volunteer firefighters) must comply with these requirements. DFRS is adopting this policy to ensure the health and safety of all its personnel with firefighter/rescuer operational status.

1.2 For more information regarding this policy, please contact the Howard County Fire and Rescue Occupational Health and Safety Officer.

2 DEFINITIONS

2.1 **ANSI Z88.6 - 1984** is an American National Standards Institute, Inc. standard for respiratory protection - respirator use - physical qualifications for personnel.

2.2 **Compressed breathing air** is defined as air with a minimum air quality of Grade E, as well as a water vapor level of less than 24 ppm as specified by NFPA 1500, Compressed Gas Association, G-7.1, 1992 Edition, commodity specification for air.

2.3 The **facepiece** is a component of the respirator which covers the wearer's nose, mouth, and in some cases the eyes. It includes the headbands, exhalation valves and in some cases components that are required to connect it to a respirable air supply.

2.4 The **Fire Chief** is the uniformed head of Howard County Department of Fire and Rescue Services, who has all powers of a department director, administers all fire and rescue services provided in the county and implements the policies of Howard County Fire and Rescue.

2.5 **Howard County Department of Fire and Rescue Services (DFRS)** is a combination system of career and volunteer personnel providing fire, rescue and emergency medical services to the citizens of Howard County Maryland.

2.6 An **Immediately Dangerous to Life or Health** atmosphere poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

2.7 The **Mine Safety Health Administration (MSHA)** is a federal agency that regulates the mining industry in the safety and health arena.

2.8 The **National Fire Protection Administration (NFPA)** is an organization of firefighters, insurance carriers and other interested parties who establish and publish the National Fire Standards, National Electrical Code and related materials.

2.9 The **National Institute for Occupational Safety and Health (NISOH)** is a federal agency that conducts research on health and safety concerns as well as tests and certifies respirators.

2.10 A **Pass Device** is a acronym for the personal Alert Safety system unit attached to the turnout gear or built in the self-contained breathing apparatus.

2.11 A **Qualitative Fit Test (QLFT)** is a facepiece testing process used to determine the proper size facepiece for individual personnel by **determining a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.**

2.12 A **Quantitative Fit Test (QNFT)** is a facepiece testing process used to determine the proper size facepiece for individual personnel by numerically measuring the amount of leakage into the facepiece.

2.13 A **Respiratory Protective Equipment (RPE)** is a device designed to protect the wearer from inhaling harmful atmospheres.

2.14 A **Supplied Air Respirator (SAR)** is a device which provides air from a stationary storage cylinder through a high pressure hose. SARs include an escape cylinder with at least five minutes of breathing air.

2.15 The **Self-Contained Breathing Apparatus (SCBA)** is an atmosphere supplying respirator for which the breathing air source is designed to be carried by the user.

2.16 A **Trans-Fill System** is a trans-fill hose and fittings, which allows two users of similarly equipped SCBA to share a common air supply during an emergency situation.

2.17 **Using SCBA** refers wearing full protective gear, SCBA in place, facepiece on, breathing from the SCBA, and PASS device activated.

2.18 **Wearing SCBA** refers to full protective gear, SCBA in place, facepiece ready for use, not breathing from the SCBA, and PASS device, if not an integral part of the air supply, activated.

2.19 **29 CFR 1910.134** is a respiratory protection standard issued by the United States Department of Labor, Occupational Safety and Health Administration (OSHA) that provides rules and regulations on the selection, maintenance and use of self contained breathing apparatus.

3 GENERAL USER/EQUIPMENT GUIDELINES

3.1 Personnel using SCBA must operate in crews of two or more when entering an IDLH atmosphere. Contact among crew members is to be visual and/or verbal at all times. They should remain in close proximity to each other, enabling them to provide mutual assistance in case of an emergency.

3.2 The SCBA/SAR will operate only in the positive pressure mode. SCBA must have a minimum rated service duration of 30 minutes. In the absence of an integrated PASS device, personnel must activate an independent PASS device prior to entering the hot zone, and the PASS device must remain in the active mode until the member exits the hot zone.

3.3 Disposable Air Purifying Particulate Filter Respirators will be provided for pre-hospital medical care. These respirators must meet at least the minimum standards of

protection as defined in NIOSH Standard 42 CFR 84. All personnel will follow DFRS's policy on Infection Control regarding levels of personal protection in dealing with patients that may create an exposure hazard.

4 GUIDELINES FOR RESPIRATORY PROTECTION CERTIFICATIONS AND FIT TESTING

4.1 All personnel who may be exposed to IDLH atmospheres must use RPE. Personnel who are required to use RPE must be medically certified by a Licensed Health Care Provider (LHCP).

4.1.1 At a minimum, medical certification must follow the guidelines provided in 29 CFR 1910.134, attachment C.

4.1.2 Records of medical certification for the use of RPE will be maintained with personnel health records. LHCP must advise the Fire Chief or designee of personnel who are not qualified to use RPE.

5 GUIDELINES FOR SCBA TRAINING AND ANNUAL RECERTIFICATION

5.1 All personnel must receive initial SCBA training as part of the Essentials of Firefighting course (or through an approved equivalent program), and annual recertification through the in-service training program.

5.1.1 The Training Division is responsible for distributing SCBA training materials.

5.1.2 DFRS Battalion Chiefs or volunteer department training coordinators must ensure that the SCBA training distributed by the DFRS Training Division is completed in their districts and in their stations, and that Level I Instructors are available for recertification and other SCBA training.

5.1.3 The training program for initial and annual recertification must include at least these elements:

5.1.3.1 Construction and operation of SCBA;

5.1.3.2 IDLH atmosphere identification;

5.1.3.3 Recognition of medical signs and symptoms that may limit or prevent the effective use of respirators;

5.1.3.4 A "Skills to be Completed" checklist;

5.1.3.5 Failures and emergency procedures;

5.1.3.6 Reporting procedures for defective SCBA;

5.1.3.7 Record keeping; and,

5.1.3.8 Routine station maintenance after use.

5.1.4 Personnel who have not participated in field operations for six months or longer must complete a re-entry program that includes SCBA recertification.

5.1.5 The Fire Chief or designee must maintain records of this training.

6 GUIDELINES FOR USING AND WEARING RESPIRATORY PROTECTION EQUIPMENT

6.1 All personnel who may be exposed to IDLH atmospheres must wear SCBA. They may be required to use SCBA during the attack and overhaul of fires, or while working at any other incident.

6.2 The RPE must be worn until command determines the atmosphere is safe. Personnel may voluntarily continue to wear RPE after command has determined that it can be removed.

7 GUIDELINES FOR FACEPIECES

7.1 All personnel must be provided with a correctly fitted facepiece. Correct facepiece fit will be determined by a quantitative fit test (QNFT) or qualitative fit test (QLFT) pursuant to 29 CFR 1910.134: Fit Testing (Attachment A).

7.2 Personnel will be tested during initial recruit/probationary training, annually, and when a new facepiece design is adopted. Only personnel who have been trained in the fit testing procedure will conduct the quantitative fit testing.

7.2.1 Records of facepiece testing will be kept at the station and copies will be sent to the Breathing Apparatus Repair Shop.

7.3 Personnel who are required to use RPE must not allow any object to enter or pass through the area where the facepiece must seal with the face or interfere with exhalation valve operation.

7.3.1 Helmets, head coverings, and protective hoods must be worn outside the facepiece seal, head harness and straps.

7.3.2 Personnel who are required to use RPE must not have beards or facial hair that interferes with the facepiece seal.

7.3.3 Personnel who wear eyeglasses must not use frames that interrupt the seal area of the facepiece. HCFR will provide spectacle kits for personnel.

7.3.4 Personnel who are required to use RPE must not wear hard contact lenses; however, they may wear soft contact lenses.

7.4 If the LHCP determines during routine medical examinations that an individual may not be able to obtain a facepiece seal because of physical changes (weight loss, dental work, etc.), LHCP staff must recommend to the Fire Chief or designee that a

supplemental fit test be performed.

7.4.1 Each user is to check his/her facepiece seal pursuant to 29 CFR 1910.134 : User Seal Check Procedures (Attachment B).

7.5 Personnel will be fit tested when they report problems related to obtaining a facepiece seal, or if supervisory or LHCP staff observe conditions (such as excessive weight loss) that could affect a proper fit.

7.6 Personnel must not risk exposure by removing the facepiece or disconnecting the regulator in hazardous atmospheres.

7.7 Personnel who detect vapor or gas breakthrough, changes in breathing resistance, or facepiece leakage must leave the IDLH atmosphere and must not re-enter until the problem has been resolved. If a maintenance problem may be the cause, the unit must be taken out of service and repaired pursuant to Section 9 of this policy.

7.8 Each primary piece of apparatus will carry one medium facepiece for each SCBA on the unit.

7.9 Small and large facepieces will be made available.

8 GUIDELINES FOR TRANS-FILL SYSTEMS

8.1 The Trans-Fill system connection may be used when a system fails or the firefighter depletes the air supply of the cylinder in use.

8.1.1 The Trans-Fill system may be used only by personnel who have been trained in its use, and according to manufacturer's instructions.

8.1.2 Trans-filling between two users of SCBA should only be attempted during life threatening emergency situations, or during simulated training exercises. After trans-filling, both donor and receiver must return to fresh air immediately.

8.1.3 Trans-filling shall not be attempted from one SCBA to another SCBA if the donor's audible alarm is ringing.

9 GUIDELINES FOR SCBA MAINTENANCE AND REPAIR REQUIREMENTS

9.1 An SCBA unit must be taken out of service when any defect is found in its assembly.

9.2 An SCBA repair tag must be completed and attached to the unit, and notification

must be made to the Breathing Apparatus Repair Shop.

9.2.1 If maintenance is required, the unit must be transported to the assigned maintenance facility. It may be returned to operational status after shop maintenance has been completed.

9.3 An SCBA used by a firefighter who suffers respiratory injuries, burn injuries, or line of duty death must be impounded by the Incident Commander. The unit's identification must include the name of the user, the date and location of the incident, and a description of the problem. The Incident Commander must take possession of the unit and all appropriate documentation and deliver it to the Health and Safety Officer or designee. All personnel who have handled the respirator involved must sign off on the documentation as the unit is transferred to the Health and Safety Officer.

9.4 All SCBA must be inspected, cleaned and disinfected pursuant to 29 CFR 1910.134: Respirator Cleaning Procedures (Attachment C), and serviced after each use according to the manufacturer's recommendations. Routine inspections, in-station preventive maintenance, and annual maintenance must also comply with the manufacturer's requirements.

9.4.1 In-station inspections must be logged on forms provided by DFRS. Station officers must ensure that these forms are used daily and monthly, and that the unit is identified either by its serial number or a number the station assigned to that unit. The forms below must be used:

9.4.1.1 Daily/weekly vehicle inspection forms used in each station; and

9.4.1.2 Breathing Apparatus Monthly Inspection forms (Attachment D)

9.4.2 Original copies of these reports must be stored in the station for 12 months and a copy must be sent to the Breathing Apparatus Repair Shop on a monthly basis.

9.4.3 All SCBA carried on first-line response units must be inspected daily, before and after use.

9.4.4 All SCBA carried on staff vehicles must be inspected weekly.

9.4.5 All SCBA at the training academy must be inspected before and after use on the days the equipment is used.

9.4.6 All SAR must be inspected daily.

9.4.7 Individual facepieces must be inspected before and after use.

9.5 All SCBA/SAR must receive both preventive maintenance and shop maintenance. All maintenance performed on SCBA must comply with the manufacturer's manual for operations and maintenance. Deviations may be permitted only if authorized in

writing by the manufacturer.

9.5.1 SCBA must receive a complete preventive maintenance inspection on a monthly basis, in accordance with the manufacturer's recommendations.

9.5.2 SCBA must receive periodic shop maintenance, performed by employees who have been trained and certified by the manufacturer.

9.5.3 Individual facepieces must receive preventative maintenance during fit testing.

10 GUIDELINES FOR SCBA/SAR RECORDS

10.1 A records program must be established and maintained for all SCBA/SAR.

10.2 The records program begins with receipt of the unit and ends with its disposal. Documentation must include a complete history of all maintenance performed on any component.

10.3 Records must be established for the regulator, back-pack assembly, and cylinders.

10.4 Each completed assembly must be identified by a station number tag.

11 GUIDELINES FOR CYLINDER AND COMPRESSED BREATHING AIR TESTING AND MAINTENANCE

11.1 Compressed breathing air used in breathing apparatus must meet the requirements of NFPA 1500, Compressed Gas Association, G-7.1, 1992 Edition, commodity specification for air. The minimum air quality is Grade E, with a water vapor level of less than 24 ppm and dew point of -65°F.

11.2 All cylinders must be maintained in accordance with the Compressed Gas Association and SCBA manufacturer's requirements.

11.2.1 SCBA cylinders must be maintained in a fully charged state.

11.2.2 SCBA cylinders must be hydrostatically tested according to the manufacturer's recommendations, normally every three years. These tests must comply with the United States Department of Transportation's rules and regulations.

11.3 Sources of compressed gas breathing air, such as compressors, cascade systems, and storage receivers used for filling SCBA cylinders, must be tested at least every three months.

11.3.1 Breathing air compressors must be maintained according to the manufacturer's recommendations.

11.3.2 A compressor operational log must be maintained at every facility where compressed air is manufactured.

11.3.3 Maintenance records will be kept for all preventative maintenance, repairs and filter changes. Records will be kept at the station and copies will be sent to the Breathing Apparatus Repair Shop.

12 GUIDELINES FOR DFRS PERSONNEL RESPONSIBILITIES

12.1 All personnel must ensure that their SCBA is in working order and ready for use with the correctly sized facepiece when they are assigned a riding position, before entering an IDLH atmosphere, and after each use.

12.2 All officers must require their personnel to follow these procedures to ensure their personal safety.

12.3 The Health and Safety Officer and SCBA Workgroup is responsible for reviewing, evaluating, and making appropriate recommendations on the Respiratory Protection Program as outlined in 29 CFR 1910.134 (I): Program evaluation (Attachment E).

Approved:

Joseph A. Herr
Fire Chief

(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

(c) Irritant Smoke Fit Test Procedure

(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
(2) The test subject shall be instructed to keep his/her eyes closed.
(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
(5) The exercises identified in section I.A.14. of this attachment shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.
(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.
(7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
(8) If a response is produced during this second sensitivity check, then the fit test is passed.

29 CFR 1910.134: Fit Testing

Part I. OSHA-Accepted Fit Test Protocols

Fit Testing Procedures—General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to and correctly fits, the user.

2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, and how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

    (a) Position of the mask on the nose
    (b) Room for eye protection
    (c) Room to talk
    (d) Position of mask on face and cheeks

7. The following criteria shall be used to help determine the adequacy of the respirator fit:
   (a) Chin properly placed;
   (b) Adequate strap tension, not overly tightened;
   (c) Fit across nose bridge;
   (d) Respirator of proper size to span distance from nose to chin;
   (e) Tendency of respirator to slip;
   (f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Attachment B of this policy or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Attachment B. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble, beard growth, mustache, or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.

12. Exercise regimen: Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises: (a) The following test exercises are to be performed for all fit testing methods prescribed in this attachment except for the CNP method. A separate fit testing exercise regimen is contained in the CNP protocol. The test subject shall perform exercises, in the test environment, in the following manner:

    (1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.

(8) Normal breathing. Same as exercise (1).

Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount ™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative C fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from

the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Portacount Fit Test Requirements.

(1) Check the respirator to make sure the respirator is fitted with a high-efficiency filter and that the sampling probe and line are properly attached to the facepiece.
(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.
(3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed: Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin: Tendency of the respirator to slip: Self-observation in a mirror to evaluate fit and respirator position.
(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.
(5) Follow the manufacturer's instructions for operating the Portacount and proceed with the test.
(6) The test subject shall be instructed to perform the exercises in Part I A. #14 of this attachment.
(7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

(b) Portacount Test Instrument.

(1) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.
(2) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this attachment.
(3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

Qualitative Fit Test (QLFT) Protocols

1. General

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter

(a) Odor Threshold Screening
Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

(1) Three 1 liter glass jars with metal lids are required.
(2) Odor-free water (e.g., distilled or spring water) at approximately 25° C (77° F) shall be used for the solutions.
(3) The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.
(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.
(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.
(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.
(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.
(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time,

and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(b) Isoamyl Acetate Fit Test

(1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject

shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

(a) General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

(b) Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

29 CFR 1910.134: User Seal Check Procedures

The Individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and/or Negative Pressure Checks

A. *Positive pressure check.* Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. *Negative pressure* check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

29 CFR 1910.134: Respirator Cleaning Procedures

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed below. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth below, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

I. Procedures for Cleaning Respirators

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43°C [100°F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean,warm (43°C [100°F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
   1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at (43°C [100°F] maximum); or,
   2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6 - 8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at (43°C [100°F] maximum); or
   3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43°C [100°F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

29 CFR 1910.134 (I): Program evaluation

This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(1) The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(2) The employer shall regularly consult employees required to use respirators to assess the employees views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

(i) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(ii) Appropriate respirator selection is for the hazards to which the employee is exposed;

(iii) Proper respirator use under the workplace conditions the employee encounters; and,

(iv) Proper respirator maintenance.

Station ___

Masks

Unit #	Date Inspected	Location	Cylinder Pressure	Regulator & Audi-Larm OK	Facepiece OK	Harness OK	Cleaned & Sanitized	Comments	Initials

Please Fax to Breathing Apparatus Repair Shop (410) 313-2652

Station ___

Cylinders

Cylinder	Location	Hydro Date	Comments

29 CFR 1910.134 (I): Program evaluation

This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(1) The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(2) The employer shall regularly consult employees required to use respirators to assess the employees views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

(i) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(ii) Appropriate respirator selection is for the hazards to which the employee is exposed;

(iii) Proper respirator use under the workplace conditions the employee encounters; and,

(iv) Proper respirator maintenance.

General Order 150.18: Carcinogen Exposure Reduction Plan

Howard County Department of Fire and Rescue Services

GENERAL ORDER

GENERAL ORDER 150.18

CARCINOGEN EXPOSURE REDUCTION PLAN

BUREAU OF OCCUPATIONAL SAFETY AND HEALTH

Issue Date: February 21, 2018
Revision Date: N/A

APPLICABILITY

All Personnel

POLICY

In an effort to further the Howard County Department of Fire and Rescue Services' (Department) Bureau of Occupational Safety and Health's (BOSH) mission of developing and maintaining an innovative Occupational Safety and Health Program, a Carcinogen Exposure Reduction Plan (CERP) has been developed. This policy lays out the procedures for reducing the exposure times and quantities to carcinogens that are encountered in the firefighting profession.

DEFINITIONS

- **Advanced Cleaning** – Cleaning of Personal Protective Equipment (PPE) performed by trained personnel with the elements out of service and performed periodically as required. Advanced Cleaning is performed in machines with approved detergents, cleaners, and disinfectants, and shall be documented.

- **Firefighter Cancer Support Network (FCSN)** – An organization dedicated to assisting firefighters who have been diagnosed with cancer. In August 2013, FCSN published a white paper with 11 recommendations to reduce the incidence of cancer within the fire service.

- **National Fire Protection Association (NFPA)** – The National Fire Protection Association, a global nonprofit organization, established in 1896, devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards.

- **Routine Cleaning** – A light cleaning of PPE performed by the end user without taking the elements out of service and performed after each use. Routine Cleaning is performed by hand only, and does not need to be documented.

PROCEDURES

General:

- Officers:
  - As the leader of the functional unit in the fire service, the company officer is the most influential person in regards to attitude, habits, and implementation of change. To this extent, the company officer must set clear expectations and lead by example by following and promoting the requirements in this policy.

- All personnel:
  - Personnel shall make efforts to reduce both the amount of time and the quantity of carcinogens to which they are exposed. This will be accomplished by following currently accepted best practices in the following areas:
    - Respiratory Protection
    - Cleaning of PPE
    - Laundering of Uniforms
    - Decontamination of Personnel
    - Storage and Transportation of PPE
    - Use of Diesel Exhaust Capture Systems
    - Tobacco Cessation

Use of Turnout Gear:

- Turnout gear shall only be worn on incidents in which its protection is needed, or may be needed. These incidents may include, but are not limited to: fires of any kind, vehicle rescues, fire alarms, flammable gas emergencies, etc.

Respiratory Protection:

- Several studies have demonstrated that carcinogenic agents can be present in compartments long after a fire is extinguished. Studies have also demonstrated that the levels of carbon monoxide present after a fire are poorly correlated with these other dangerous agents. (Oregon Study) To that extent, once the decision to use SCBA has been made, its use shall be continued throughout all phases of the incident to include salvage, overhaul, and origin and cause determination.

Incident commanders shall have the authority to modify respiratory protection requirements for exigent circumstances. These instances should be rare and shall require the following:

- The incident commander (or their designee) shall document the names of the members who worked in the post-fire environment without SCBA.
- The incident commander (or their designee) shall document the length of time that each member worked in the post-fire environment without SCBA.
- The incident commander shall submit justification for the exigency exception in writing to the Assistant Chief of BOSH and the Assistant Chief of ESB by the end of the shift.

Cleaning of PPE:

Barring exigent circumstances such as extreme weather, safety concerns, or depleted County-wide apparatus availability, the following shall be accomplished before leaving the incident scene. In accordance with NFPA 1851, Chapter 7, as soon as practical after exposure to the products of combustion, or other carcinogenic materials, personnel shall:

- Evaluate the level of contamination and initiate Routine Cleaning while still at the incident scene.
- Brush off any dry debris.
- Rinse off any other debris with water. Heavy scrubbing or the use of high velocity or high pressure water jets (such as a pressure washer) shall be avoided.
- When necessary, a soft bristle brush shall be used to gently scrub and the ensemble shall be rinsed again.
    - Soft bristled brushes dedicated to the cleaning of PPE shall be carried on all front line suppression equipment to prevent cross contamination with products that could degrade the PPE.
    - Stiff bristled brushes, such as floor brushes or wheel/tire brushes, shall not be used as they could damage the PPE.
- In the event that the PPE is contaminated to the point where the above procedures are insufficient, personnel shall place the items out of service and send them to the supply unit for Advanced Cleaning.
- SCBA and SCBA elements shall be rinsed and brushed in accordance with the manufacturer's recommendations.

Laundering of Clothing:

As soon as practical after returning to quarters, the officer or his or her designee shall ensure that all clothing uniforms worn during the incident are laundered.

Decontamination of Personnel:

Multiple studies have confirmed that there is a marked increase in skin permeability and absorption as skin temperature and moisture rise. Data has shown that absorption can increase by 400% for every 5° F increase in skin temperature. (Cancer Support Network) With this in mind, it is essential that personnel decontaminate themselves as soon as practicable after an incident by:

- Using commercially available wipes that are specifically designed for firefighting to remove as much gross contaminate as possible. Personnel shall clean all exposed skin, paying special attention to the neck, angle of the jaw, face, hands, and under arms.
    - Barring exigent circumstances such as extreme weather, safety concerns, or depleted County-wide apparatus availability, this shall be accomplished before leaving the incident scene.
- Personnel should shower immediately upon returning to quarters. Out of service time should be provided for this if staffing and apparatus availability allow it.

Storage of PPE:

PPE can continue to off gas after exposure to the products of combustion. Every effort shall be made by personnel to not store turnout gear in their homes or their vehicles. All personnel are encouraged to store their gear in a fire station. Under no circumstances shall PPE be worn or stored in the residential areas of fire stations.

In the event that personnel must transport gear in their personal vehicles, the following precautions shall be taken:

- All PPE shall be transported in Department issued gear bags or hard sided containers.
- Whenever possible, gear shall be transported in cargo areas of the vehicle such as the trunk or bed of a pickup truck.

- Turnout gear shall not be stored in the passenger area of staff or command vehicles. If there is no other option due to the configuration of the vehicle, the gear shall be stored in a Department issued gear bag, or hard sided container.

Diesel Exhaust Mitigation:

Many agencies, including the World Health Organization, the Centers for Disease Control and Prevention, and the Environmental Protection Agency, classify diesel exhaust as possibly, potentially, or likely carcinogenic (Cancer.org). To that extent, all personnel shall familiarize themselves with GO 500.04: Diesel Exhaust Mitigation, and utilize the systems described therein.

Tobacco Cessation:

The Department discourages all personnel, and prohibits some, from using any form of tobacco products. Abstention from the use of tobacco products accomplishes:

- A reduction of health hazards associated with tobacco use.
- Delivery of higher quality service to the public because of improved physical fitness, endurance, and health.
- Safer performance of assigned duties by personnel due to improved physical condition.
- A cleaner and more pleasant environment at Department work sites.
- A reduction in health hazards as personnel will only be exposed to hazardous conditions directly related to fire and rescue work.

See General Order 130.03: Use of Tobacco Products.

Personnel who desire to stop using tobacco products can be assisted through a cessation program by contacting the Howard County Health Department at 410-313-6300.

REFERENCES

- General Order 130.03: Use of Tobacco Products
- General Order 500.04: Diesel Exhaust Mitigation
- NFPA 1500: *Standard on Fire Department Occupational Safety and Health Program*
- NFPA 1851: *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*
- NFPA: About Us, *available at:* http://www.nfpa.org/about-nfpa
- OSHA 29 CFR 1910.134: *Occupational Safety and Health Standard on Respiratory Protection*
- A Study on Chemicals found in the Overhaul Phase of Structure Fires using Advanced Portable Air Monitoring available for Chemical Speciation, *available at:* http://www.oregon.gov/osp/sfm/documents/airmonitoringreport.pdf
- Firefighter Cancer Support Network: Skin permeability, *available at:* http://www.nature.com/jid/journal/v41/n5/full/jid1963115a.html
- Cancer.org, Diesel Exhaust and Cancer, *available at:* http://www.cancer.org/cancer/cancercauses/othercarcinogens/pollution/diesel-exhaust-and-cancer

SUMMARY OF DOCUMENT CHANGES

New General Order

FORMS/ATTACHMENTS

- None

APPROVED

John S. Butler, Fire Chief
Office of the Fire Chief

Author:

David Reines, Captain
Office of the Fire Marshal

General Order 300.01: Chain of Command

Howard County Department of Fire and Rescue Services

GENERAL ORDER

GENERAL ORDER 300.01

Chain of Command

OFFICE OF THE FIRE CHIEF

Issue Date: May 03, 1984
Revision Date: November 18, 2016

APPLICABILITY

All career, volunteer, and contingent uniformed personnel.

POLICY

To establish standardized Administrative Chain of Command for classified employees, and an integrated Operational Chain-of-Command for the combination fire and rescue system in Howard County, MD.

DEFINITIONS

- None

PROCEDURES

ADMINISTRATIVE CHAIN OF COMMAND (SUPERVISION / DAILY WORKFLOW):
The daily operational chain of command for County classified uniformed employees shall be:

- Fire Chief
- Career Deputy Chief
- Career Assistant Chief
- Career Battalion Chief
- Career Fire Captain
- Career Fire Lieutenant
- Career Master Firefighter - Career Firefighter – Career Firefighter Recruit – Career Firefighter Trainee

*The Administrative Chain of Command is not meant to contradict with or disallow the assignment of any specific employee to a specific supervisor.

OPERATIONAL CHAIN OF COMMAND (EMERGENCY INCIDENTS / OPERATIONAL SITUATIONS):
The integrated operational incident chain of command for employees and volunteer emergency providers shall be:

- Fire Chief
- Career Deputy Chief

- Career Assistant Chief
- Volunteer Fire Chief
- Career Battalion Chief
- Volunteer Deputy Chief - Volunteer Assistant Chief
- Career Fire Captain
- Volunteer Fire Captain
- Career Fire Lieutenant
- Volunteer Fire Lieutenant
- Career Master Firefighter
- Career/Volunteer Firefighter
- Firefighter Recruit
- Volunteer EMS Officer* - Volunteer EMS-only Provider

*If also a Volunteer Firefighter, would have Volunteer Firefighter line authority.

REFERENCES

- GO 120.02: Volunteer Officer Requirements
- GO 100.04: Position Requirements – Licenses, Certifications, Experience, and Education Prerequisites

SUMMARY OF DOCUMENT CHANGES

- Aligned Volunteer Sergeant with Firefighter level line authority.
- Added Volunteer EMS Officer to the Operational Chain of Command
- Added the Volunteer EMS-only Provider to the Operational Chain of Command.
- Added qualifier regarding the administrative assignment of specific employees to specific supervisors.

FORMS/ATTACHMENTS

- None

APPROVED

John S. Butler, Fire Chief
Office of the Fire Chief

General Order 300.02: Personnel Accountability

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
300.02

Originating From	Issue Date	Revision Date	Attachments
Emergency Services Bureau	**02-19-1993**	**06-04-2013 (05-21)**	**A**

SUBJECT: **PERSONNEL ACCOUNTABILITY**
APPLICABILITY: **All Operational Personnel**

POLICY

This General Order shall establish a system to efficiently account for personnel responding to and operating on the scene of an emergency incident. The personnel accountability system gives incident commanders a fast and efficient means to account for all fire and rescue personnel responding to or on the scene of an emergency.

DEFINITIONS

1. Personnel Accountability Tag (PAT) - The PAT shall consist of a snap fastener with a personnel identification card attached (Attachment #1). Every member of the Howard County Department of Rescue Services shall be issued a PAT. Each member shall keep their PAT attached to an existing "D" ring on their turn out coat when not assigned to a response unit. When an individual has been assigned by a unit Supervisor to a position on a response unit, the unit Supervisor shall place the PAT on the collector ring located in the cab of the assigned unit.

2. Collector Ring - The collector ring shall consist of a large ring with a unit identification tag. The collector ring shall be kept in the cab of each unit and shall be removable. Each emergency vehicle, except automobiles; SUV's and utility vehicles, shall be equipped with a collector ring.

3. Accountability Control Board - Used to keep track of the current status of all companies and personnel assigned.

4. Hazard Zone – A Hazard Zone is any area or zone where there is a known or potential risk to the safety of operating personnel, including but not limited to environments that are Immediately Dangerous to Life and Health (IDLH), potential collapse zones, and areas at risk for rapid change in their safety profile.

5. Command Assignment Chart – Used in Command Posts to track companies and units operating on the incident.

6. Personnel Accountability Report (PAR) – An organized reporting activity designed to provide positive confirmation of the location, assignment, and number of personnel assigned to a division, group, or unit operating within a hazard zone. Being "PAR" signifies that *all personnel assigned to that division, group, or unit operating in the hazard zone have been identified, positively located, and are accounted for*. Example: "Engine 61 to Command, Engine 61 is PAR."

7. Level I Accountability – The minimum level of accountability to be used at all incidents. All supervisors shall maintain a constant awareness of the position and function of all personnel assigned to operate under their supervision. This awareness shall serve as the basic means of accountability that shall be required for operational safety. The incident commander shall maintain an awareness of the location and function of all companies and sections. Division and group officers shall directly supervise and account for the companies operating under their supervision. Company officers shall maintain an ongoing awareness of the location and condition of all company members. Where assigned as a company, personnel shall be responsible to remain under the supervision of their assigned company officer.

8. Level II Accountability – A level of accountability activated when conditions in any Hazard Zone exist or may develop that pose a potential danger to operational personnel where an Accountability Manager gathers and organizes unit PAT tag collector rings and assures PAR report are conducted at a minimum of 15 minute intervals.

9. Level III Accountability – A level of accountability activated by the IC that requires point of entry accountability by a Division officer and typically an aide, where accountability, air management, and work-rest cycles are managed and documented.

PROCEDURES

10. Every division, group, and unit supervisor is responsible to account for all personnel under their command at all times. Each Unit supervisor shall report the unit's staffing level when responding, as outlined in the Communications General Order 410.01.

11. Emergency dispatchers at Howard County's Public Safety Answering Point (Howard Communications) shall monitor and record the number of personnel responding to an incident. After all units have reported responding for the initial alarm and each subsequent alarm, Howard Communications shall transmit the total staffing level for responding units to the Incident Commander (IC) as outlined in the Communications General Order.

12. To ensure the safety of operational personnel, beginning from the time of first unit arrival and ending once the IC transmits the "fire out" benchmark, Howard Communications shall transmit a single extended alert tone and announce the duration of the incident at fifteen (15) minute intervals notifying the IC the duration of the incident. Example: (SINGLE ALERT TONE SOUNDED) – *"Howard" to Smith Road Command - duration of your incident is now fifteen (15) minutes"*

13. As soon as possible upon receipt of the fifteen (15) minute duration reminder, the IC (or the Accountability Manager if Level II or III accountability is implemented) shall direct division, group, and unit supervisors operating within the Hazard Zone to provide a PAR report for personnel under their command to the IC or designated supervisor.

14. When all personnel are accounted for, division, group, and unit supervisors shall respond accordingly. Example: *"Division Alpha to Command – all personnel are accounted for"*.

15. If any member cannot be accounted for, division, group, and unit supervisors shall report their status as "missing". An immediate physical search shall be initiated along with an attempt to contact via radio. If radio contact is unsuccessful, a MAYDAY shall be declared in accordance with General Order 300.04. Example: *"Division Alpha to Command – Firefighter Smith is missing – he was last seen on the first floor, quadrant B. Search procedures have been initiated"*.

LEVEL I ACCOUNTABILITY

16. When responding to an incident, unit supervisors shall ensure the number of PATs on the collector ring and names match those personnel responding on the unit. The collector ring shall remain in the cab of the unit unless Level II Accountability has been announced by the IC.

17. Any member responding to the scene other than on dispatched apparatus must:
    - Report to the IC and identify yourself on arrival.
    - Await assignment from the IC.
    - Place your PAT on the assigned unit collector ring.



PAT tags and Unit Collector Ring

18. Company supervisors are responsible to know the exact number of personnel under their command. Division and group supervisor are responsible to know the exact number and identification of the units / crews operating under their command.

LEVEL II ACCOUNTABILITY

19. Level II accountability shall be activated when conditions in any Hazard Zone exist or may develop that pose a potential danger to operational personnel. This may include the danger of becoming lost or disoriented due to building configuration or an IDLH, collapse potential, extreme fire behavior, or when operating during overland search or wildfires over large areas.

20. When Level II Accountability is announced by the IC, an Accountability Manager shall be designated. The Accountability Manager shall report to Command and is responsible for:

- Gathering the collector rings.
- Organizing and arranging the collector rings on the Accountability Control Board at a designated location near the Command Post.



Personnel Accountability Control Board

- Verifying the total number of operational personnel assigned to the incident matches the number of collected PATs.
- Utilizing additional Accountability Managers and locations as necessary due to the geographic nature of the incident.
- At fifteen (15) minute intervals (and following changes in overall incident strategy), the Accountability Manager shall provide an IC PAR Status Report to the IC for all units operating in the hazard zone. A new PAR report shall be obtained for any unit operating in the hazard zone that has not transmitted their PAR status within the previous two minutes of this interval, or for any units operating in extreme IDLH environments. The IC PAR Status report shall include:

- The PAR status and number of operational personnel assigned in the complete hazard zone.
- The PAR status and number of operational personnel assigned in the hazard zone, by division and group.
- Confirmation of continuity between collected PATs and operational personnel numbers obtained through unit PAR reports for units in the hazard zone.
- The names of any division or group supervisors operating position is *within* an IDLH environment.
- The names of any units currently operating in *extreme* IDLH environments.
- Once accomplished, the IC shall transmit that "All units and personnel operating in the hazard zone have been accounted for."

21. Both the "Personnel Accountability Control Board" and the "Command Assignment Chart" shall be used in the process of determining PAR status for operational units within the hazard zone.

22. It shall be the responsibility of each unit supervisor to ensure that their units PAT's are removed from the Accountability Control Board before leaving the incident scene.

23. It shall be the responsibility of each vehicle operator to ensure that the collector ring is returned to the cab of the unit before leaving the incident scene.

LEVEL III ACCOUNTABILITY (POINT OF ENTRY)

24. When the IC determines that the incident requires more stringent accountability, he/she shall implement "Point of Entry" accountability. During "Point of Entry" accountability, the following responsibilities and assignments shall occur:

- The Accountability Manager shall continue to assist Command with tracking the accountability status reports as provided by division and group supervisors.

- Designated division or group supervisors shall be assigned to *every point of entry*, and they shall actively monitor the points or points of entry into the structure, confined space, or areas involved. All personnel operating in the Hazard Zone shall be assigned to a division or group supervisor. Given adequate resources exist, Command shall assign an Assistant Accountability Manager to each of the division or group supervisors responsible for "point of entry control" to help oversee the documentation of operational activities.

- As part of "Point of Entry" accountability, air supply monitoring and work period monitoring should likewise be implemented. Division or group supervisor(s) managing "Point of Entry" accountability shall ensure that each member's name, company number, duration of air supply, time of entry, and assignment is recorded on an Entry Control chart. PAT tags for personnel assigned to units under their supervision will be kept on a Personnel Accountability Control Board for the division. Division or group supervisors for points of entry shall also assure that adequate resources are requested to provide immediate relief to operating crews as appropriate for the Hazard Zone environment.

- As personnel exit a control point, the time of exit shall be recorded. Personnel who must exit at a point remote from the control point shall inform their division or group supervisor that they have exited from a remote location of the building. If any individual cannot be accounted for, the division or group supervisor shall report their status to the Incident Safety Officer as "missing", and that should be immediately relayed to the IC. An immediate physical search shall be initiated along with an attempt to contact via radio. If radio contact is unsuccessful, a MAYDAY shall be declared in accordance with General Order 300.04. Example: *"Division Alpha to Command – Firefighter Smith is missing. He was last seen on the first floor, quadrant B. Search procedures have been initiated".*

- The Accountability Manager shall provide an IC PAR Status report to the IC at fifteen (15) minute intervals and following changes in overall incident strategy or significant incident events for operational personnel assigned in the hazard zone.

COMPLIANCE

25. The PAT shall be considered an issued item of personal protective equipment. If a PAT is lost or misplaced, a replacement shall be obtained as soon as possible from the Bureau of Logistics. Each individual's PAT shall be inspected when the individual's personal protective clothing is inspected.

26. The mechanism to quickly account for personnel must be available to the IC at any point during an incident. In order to ensure the effectiveness of this system and the subsequent safety of all personnel, accountability procedures shall be strictly adhered to at all times. If an individual arrives at the scene without a PAT, their Fire Department ID card may be used as a substitute PAT.

REFERENCES

General Order 300.04 Mayday
General Order 300.07 Incident Command System
General Order 300.11 Rapid Intervention Crew
General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines
General Order 410.01 Communications

FORMS/ATTACHMENTS

Attachment A: Entry Control Chart (Example)

Approved:

John S. Butler

John S. Butler
Deputy Fire Chief

Emergency Services Bureau

Entry Control Chart

v2013-05-07

UNIT	NAME	AIR TIMES			CYL	AIR PSI		UPON EXIT		
		ON	5 MIN WARNING	OFF	TYPE	IN	OUT	ReHab	ReCyc	

General Order 300.04: MAYDAY Situations

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
300.04

Originating From	Issue Date	Revision Date	Attachments
Emergency Services Bureau	05-20-1995	06-04-2013 (05-21)	N/A

SUBJECT: MAYDAY Situations
APPLICABILITY: All Operational Personnel

POLICY

This General Order shall establish procedures to be used when an imminent life-threatening situation exists.

DEFINITIONS

1. MAYDAY – a term used to alert the Incident Commander (IC) and other individuals that operating personnel are in a life-threatening situation.

2. Emergency Tone – an informational tone broadcast transmitted by emergency dispatchers at Howard County's Public Safety Answering Point (Howard Communications) for a period of five (5) seconds over all operational radio channels to notify personnel that an emergency has been declared.

3. Channel Marker – A single beep tone that is used once the emergency tone has been activated. This tone will ensure that all personnel utilizing the channel understand that units are operating with an emergency on the fire ground and that transmissions should be limited.

4. Personnel Accountability Report (PAR) – An organized reporting activity designed to provide positive confirmation of the location, assignment, and number of personnel assigned to a division, group, or unit operating within a hazard zone. Being "PAR" signifies that *all personnel assigned to that division, group, or unit operating in the hazard zone have been identified, positively located, and are accounted for*. Example: "Engine 61 to Command, Engine 61 is PAR."

5. Initial Rapid Intervention Crew (IRIC) – a team of at least two (2) qualified personnel who observe the initial entry team entering the IDLH atmosphere and are available, trained and equipped with full protective clothing and Self-Contained Breathing Apparatus (SCBA) for immediate response to rescue the initial entry team. One (1) of these members must maintain contact with the initial entry team either visually and/or by voice or radio contact. The team can include the IC that is operating in the Tactical Command mode. At least two members of this team must be equipped with a radio, and all members should have a radio if possible.

6. Rapid Intervention Crew (RIC) – a crew specifically designated by the IC at the scene of an emergency beyond the initial stages, consisting of a minimum of four (4) qualified personnel, one being the RIC Supervisor. The RIC shall be available for the rescue of firefighters should the need arise. Depending on the size and complexity of the incident, the IC may establish one or more RICs. The RIC replaces or enhances the IRIC that is required during the initial phases of the incident. The RIC should be further reinforced with a Special Service company in order to provide the most effective number of personnel and compliment of tools for a potential rescue.

PROCEDURES

DECLARING A MAYDAY

7. When personnel operating on the scene of an emergency incident find themselves in a life threatening situation and require immediate assistance, they shall immediately declare a MAYDAY.

8. Declaration of a MAYDAY shall be limited to those situations that demand immediate action by on scene resources to come to the aid of a distressed member.

9. The conditions under which a fire fighter should call for assistance can include (but are not limited to) one in which the fire fighter has done the following:
    - Become tangled, pinned, or struck and cannot extricate self in 60 seconds
    - Falling through a roof or floor
    - Been caught in a "flash over
    - Been in an area with zero visibility, had no contact with a hose or lifeline, and did not know the direction to an exit
    - Had the primary exit blocked by fire or collapse and had not been able to locate a secondary exit within 30 seconds
    - Experienced a low air alarm activation and was not at an exit (door or window) within 30 seconds
    - Experienced a failure of an Self Contained Breathing Apparatus (SCBA)
    - Been unable to locate an exit (door or window) within 60 seconds
    - Serious medical emergency

10. Personnel equipped with a radio shall declare a MAYDAY by transmitting a verbal message over the fireground channel.

11. Personnel transmitting a MAYDAY shall activate the radio Emergency Identifier button located on top of the portable radio to ensure the MAYDAY is acknowledged.

- Personnel activating the Emergency Identifier shall provide the verbal LUNAR message listed below and receive acknowledgement from the IC or Howard Communications that your MAYDAY has been received.

12. The message shall begin with "MAYDAY, MAYDAY, MAYDAY" immediately followed by:
    - WHO- is calling the MAYDAY
    - WHAT – is the problem
    - WHERE – is the location of the MAYDAY

13. The acronym LUNAR shall be used to guide personnel in providing important information:
    - **L**ocation (last known location including floor number, quadrant, etc.)
    - **U**nit (identification of the crew and their unit assignment)
    - **N**ame (name of the individuals that need rescue or recovery)
    - **A**ssignment/**A**ir (the last known assignment and amount of air left in the cylinder)
    - **R**esources needed (what equipment is needed to implement the rescue plan)

14. When personnel not equipped with a radio, or with a non-functioning radio, find themselves in a MAYDAY situation they must notify any individual in the vicinity of the situation.

15. The Personal Alert Safety System (PASS) device shall be activated to alert personnel within hearing range that an emergency situation exists.

16. Should a PASS device activation be heard by other operating personnel, the location shall be broadcast and an attempt to establish contact with that individual shall be made, either physically or by radio. If contact is not made, and there is still a PASS activation, a MAYDAY shall be declared and resources will be assigned to locate the activated device.

17. Once a firefighter has declared a MAYDAY, the firefighter shall preface all radio transmissions with "MAYDAY (firefighter name) to Command". This will ensure all personnel are aware of who is making the transmission.

18. When declaring a MAYDAY for another firefighter, the name of that firefighter shall be used to avoid confusion as to who is in trouble.

FIREFIGHTER ACTIONS WHILE WAITING FOR RESCUE

19. Personnel declaring a MAYDAY shall consider the following:
    - Do not remove your facepiece
    - Stay calm to help increase your breathing time
    - Activate your PASS device
    - Do not change radio channels

- Communicate directly with the RIC once deployed
- Be aware that it may be necessary to "silence" your PASS device while talking on the radio
- Orient yourself to the surroundings
- If trapped or disoriented as a crew, stay together
- **Attempt self extrication, if possible**
- Search for an exit - look for light
- Retreat to an area of safety
- Use your flashlight as a beacon device
- Attempt to make tapping noises using tools or other objects
- Attempt to follow a hose line / life line to safety
- Find your own way out if you are physically able
- Listen for crews and apparatus noise

PUBLIC SAFETY COMMUNICATIONS - ACTIONS AND RESPONSIBILITIES

20. The monitoring of fireground radio channels by the Howard Communications dispatcher is an essential component of firefighter safety. Any time a Howard Communications dispatcher recognizes that an emergency situation exists, they are to immediately notify the IC.

21. At the request of the IC, the Howard Communications dispatcher shall activate the emergency tone on all channels in the zone via the announcement group and notify units on the incident that a *"MAYDAY has been transmitted and standby for a message from the IC".*
    - All units operating on the incident shall be notified by Howard Communications to *"discontinue any further radio traffic unless an emergency exists".*

22. The channel marker will be activated on the priority channel to ensure all personnel understand an emergency has been declared on the fire ground.

23. In the event that a MAYDAY is transmitted and not acknowledged by the IC, Howard Communications dispatcher shall immediately notify the IC. In the event neither the IC nor Howard Communications acknowledges the MAYDAY, any member may notify the IC/ or Howard Communications of the MAYDAY call.

24. The primary fireground channel shall serve as the "priority" channel for units operating as part of MAYDAY operations. The RIC and IC will remain on the "priority" channel.

25. The Howard Communications shall provide an additional dispatcher for fireground operations and notify the IC when an additional channel is available.

- The IC will determine if an alternate channel will be utilized and determine which units will remain on the priority channel and those to be assigned to the alternate channel.

26. In the event a radio Emergency Identifier has been activated from the fireground, Howard Communications shall immediately notify the IC and provide any information pertaining to the Emergency Identifier activation.

27. At the conclusion of the MAYDAY event, the IC shall instruct Howard Communications to make an announcement on all radio channels that the MAYDAY has been terminated and fireground operations shall return to the original fireground channel.

INCIDENT COMMAND - ACTIONS AND RESPONSIBILITIES

28. Immediately acknowledge the individual calling upon receipt of a MAYDAY and determine the following information:
    - WHO- is calling the MAYDAY
    - WHAT – is the problem
    - WHERE – is the location

29. Repeat the information back to the individual calling the MAYDAY confirming that the MAYDAY has been received and the accuracy of the information provided.

30. Acknowledge the MAYDAY and request that the Emergency Tone be transmitted by Howard Communications as outlined in section 21. At the conclusion of the emergency tone the IC shall announce that a MAYDAY has been declared:
    - WHO- is calling the MAYDAY
    - WHAT – is the problem
    - WHERE – is the location

31. Deploy the RIC based upon an established action plan (WHO; WHAT; WHERE) and in accordance with General-Order 300.11. Appropriate deployment is generally considered to be to:
    - Reported location
    - Last known location
    - Most hazardous area first

32. Request additional resources as necessary, assuring adequate EMS resources are available for the potential number of victims and sufficient resources for continued suppression efforts.

33. Establish an additional (backup) RIC team.

34. Maintain and control all fireground communications.
    - Non-essential radio traffic is to cease
    - Personnel in distress shall not be expected to switch radio channels.
    - Assure continuous active monitoring of the radio channel on which the MAYDAY was transmitted. Assign a resource to accomplish this if necessary.
    - If the IC determines that MAYDAY communications would be improved, they shall request an additional fireground radio channel for non- MAYDAY operations, from PSCC. The IC must coordinate which units shall remain on the MAYDAY channel, and which units will switch to the added operational channel.
    - Face-to-face communications shall be utilized, if possible, within groups and divisions. Group supervisors may relay "important" information if necessary, but radio discipline should be maintained.

35. Expand the Incident Management System as appropriate. The functional management of hazard mitigation operations and MAYDAY operations shall be separated. The IC must quickly:
    - Decide if hazard mitigation operations should be moved to a different channel from MAYDAY operations and, if so, initiate the channel move with Howard Communications and incident crews.
    - Make clear assignments as to which crews have objectives for which operational area.
    - Assure command officers are assigned to manage both operational areas, the original hazard mitigation operations and the MAYDAY operations.
    - Assure that both functional areas have a qualified Safety Officer(s) assigned.
    - Assure that both functional areas have a RIC team(s) assigned.

36. Additional branches, divisions or groups shall be established as needed based upon the current and anticipated needs of the incident. Consideration may be given to the following:
    - EMS
    - Staging
    - PIO
    - CISD
    - Family/Survivors Support

37. The IC shall verify accountability for all units operating in the hazard zone as soon as possible. PAR reports should be conducted face-to-face if possible, and in accordance with GO 300.02 Accountability. If an alternate fireground channel has been assigned as a result of the MAYDAY, necessary PAR reports should be performed on that channel and NOT the active MAYDAY channel. Once accomplished, the IC shall transmit that "All units and personnel operating in the hazard zone have been accounted for."

38. The IC will conclude MAYDAY operations and return units to normal operations upon confirmation that a MAYDAY operation is completed and after a complete PAR has been conducted.

39. Once the MAYDAY event has been terminated, the IC shall reassesses incident priorities and makes adjustments to the incident action plan, as necessary. Adjustments to the incident action plan and the current operational mode shall be communicated to all branches, divisions, groups, and units.

UNIT SUPERVISORS - ACTIONS AND RESPONSIBILITIES

40. All supervisors operating on the scene of an emergency incident shall ensure that accountability is maintained at all times. Supervisors shall keep the IC aware of their location and any progress being made.
    - Company officers shall indicate that they are PAR when acknowledging radio transmissions from the IC and/or group or division supervisors when they are in direct physical/visual contact with all personnel for which they are responsible.

41. When a MAYDAY has been declared, all supervisors must adhere to operational discipline and keep assigned personnel and units under control. Supervisors must not permit freelancing into the area of the rescue effort.

42. All operating personnel shall listen closely to Howard Communications and be prepared to change to an alternate fireground channel when directed to do so.
    - Supervisors shall ensure that all assigned personnel and units have changed to the alternate fireground channel.

43. All officers operating in the hazard zone shall immediately account for all assigned personnel. This shall be accomplished by face-to-face communications if possible, leaving the alternate radio frequency clear for emergency traffic.
    - If personnel are not accounted for, the IC shall be notified immediately.
    - Confirmation of accountability for assigned personnel shall be provided to the IC when requested.

44. Only crews specifically assigned by the IC or those who are in direct physical contact with the firefighter declaring the MAYDAY may engage in any rescue effort. The IC shall be notified of your location and any resources necessary to assist the RIC.

45. Supervisors shall ensure that all operational assignments continue to be carried out and maintained as directed by the IC.

46. RIC supervisors shall ensure that any RIC operation authorized and directed by the IC is performed in a coordinated manner.

OPERATING PERSONNEL - ACTIONS AND RESPONSIBLITIES

47. All personnel operating on the scene of an emergency incident shall ensure that accountability is maintained at all times. Personnel shall keep their supervisor aware of their location and any progress being made.

48. When a MAYDAY has been declared each individual shall immediately report to their assigned supervisor for accountability. This shall be accomplished by face-to-face contact when-ever possible, leaving the radio frequency clear for emergency traffic.

49. If an individual's supervisor is unaccounted for, the IC shall be notified immediately.

50. Operating personnel shall listen closely to the IC and Howard Communications and be prepared to change to an alternate fireground channel when directed to do so.

REFERENCES

General Order 300.02 Accountability
General Order 300.07 Incident Command System
General Order 300.11 Rapid Intervention Crew
General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines
General Order 410.01 Communications

FORMS/ATTACHMENTS

None

Approved:

John S. Butler

John S. Butler
Deputy Fire Chief

General Order 300.07: Incident Command System

Howard County Department of Fire and Rescue Services

GENERAL ORDER

GENERAL ORDER 300.07

Incident Command System

EMERGENCY SERVICES BUREAU

Issue Date: September 21, 2005
Revision Date: November 01, 2016

APPLICABILITY

All career, volunteer, and contingent operational personnel

POLICY

An emergency incident presents a complicated and rapidly changing situation. Effective command organization will serve to create effective operations, proficient communications, and maximum accountability and safety for all personnel operating in Hazard Zones and within areas that pose Immediate Danger to Life and Health (IDLH).

Howard County Department of Fire and Rescue Services (Department) shall adopt the National Incident Management System (NIMS) model as outlined and described in the United States Fire Administration/National Fire Academy *Field Operations Guide* (Document ICS 420-1, July 2016), accessible at http://www.usfa.fema.gov/downloads/pdf/publications/field_operations_guide.pdf.

This policy shall outline further local applications and procedures of the Incident Command System to help guide the Incident Commander (IC), designated Division and Group (D-G) supervisors, and other personnel operating within the incident command structure.

DEFINTIONS

- **Accountability** is a set of tasks accomplished by a designated individual that include gathering Unit Collector Rings and Personal Accountability Tags, organizing them on the Accountability Control Board, verifying the number of personnel assigned to each resource, utilizing additional Accountability Managers as necessary, and obtaining PAR status from units as required for a PAR status report to Command at fifteen (15) minute intervals during an incident.

- An **Accountability Control Board** is used to keep track of the current status of all companies and personnel assigned, reference General Order 300.02: Personnel Accountability.

- The **Channel Marker** is a single beep tone that is used once the emergency tone has been activated. This tone will ensure that all personnel utilizing the channel understand that units are operating with an emergency on the fire ground and that transmissions should be limited.

- **Command** is the act of directing, ordering, and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

- The **Command Aide** is a person assigned to assist the IC in the Command Post with documenting resources on a tactical worksheet, monitoring tactical radio channels, and other critical functions of command. The Command Aide may have other assigned duties as directed by Command, but under normal circumstances, the Command Aide should NOT be assigned to tactical or company-task level assignments during emergency incidents. The paramount goal of this resource is to increase the effectiveness of Command.

- A **Command Post Operator** is an optional role within the Strategic Command Team that is assigned to operating the command post and equipment therein.

- A **Command Support Officer** is an optional role within the Strategic Command Team that can support Command by coordinating resources and providing assistance with communication and documentation.

- The **Command Transition Report** is transmitted by the arriving chief or command officer that officially transfers command from an initial IC that had been operating in the Tactical Command mode to the arriving chief or strategic command officer.

- The **Emergency Tone** is an informational tone broadcast transmitted by emergency dispatchers at Howard County's Public Safety Answering Point (Howard Communications) for a period of five (5) seconds over all operational radio channels to notify personnel that an emergency has been declared.

- **Emergency Traffic** is the declaration transmitted over a radio channel when the sender has an urgent message. The phrase is to be recognized and respected by other personnel on the scene so as to give the sender's message absolute priority, and to limit all non-essential radio traffic until the urgent situation is resolved. Any operating personnel can declare Emergency Traffic and the *Emergency Traffic Channel Marker* tone in order to communicate with priority status. In order to facilitate the restriction of all non-essential radio traffic, Howard Communications shall broadcast a repeating *Emergency Traffic Channel Marker* tone for as long as the Emergency Traffic restriction is lifted by Command.

- The **Follow-Up (Basement) Report** is a structured report given following the Initial Radio Report that includes results of a 360 degree assessment, identifying the basement type of the structure, and reconfirms the overall incident strategy and location of accountability tag collection.

- A **Hazard Zone** is any area or zone where there is a known or potential risk to the safety of operating personnel, including but not limited to environments that are IDLH, potential collapse zones, and areas at risk for rapid change in their safety profile. An atmosphere that is IDLH poses an immediate threat to life, would cause irreversible adverse health effects, or impair an individual's ability to escape from a dangerous atmosphere.

- The Department's general **Incident Risk Management Plan** provides a framework for defining the level of acceptable risk given certain sets of circumstances. That plan translates into a clearly communicated overall incident strategy, either "offensive" or "defensive."

- An **Incident Tactical Worksheet** is a type of Command assignment chart that is typically used when in the strategic mode of command within a command post. Command uses this worksheet to visually track the ICS structure for the incident, units operating on the incident and their assigned tasks, and incident features such as occupancy layout and access.

- The **Initial Radio Report** is a highly structured radio report that is transmitted by the first arriving officer following their size-up of the incident critical factors. It officially establishes Command for an incident, as well as establishing the incident's overall strategy.

- A **Known Life Hazard** is a circumstance where responding personnel hear, see, or learn from a reliable source that a person is in or near an IDLH atmosphere and in immediate life-threatening danger. The information may be obtained by direct observation, from emergency dispatchers at Howard Communications, or from bystanders. Often, a risk-benefit decision must be made based on the reliability of the information and other factors. Operational risk should only be significantly elevated in circumstances where the life hazard is reliably known.

- If directed to **Level One Staging**, all companies except the first arriving engine and first arriving truck shall stage prior to arrival at the scene, nearby (within a block if possible) but in an uncommitted position that still allows access into the incident scene. Once staged, units shall be prepared to assume tasks as they are assigned by Command. Engine companies should not stage past their last water source. Units arriving at their Level One staging positions shall transmit notification of their arrival to a Level One staging position to Command. Unit personnel will remain on the apparatus and monitor the assigned incident radio channel.

- Command may establish a **Level Two Staging** area for arriving resources. When this occurs, arriving resources will then assemble at a centralized Level Two Staging area designated by Command that is adjacent to the incident. The area should be close enough to the incident scene to provide timely access, but located out of the way and not exposed to the incident's hazards.

- **MAYDAY** is a term used to alert the IC and other individuals that operating personnel are in a life-threatening situation.

- There are three distinct **Modes of Command**, the Investigation mode, the Tactical mode, and the Strategic mode. Each implies that Command is operating under different circumstances and in differing environments. Depending on which mode is declared, expectations of command capacity are adjusted.

- **NIMS** refers to the National Incident Management System and the defined positions and terminology for incident management and command structure.

- **On-Deck** is a typical unit (or crew) assignment where that unit is to be next in line and prepared to work (Dictionary.com, n.d.). Usually the unit is placed in a forward position located just outside the immediate Hazard Zone and safely distanced from the entrance of a tactical position where they can be easily used to quickly relieve another unit that has completed their work cycle in the Hazard Zone, to reinforce a deployment of the designated Rapid Intervention Crew, or to reinforce crews

operating within the Hazard Zone. Their readiness and immediate availability is critical to being able to provide quick relief and facilitating an effective air management strategy for interior crews. Leaders of on-deck units will report to their assigned supervisor, typically a D-G supervisor or directly to Command. Once assigned to the position of on-deck, crews shall remain on-deck until given another assignment by their designated supervisor.

- A **Personnel Accountability Report (PAR)** is an organized reporting activity designed to provide positive confirmation of the location, assignment, and number of personnel assigned to a division, group, or unit operating within a hazard zone. Being "PAR" signifies that *all personnel assigned to that division, group, or unit that are operating in the hazard zone have been identified, positively located, and are accounted for*. Example: *"Engine 61 to Command, Engine 61 is PAR with 4."*

- Once leaving a Hazard Zone after completing a work cycle, crews may be directed to **Recycle**, or make themselves ready for reuse (Merriam-Webster's online dictionary, n.d.), and reassignment into the Hazard Zone. This is typical when it is determined by Command that conditions do not dictate the need for extended periods of rest or shelter in between work cycles or rehabilitation at a formal **Rehabilitation Area**, Division, or at the Medical Unit. When Recycling, crews usually remain assigned to their working supervisor, replace their air cylinders, and when ready the Crew Leader lets their supervisor know they are ready for re-assignment. The length of the work-rest cycle, as well as the need for formal rehabilitation, is set by Command for each incident based on work conditions, environmental conditions, and policy.

- A **Rehabilitation Area** or Division may be established by Command when on-going fire and rescue operations have the potential to significantly affect the physiological condition of emergency personnel. Command may designate a **Medical Unit Leader** who is responsible for development of the Medical Plan (ICS form 206), which includes responder rehabilitation and responder medical care, and supervision of those resources. On large incidents, the Medical Unit Leader may be assigned within the Service Branch of the Logistics Section. Formal rehabilitation cycles may be accomplished within the Medical Unit.

- **Safety Red Flags** are conditions that must "jump out" at personnel and trigger an increased awareness and appreciation of increased risk. A Safety Red Flag will not necessarily change the overall incident strategy or incident action plan, but it must be identified and addressed by Command and the Hazard Zone management team. Examples include fire in a basement, crews operating over a fire, and crews operating in zero visibility.

- A **Senior Advisor** is an optional role within the Strategic Command Team that is designed to provide quality assurance and assist the IC by providing a senior perspective on the effectiveness and appropriateness of incident strategy and organization.

- A **Single Family**, or "detached," is defined as a structure that is usually occupied by one household or family; has only outside walls, does not share an inside wall and does not touch any other dwelling.

- The **Strategic Command Post** is a designated vehicle or place from which the IC and Command Team manage the functions of command with various support elements in place.

- The initial **Strategic Command Team** is, at a minimum, comprised of 1) an IC functioning in the Strategic Command Mode and 2) a dedicated officer or technician whose primary function is to enhance the effectiveness of incident management through technical support of the IC (a Command Aide). The team can be expanded as is required to support the command functions required by the incident. Further expansion of the Strategic Command Team could include the addition of a Senior Advisor and a Command Support Officer, who would actively communicate with a Level Two Staging Manager and manage the assignment of additional Command Team NIMS positions and command post needs as is appropriate.

- An IC functioning in the **Strategic Command Mode** is typically a chief or command level officer that is commanding from *outside of the tactical environment, and within an environment that facilitates and enhances managing the functions of Command*. A stationary Command Post has been established, in which the IC and their Command Aide (and possibly others) are actively managing an Incident Tactical Worksheet, recording the position and function of all assigned resources, assuring the Incident Action Plan (IAP) aligns with the critical incident factors, and monitoring radio transmissions closely in a noise and distraction-free environment, preferably using a headset. Command functions include, but are not limited to: confirming the overall incident strategy, confirming and continuing to formulate an IAP, regular assessment of the presenting critical incident factors, establishing objectives based on the incident's critical factors, evaluating the need for additional resources, directing and assigning responding resources, and coordinating activities necessary for overall operational control.

- An IC functioning in the **Tactical Command Mode** is typically a company officer that is *performing all the responsibilities of Command while on-foot and from within the tactical environment*. They are maintaining an exterior position near the Hazard Zone, and are NOT committed within an IDLH or potentially rapidly evolving atmosphere. Command functions include, but are not limited to: declaring the overall incident strategy, formulating an IAP that aligns with the identified critical incident factors, establishing objectives based on the incident's critical factors, evaluating the need for additional resources, directing and assigning responding resources as they arrive. They are typically functioning while in turnout gear in a loud and distracting environment, initiating and monitoring incident communications using a portable radio, functioning without a Command Aide, and not managing a Command Assignment Sheet (tactical worksheet). A transition to the **Strategic Command Mode** is anticipated upon arrival of a chief or command officer.

- A **Townhouse** is defined as a house attached to any number of other townhouses (three or more), each of which may have multiple floors, commonly side by side each with their own separate entrances.

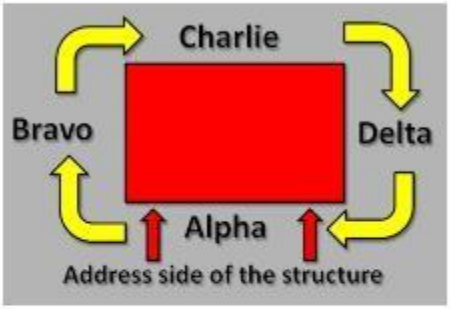
- **Tactical Ventilation** occurs as a result of specific, coordinated tactical actions that are calculated to accomplish an *intended* objective relating to ventilation of a structure. Non-Tactical Ventilation is *unintentional* ventilation of a structure that results from other activities that are taking place on the fire ground, such as making access to a structure through a door or window, advancing a hose line

into a structure, or creating a means of egress by removal of a window. Recent research has shown that unintentional Non-Tactical Ventilation can have unanticipated, rapid, and significant impact to fire intensity and spread, and has been attributed as a factor in several firefighter fatalities regionally and nationally.

PROCEDURES

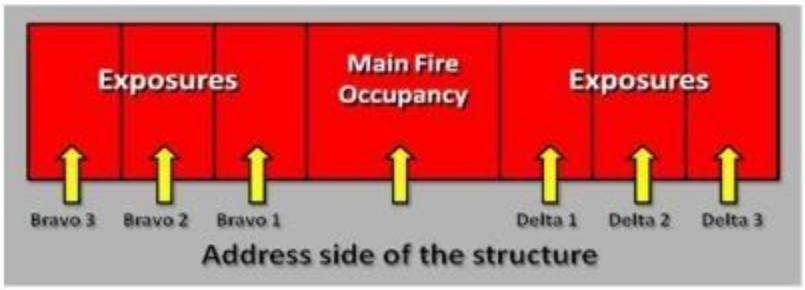
Structure and Geographic References:

Reference to the structure's exterior sides:



- Side Alpha shall be the side of the building that is utilized as the building address. In most cases, this would be the side that includes the main entrance or foyer. In those situations where the building location or configuration is unusual, the officer shall designate the sides of the building using a landmark (e.g., parking lot, swimming pool, etc.)
- When it is necessary, place a unit on the corner of a building to maintain clarity, denote the corner by using the intersection of the two building sides (e.g., "Truck 7, set up on the Bravo/Charlie corner.").

Reference to the structure's exposures:



Reference to the structure's size:
The size of the structure shall be defined by the overall size of structure, not by occupancy type.

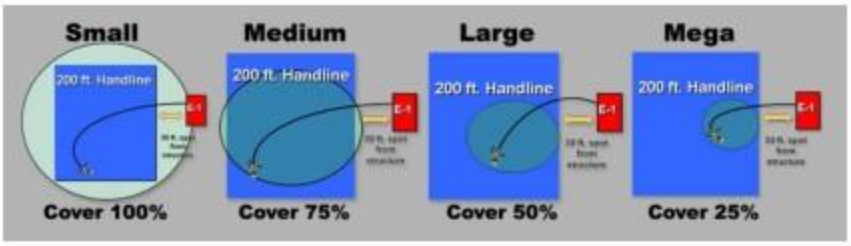
Descriptions of structure size can often be ambiguous. For example, one might call a 4500 square foot home "large," because compared to what might be considered an average sized home (2500 square feet), it seems large when looking at it in the context of a single family residence, the occupancy type. But, if that same 4,500 square foot occupancy was a strip mall, one would likely consider it to be a "small" strip mall. But, operationally, they present similar challenges.

In order to minimize ambiguity, **the description of structure size shall be based on how it relates to the areas that can be covered with a typical 200 foot hose line**, and on the maximum depths into the structure at which safe operations can take place.

- Small - A 200 foot line can access 100% of the fire area/occupancy. This applies to all occupancy types, houses to warehouses.
    - Usually up to about 30'x75' or 50'x50'
- Medium - A 200 foot line can access plus or minus 75% of the fire area/occupancy.
    - Usually up to about 100'x100'
- Large - A 200 foot line can access plus or minus 50% of the fire area/occupancy.
    - Usually up to about 200' x 200' feet per level (e.g. 40,000 square feet)
- Mega - A 200 foot line can access significantly less than 50% of the fire area/occupancy, often 25% or less.
    - Larger than 200'x200'

Using this structure description method will provide more consistent classification of structure size, basing it around a core operational task, hose line access. Note that multiple levels to which access must be made from ground level might make a structure effectively larger, despite the square footage per level (as in a garden style apartment).

This method will also link structure size descriptions to safe air management, as effective management of air reserves is directly related to the distances and depths to which personnel travel within the structure. Firefighters working in an IDLH atmosphere are totally dependent on the air that is brought with them into the Hazard Zone, and must maintain enough air reserve to effectively exit in the event of a sudden or unplanned event without dipping into their emergency reserve. In this way, this method of describing building size can improve safety by providing a direct association to building size with realistic working times of our SCBA, and influence how work-air cycles might be managed at an incident, particularly in larger, more dangerous structures.



Reference to the interior of a structure:



The interior of the buildings shall be divided into quadrants 1, 2, 3, and 4, starting at the left front of the building. The floor number shall be used to identify the level of the building (e.g., *"Engine 91, check floor number 4, quadrants 1 and 2."*).

Reference to multi-story structure interior floors:



- For purposes of radio reporting, basement and sub-level floors **SHALL BE INCLUDED** in the reference to a structure's total number of floors.
    - The term "including" shall be used when providing a radio report that refers to a basement level. For instance, "the structure appears to have a total of three stories INCLUDING a basement with lookout windows in the rear, two complete stories showing below the roof line in the rear." The basement level does not imply three stories PLUS a basement level.

- Floors above basements and sub-levels shall be referred to as "floor number …". Floors shall not automatically be referred to as "divisions." If Command establishes a supervisor for a given floor, activity on that floor may then occur under direction of that Division Supervisor, and that supervisor shall be referred to as "Division …". From that point forward, for floor number 4, "Division 4" would be the title of the supervisor who is supervising the activity on the floor.

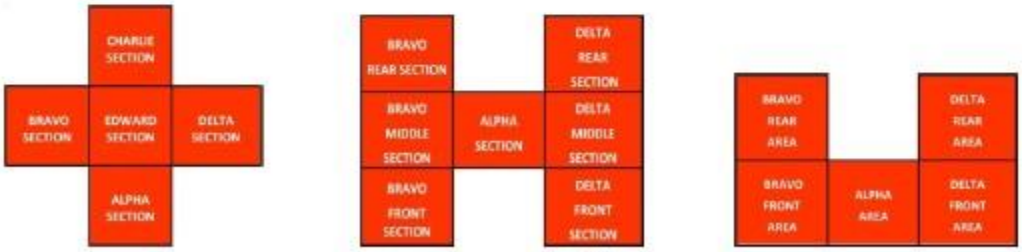
Reference to the structure's basement:

- Type
    - Walk-out
    - Walk-up
    - Note presence or absence of Look-Out Windows
    - Note presence or absence of Window Wells
        - If present, specify if a Window Well window enlarged for egress is present
    - Basement with no exterior openings
    - No basement

- Condition
    - Finished
    - Unfinished
    - Unable to determine

Reference to the interior of winged and irregular structures:

The wings of an irregular structure may be broken down into areas or sections by the officer in charge whenever this will facilitate operations. Whatever designations are implemented at irregular structures, Command must clearly declare them and all company and command officers must be advised of the section or area designations. Possible examples are:



Response and Communications:

Communicate in accordance with this General Order, *General Order 410.01 Communications*, and the response policy for the specific occupancy, if any.

The phonetic alphabet shall be used for radio communications, as the alphabetical letters are easily misunderstood over the radio. (Alpha, Bravo, Charlie, Delta, Echo, Foxtrot, Golf, Hotel, India, Juliet, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Whiskey, X-ray, Yankee, Zulu).

An exceptionally high level of discipline will be required of all officers and operational personnel during structural firefighting operations. Failure to follow any portion of the Incident Action Plan (IAP),as defined by either general order or incident command, can lead to a breakdown of the entire operation and could have significant life-safety and other consequences.

Units responding shall indicate "responding with [number of] personnel" to Howard. The transmission is to be made on the assigned operating channel.

Units not assigned an action by Command that are initiating actions as outlined in General Order Deployment Models shall report on scene and transmit their assumed position and function (e.g. *"Engine 71 is on location, side Alpha; we have Engine 91's hydrant; stretching a backup line from Engine 91"*). If assigned a task or action by Command they should transmit a confirmation of that order to assure complete understanding.

Only the company officer shall report to or communicate with the Command Post to receive an assignment. Units not assigned by established deployment models or those units who have not received orders from Command shall announce their arrival and stage as appropriate and await orders, gather information, and organize and brief assigned personnel.

Staff and chief officers responding to the incident shall report to the Command Post for assignment.

Agency representatives from assisting or cooperating agencies shall report to the Liaison Officer at the Command Post.

Establishing Command:

While companies are en route to an emergency, the highest ranking responding officer will make operational decisions related to the incident.

The Department shall establish an incident command structure for all incidents where two or more companies are actively engaged in operational tasks, and for incidents that present a potential or on-going Hazard Zone. The establishment of Command shall be designated by the transmission of an Initial Radio Report that identifies the unit establishing Command and the Mode of Command being assumed. Once Command is established, units that are en-route and on-scene shall coordinate and communicate any subsequent unit actions or observations through "Command."

If mutual aid units are first arriving, the first arriving Howard County Department officer will normally transition and assume command as the initial IC.

In certain special circumstances, the first arriving company officer may elect to **Pass Command**. This shall ONLY be permissible when:

- There is a **Known Life Hazard** (a known and immediate critical life threat), when the value of quick action by the company officer outweighs the value of establishing Command.
- A chief, command officer, or other company officer is arriving nearly simultaneously and takes Command.
- A Size-Up Report must still be transmitted by the officer that is passing command, but it may be abbreviated as appropriate. The report will reflect the actions of the first unit.
    - *"Engine 22 is on scene, side Alpha, of a small two-story wood frame townhouse. We have a working fire, fire showing from the second floor. Report of victim trapped on floor number one. We have checked the rear and the basement is clear. Lieutenant from Engine 22 is **passing command to the next arriving unit.** Engine 22 is initiating offensive operations, stretching a hose line to the first floor from side alpha for search and rescue and fire control."*

- In such cases, the officer of the next arriving company MUST establish Command.
- Use of an Initial RIC team shall be in compliance with General Order 300.11: Rapid Intervention and IDLH Initial Entry Teams.
- It is imperative that all firefighters operating within any Hazard Zone always operate in teams of two or more, maintain constant communication with each team member through visual, audible, physical, or safety device, and maintain close proximity to each other to provide assistance in case of any emergency.

Company officers (non-chief officers) that establish command shall include their rank in the transmission of the command statement.

- *"... Captain from E81 is establishing Bethany Lane Command ... "*

Modes of Command:

There are three **Modes of Command** that can be assumed: Investigation, Tactical Command, or Strategic Command.

- **Investigation Command Mode**
    - The Investigation Command Mode may be established when a first arriving company officer (or firefighter) cannot identify a Hazard Zone, but must investigate further.
    - The IC is in Command on-foot, mobile and investigating.
    - After arriving on scene and transmitting a Size-Up Report, the company officer might state
        - *"... Company is investigating. Lieutenant from E31 is in Command."*

- **Tactical Command Mode**
    - The Tactical Command Mode is an early Command mode that *may* precede the **Strategic Command Mode**, depending on which unit or level of officer arrives first.
    - The Tactical Command Mode may be established when a first arriving company officer (or firefighter) encounters a Hazard Zone and establishes initial Command in the absence of a

chief or command level officer. A transition to the Strategic Command Mode is anticipated upon arrival of a chief or command officer in an appropriate vehicle.

- The IC functioning in the Tactical Command Mode is typically a company officer that is *performing all the responsibilities of Command while on-foot and from within the tactical environment*. They maintain an exterior position near the Hazard Zone, and are NOT committed within an IDLH or potentially rapidly evolving atmosphere.
- Command functions include, but are not limited to: declaring the overall incident strategy, formulating an IAP that aligns with the identified critical incident factors, establishing objectives based on the incident's critical factors, evaluating the need for additional resources, directing and assigning responding resources as they arrive.
- The IC is typically functioning while in turnout gear in a loud and distracting environment, initiating and monitoring incident communications using a portable radio, functioning without a Command Aide, and not managing a tactical worksheet.
- It is particularly challenging to command from within the tactical environment and function simultaneously on all three organizational levels; strategic, tactical, and task. The IC is often in command of the incident while simultaneously directing initial tactical and task operations of the first arriving crews. Responding resources must take the environment of the IC into consideration. Managing command within these circumstances is not preferable for more than the initial stages of an incident. Based on incident conditions and chief or command officer response times, ICs functioning in the Tactical Command Mode must make the decision whether it may be more appropriate to function from a fixed position inside of a vehicle where the environment can be more focused and some **strategic command post** elements could be employed.
- It should be emphasized that the *role* of the IC functioning in the Tactical Command Mode still includes all Command responsibilities as outlined in the NIMS and organizational policies. These include declaring the overall incident strategy, establishing objectives based on the incident's critical factors, evaluating the need for additional resources, and directing and assigning responding resources. The difference for the IC functioning in the Tactical Command Mode is the conditions under which Command is typically being managed.

- **Strategic Command Mode**
  - The Strategic Command Mode requires a chief or command level officer to establish themselves as the IC and to manage command from *outside of the tactical environment, and within an environment that facilitates and enhances managing the functions of Command*.
  - There is generally a team in place to support managing the functions of Command.
  - The IC and support team are stationary, and are inside of a vehicle designated as the **Command Post**. Within the Command Post, the IC and their Command Aide (and possibly others) are actively managing a Command Assignment Sheet (tactical worksheet), recording the position and function of all assigned resources, assuring the IAP aligns with the critical incident factors, and monitoring radio transmissions closely in a noise and distraction-free environment, preferably using a headset. A Senior Advisor may be present advising and verifying that enough resources are assigned to the incident, that the overall incident strategy and IAP are current and in-line with forecasted incident conditions, confirming the incident organization chart matches the size and complexity of the incident, and managing

the Command Post. A Command Support Officer may also be present, assisting with communications, resource management, and documentation.

- Command functions include, but are not limited to, confirming the overall incident strategy, confirming and continuing to formulate an IAP that aligns with the identified critical incident factors, establishing objectives based on the incident's critical factors, evaluating the need for additional resources, directing and assigning responding resources, and coordinating activities necessary for overall operational control.

Command, whether operating from within a tactical environment or from within a Command Post, is tasked with developing an IAP and managing the resources assigned to mitigate the incident. The Incident Command System should be expanded anytime the incident officer feels that the limit of effective span of control has been reached, and the need for additional management exists.

On routine medical calls, it is typical that a company officer from a supporting unit that is on scene will assume the responsibilities of the IC (e.g., need for additional resources, notifications, etc.), while coordinating closely and effectively with the provider in charge of patient care and other EMS providers to meet the medical needs of the patient or patients.

If an Operations Section Chief is established for a given incident, that Operations Section Chief shall retain those responsibilities that are operational in nature which are attributed to the IC throughout this section of the document. Obviously, both Command and an established Operations Section Chief share in many incident responsibilities, such as providing effective oversight and providing for the safety of operating personnel.

Units on the scene can be considered as either *available* (ready for an assignment), *assigned* (performing and active function, or in transition from one location to another), or *out of service*.

Command should actively request and receive ongoing **Unit Status Reports** from the units (or their D-G supervisors) that have been assigned tasks in the Hazard Zone. When reporting status, units should report the *conditions* they have, the *actions* they have taken, and their *needs* for additional resources or actions of others, and end the report with their PAR status. Unit leaders, D-G supervisors, and all officers must proactively keep their respective supervisors advised on conditions in their area of responsibility, while respecting the need for brief, concise, and efficient radio communications. Officers shall provide their supervisor a Unit Status Report that outlines their conditions, action and needs in the following situations:

- Mayday
- Victim located
- Sudden change of events
- Unsafe condition identified
- Unable to complete assignment (e.g. obstacle identified, need additional resources)
- Changing crew location (moving from one apartment to another, etc.)
- Concealed space fire is not easily controlled
- Roof Report
- Assignment has been completed

A **Roof Report** is a concise status of roof conditions, and includes the type of roof, location of any fire breaks, an assessment of roof loads, an assessment of roof condition, and the presence of any fire or smoke. If the structure is of tilt-slab construction, roof reports should include an assessment of exterior walls for buckles and bows.

Command should assign D-G supervisors as needed to maintain an effective span of control. Supervisors operating within an IDLH atmosphere should supervise no more than two to three Units (the maximum of five should never be exceeded, and supervisors should strive to remain on the edge of the IDLH in these cases), while outside of the IDLH three to seven units is acceptable, with five being the optimal maximum. The expansion of the ICS structure is developed by Command as the situation dictates. Command will establish sections, branches, divisions, groups, and managers in order to allow for a safe and effective span of control when managing the incident objectives and overall strategy.

- When two or more companies are assigned to a function or area, Command must consider the need to establish a D-G supervisor (or branch director) to manage the assigned companies. The assigned D-G supervisor must not remain in a company officer position.
    - Whenever possible, these individuals should be selected from responding command officers, staff personnel or company officers not already deployed. Company officers used in these positions will assign an individual from their crew as the new Unit Leader, and that unit (if sufficiently staffed) would then be available for assignment. Once an individual is assigned to an ICS position, they assume the radio designation of the command position (e.g. alpha division, charlie division, roof division, rescue group, medical group, or extrication group).
        - If there are not enough personnel left in the crew to form an effective unit, Command may consider assigning those personnel to other crews.

- D-G supervisors must provide thorough oversight over those units and personnel assigned to them. This is usually most effectively done when given responsibility for a specific geographic area. Therefore, when possible, instituting *division* supervisors is preferable to instituting *group* supervisors.
- When possible, D-G supervisors should be positioned at a point of entry to the structure. Once assigned there, all units that enter the structure by way of a point where there is a supervisor assigned shall be assigned to that supervisor.
- D-G supervisors should remain exterior to the structure when at all possible.
    - When operating in an offensive strategy, officers must make a decision about where they will position themselves to perform their assigned role. In particular, assigned D-G supervisors should be positioned outside of the IDLH environment in a position where they can effectively communicate and manage the units assigned to them.
    - Their ability to clearly and effectively communicate is imperative. Therefore, they should not be in a location that requires them to wear breathing apparatus if at all possible.
    - There are infrequent situations where it can be beneficial from tactical standpoint for Command to allow D-G supervisors take a position within the IDLH. If a supervisor elects to position themselves within the IDLH atmosphere, Command must be informed of such immediately so that management tasks that are normally expected from D-G supervisors (such as assuring adequate and timely replacement resources, work-cycle time and rotation, are consumption awareness, etc.) can be accomplished by someone else.

        - The impact of assigned D-G supervisors operating within the IDLH can be very significant to the management of an incident. They are typically impaired or unable to effectively communicate (due to using breathing apparatus), unable to maintain the proper supervisor perspective (due to being in breathing apparatus and inside a hostile IDLH environment), and unable to completely manage their divisions or groups effectively. There is usually little benefit to this situation, as it reduces supervisors to a mere point of radio contact, and thus does not effectively support Command. The decision by a D-G supervisor to operate from a position within the IDLH should not be made lightly or without justification.

- D-G supervisors should assure that unit accountability, work-rest cycles, and breathing air cycles are being managed for companies assigned to them, including effective rotation of their crews and the **on-deck** resources when required to do so.
    - The D-G supervisor's oversight of the management of assigned unit's air supply in no way diminishes the individual member's responsibility to manage their own air supply, or the company officer's responsibility for managing his/her crew's air supply.
    - An effective rule of thumb for managing the work-rest cycle of a Hazard Zone unit is to contact that unit about two minutes before they have reached their estimated air safety margin and remind them they are getting close to their work cycle ending, and they will need to exit the Hazard Zone soon.
    - A D-G supervisor that is managing fire control operations initiated through side alpha access might consider the following resources for use in their division:
        - An engine and a truck company for active work
        - An engine and a truck company to be on-deck for relief
        - Two engine companies to fill-in during a recycle or rest cycle
        - Assure the division has coverage from an established RIC team should it become necessary
        - Consideration for an assigned Aide to assist the supervisor in documenting accountability, air consumption, and work-rest cycles
        - Consideration for a dedicated division safety officer
        - Consideration for a dedicated accountability manager (required for Level 3 Accountability)
            - Accountability must occur in compliance with *General Order 300.02 Accountability*

- Crews that are rotated out of a Hazard Zone can be either **recycled** or re-assigned to an established **rehabilitation area or division**, at the discretion of their D-G supervisor or Command. Company officers and D-G supervisors are responsible to monitor the welfare of their personnel at all times. Companies exiting the Hazard Zone shall perform a face-to-face with the D-G supervisor that shall include a report of the physical condition of their crew.
    - **Recycled** implies that the crew does not need time for rehabilitation and/or medical monitoring. Usually these recycle activities are limited to changing air cylinders and hydration of personnel. If the company is able to recycle, they will retain their assignment to the division or group. During Level 3 Accountability, the D-G supervisor shall retain the unit's PAT tags on their accountability board and note the company is recycling.

- If the company is sent to an established **medical unit** or **responder rehabilitation division**, they will be assigned to that division supervisor until they are released and ready to return to incident operations.
    - *"Division Charlie to Command, I'm sending Engine 22 to Rehab and I need another engine company to replace them."*

- Command officers must maintain an awareness of the condition of the personnel working under them. Personnel can rest between work cycles in any number of places on the scene, but formal rehabilitation processes that include protection from the elements, hydration, nourishment, and medical monitoring, should be proactively considered. Command must assess the current weather and environmental conditions when establishing their work-rest-rehabilitation plan, particularly when extreme conditions exist.
- Units that complete a rehabilitation cycle may become available for assignment in one of several ways, as implemented by Command. They may be reassigned by either the Medical Unit Leader or Responder Rehabilitation Manager (if instituted) to physically report to the Level Two Staging Area, they may be directed to stage at the rehabilitation area and contact the Staging Area Manager by radio to report their availability for assignment, or they may be directed to report their availability from the rehabilitation area by radio directly to Command.

The Initial Radio Report and Size-Up:

The first arriving officer or Unit Leader shall perform a size-up and establish command by transmitting an **Initial Radio Report** that includes a command statement for all incidents where two or more units are investigating an incident or are actively engaged in operational tasks. Once Command is established, units that are en-route and on-scene shall coordinate and communicate any subsequent unit actions or observations through "Command." The size-up should begin with an assessment of the incident's critical factors (See Appendix A).

The Initial Radio Report shall communicate their size-up, their determination of overall incident strategy, their IAP and establishes Command. Once Command is established, units that are en-route and on-scene shall coordinate and communicate any subsequent unit actions or observations through Command. The size-up should include an assessment of the incident's critical factors. The report should include:

- Unit ID and arrival to the scene
    - *"Engine 101 to Howard."*
    - *"Engine 101, go ahead."*
    - *"Engine 101 on location ..."*

- Structure and area description
    - Size of structure
    - Number of stories
    - Occupancy type
        - Single-family
        - Multi-family, Multi-family apartment
        - Strip mall

        - Large commercial
        - Big box, High rise
    - Arrangement
        - *"... of a medium sized multi-family garden style apartment, three stories, ..."*

- Problem description
    - Conditions (nothing showing, working fire, etc.)
    - Location/floor
    - Location/side
    - Apparent life-safety issues
    - Special circumstances
        - *"... with a working fire, smoke showing from the second floor side alpha ..."*

- Initial IAP and actions to be taken by first arriving unit
    - First arriving unit (e.g. Engine 1) location
    - Water supply
    - Task-location-objective
        - Task (Lay out from ..., stretch a line ..., etc.)
        - Location (... into side alpha, 3rd floor, etc.)
        - Objective (... for primary search, fire control, investigate, etc.)
        - *"Engine 101 has laid a supply line from the hydrant at the entrance to the cul-de-sac, and will be making a quick exterior knockdown from side alpha, and then advancing a line to the second floor, quadrant 1 apartment, for primary search and fire control."*

- Declaration of strategy
    - Offensive
    - Defensive
        - *"Units will be operating in the offensive strategy."*

- Assumption of command
    - Naming of command
    - Mode of command
    - Accountability location
        - *"Captain from Engine 101 is establishing Clocktower Lane Command in the tactical mode. Accountability will be at Engine 61 on side alpha."*

- Resource Determination
    - If the incident involves a working fire, in most cases Command should request the Working Fire Task Force
        - *"Dispatch the Working Fire Task Force."*
    - Consider additional alarm assignments if the fire has taken control of the structure or civilians are trapped
    - Consider appropriate staging
        - *"Dispatch the Working Fire Task Force and a second alarm. Have all second alarm units Level Two Stage at the Park and Ride at Snowden River Parkway and Route 32."*

- When designating a Level Two Staging area, Command shall designate a Staging Area Manager to manage, log, and report staging area resources. If no Staging Area Manager is designated by Command, the Engine Company officer from the first engine to arrive in the Level Two Staging area shall assume the role and responsibilities. If it is not necessary for the entire crew of their unit to used to manage the staging area, that officer shall appoint another to be Unit Leader of the unit on which they arrived. Channel six (6) of the incident's assigned zone will be used for staging area communications. Command and the Staging Area Manager will continually communicate as to the number and type of units that are available in the staging area. Staging can request and receive resources from Howard Communications or from an established rehabilitation area, as designated by Command. All units in staging shall monitor that channel until deployed to operational areas.

- Continue with IAP work assignments for arriving resources
  - *"Command to incoming units, **unit assignments will be made by Command**."*
  - Second arriving unit task-location-objective
    - *"Command to Engine 61."*
    - *"Engine 61, go ahead."*
    - *"Engine 61, pump the hydrant for E101, with your crew to report to side alpha, take a line from Engine 101, and back up Engine 101 on the second floor quadrant 1 apartment, primary search and fire control."*
    - *"Engine 61 is direct with our assignment to extend a line from Engine 101 on side alpha to back up Engine 101 on the second floor, quadrant 1, to assist with primary search and fire control."*

  - Third arriving unit task-location-objective
    - *"Command to Engine Tower 10."*
    - *"Tower 10, go ahead."*
    - *"Tower 10, proceed to side alpha, take a line from Engine 101, and primary search and check for extension on the third floor. You will be operating above the fire."*
    - *"Tower 10 is direct with our assignment to extend a line from Engine 101 on side alpha to the third floor for primary search and checking for extension. We will be operating above the fire."*

  - etc.

Once the Initial Radio Report is transmitted by the IC and Command is established, Command shall either conduct or assure that a 360 degree assessment of the structure, that utilizes a thermal imager if available, is quickly completed. Once completed, Command shall transmit a **Follow-Up (Basement) Report** that includes:

- Results of the 360 structure assessment
  - Assessment of occupancy with **total number of stories**
    - *"Side Charlie shows a three-story middle-of-the-group townhouse, ..."*

- Stories visible below roof (or gutter) line.
  - *"… with two stories visible **below the roof (or gutter) line** …"*
- Basement type
  - *"… **including** a walk-up basement with a lookout window."*
- Basement condition.
  - *"Basement appears to be unfinished."*
- Conditions visible from side Charlie.
  - *"Fire showing from floor number two, quadrant two."*

- If person transmitting the Follow-Up Report is the IC
  - If any, changes to problem identification
  - If any, changes to IAP
  - Confirmation of the overall incident strategy
    - *"… Units will continue to operate in the offensive strategy …"*
  - Confirmation of the location of PAT tag accountability collection
    - *"… Accountability will be at Engine 101 on side alpha."*

Determining Overall Incident Strategy:

The Overall Incident Strategy, which reflects the incident's risk management strategy, must be determined prior to formulating the initial IAP. There are two distinct strategies; **offensive** and **defensive**. The two distinct strategic choices dictate in simple and understandable terms how close the emergency responders will get to the incident's Hazard Zone. NEVER combine offensive and defensive operations in the same fire area. This overall strategy will then serve as the basis for formulating the IAP, which is the next step. Safety is the number one priority for both civilians and responders, and effective safety practices begin by being in the right overall risk management strategy, either offensive or defensive. Which strategy is chosen depends on the incident's size-up assessment and critical factors weighed against the following Departmental **Incident Risk Management Plan**:

- Risk Management Concept 1: We will risk a lot, in a calculated manner, to save savable lives.
  - If there is a possibility that there are savable lives inside a structure, and it is reasonably safe to conduct offensive interior firefighting, the offensive strategy is appropriate. If fire conditions indicate that the interior of the structure is not survivable or that interior firefighting would not be reasonably safe, interior firefighting is not an option, and the defensive strategy is required.

- Risk Management Concept 2: We will risk a little, in a highly calculated manner, to save savable property.
  - We will risk a little in a highly calculated manner to save savable property. If a Known Life Safety Hazard is not a critical incident factor, and it is reasonably safe for firefighters to conduct offensive interior firefighting, a carefully calculated lower risk offensive strategy is appropriate.

- Risk Management Concept 3: We will not take any risk at all to attempt to save what is already lost.
    - If fire conditions indicate that the interior of the structure is not survivable, or that interior firefighting would not be reasonably safe, interior firefighting is not an option. The defensive strategy is required.

Offensive Operations:

Offensive operations are operations being conducted inside a hazard zone. They may include exterior or interior operations. Offensive and defensive operations shall never be simultaneously undertaken in the same fire area. Priorities are:

- Rescue
- Fire control
    - Expect fire control within ten minutes, and revise overall strategy and IAP accordingly.
    - Re-evaluate overall incident strategy at least every five minutes.
    - Command must verbally acknowledge each five minute notification from Communications by re-announcing the incident's strategy over the assigned tactical radio frequency until the incident is placed under control, or until Command requests to discontinue or restructure the notifications.
    - When in the offensive overall incident strategy, certain exterior operational tactics may not only be appropriate, but in fact may be the *most* appropriate fire attack tactic. An example of this may be Command's intention to employ a **quick exterior knockdown** and then an advance crews to interior positions for fire control operations. Current research clearly demonstrates the advantages of keeping a fire ventilation-limited by using effective flow path control, and quick application of water through available external openings prior to interior attack, both of which consist of exterior tasks that can be employed while in the offensive strategy. Crews must be well disciplined and not make entry into an interior Hazard Zone until assigned to do so by Command, understanding that **operating in the offensive overall incident *strategy* may not mean that Command is employing interior attack *tactics* at the moment**.

- Property conservation
- Customer stabilization

Defensive Operations:

Defensive strategy operations are essentially "holding actions" used to keep the hazard from spreading and protecting exposures. These operations become necessary when the critical factors indicate that the *risks of offensive operations outweigh the potential benefits*. This might occur when:

- The benefits of offensive operations are simply too little (as in a vacant abandoned structure).
- The hazard is simply too evolved to be effectively controlled by offensive operations (as in a large, evolved, free burning fire).
    - Once initiated, if defensive operations are effective at reducing the hazard, the risks of potential offensive operations may become reduced to the point that the benefits outweigh the risks. At that point, Command may change the overall incident strategy from defensive to offensive, and tactics may change to offensive exterior or even interior operations.

- The resources available on the scene are not yet adequate to safely initiate offensive operations, making defensive operations appropriate until additional resources arrive. Once adequate resources are in place, the overall incident strategy may change to offensive operations consisting of exterior or even interior operations.
- Defensive operations are NEVER conducted inside the Hazard Zone, but are conducted near the Hazard Zone – from safe locations.
    - Ensure firefighter safety at all times
    - Clearly transmit and define the hazard zone that is defensive only, *including collapse zones*.
        - Be certain of reference designations (primary fire structure, bravo, delta, etc.). Use actual structure addresses only as confirmation information and only when absolutely sure about their accuracy.
    - Establish cut-offs
    - Protect exposures (possibly with master streams)
    - Search exposures

Once the overall incident strategy is established, tactical priorities and the initial IAP can be formulated. If the overall incident strategy changes, the IAP will also change and a structured process be used to communicate the change to all operating units. Incident size-up is an ongoing process.

The Incident Action Plan and Establishing Tactical Priorities:

Command must ensure that an adequate initial size-up of the incident scene has occurred, that the incident's critical factors have been identified, and that an overall strategy decision has been made and communicated PRIOR to formulating an initial IAP or beginning interior firefighting operations. Additionally, it is crucial that both the initial IC functioning in the Tactical Command Mode (if there is one) and the IC that will be functioning in the Strategic Command Mode (who will be assuming Command from in a command vehicle) *continually* reassess these things and *continually* evaluate the risk versus benefit of all tasks to be accomplished on every incident.

Always establish an action plan that is consistent with the overall incident strategy.

IAP priorities and operational considerations for structures include:

- Assure proper overall incident strategy
- If a fire incident, assure likely fire spread path has been identified
- Hazard verification
    - Investigate to verify the exact location, nature, and extent of the hazard, including the specific location, fire floor, and the extent of fire extension.
- Objectives aimed to achieve established key benchmarks as appropriate for the type of incident. Once achieved, the accomplishment of those **key benchmarks** shall be transmitted by Command to Howard Communications emergency dispatchers. ICs shall document and immediately transmit to Howard notification of certain benchmarks that have been achieved.
- **Rescue** and occupant control
    - Protect, remove, and provide care to endangered customers.
        - Consider the most effective method (evacuation or protection in place).

- Primary search to obtain **"Primary Search Complete"** benchmark (Command shall transmit benchmarks to Howard Communications as soon as they are achieved).
- Secondary search to obtain **"Secondary Search Complete - All Clear"** benchmark.
- Provide short-term customer service to affected parties once the hazard is mitigated.

- Fire control
  - **Exposures** protection.
  - **Water Application: Quick exterior knockdown** tactics prior to interior operations provide many benefits. Care should be taken to NOT significantly disrupt the existing flow path dynamics, accomplished by using straight streams and applying water through only the lower half of openings. Employing the *tactic* of a quick exterior knockdown is part of an *offensive* overall incident *strategy*, and in no way implies that the IC has declared a defensive overall incident strategy. When utilized, units should still position and prepare themselves for offensive tactics.
  - **Confinement: "Fire Under Control"** benchmark, defined as a fire that is no longer free burning, that crews are in position to effectively discover and mitigate fire spread in the structure of origin, fire spread is unlikely (it is "contained"), and the fire no longer threatens any exposure. This benchmark usually precedes the overhaul phase.
  - **Extinguishment: "Fire Out"** benchmark, defined as the absence of fire after appropriate investigative and overhaul activities have taken place and no hidden extension is confirmed.
  - Assure that all personnel in the Hazard Zone are working under the protection of a charged hose line, including truck and squad companies.
  - Assure that active measures to control unintentional non-tactical ventilation are implemented.
  - Take early actions to establish uninterrupted water supply.
  - Control utilities and building systems (gas, electric, HVAC ventilation systems).
  - **Overhaul:** Once the fire is extinguished, the objective is to **overhaul**, **salvage, and ventilate** so that incident conditions cease causing damage. These activities end at the point where cessation of any further property destruction occurs, whether from fire, water, mitigation activities, weather, or any other potential cause.

- **Vehicle Rescue and EMS**
  - "**Patient Extricated**" benchmark, as appropriate.
  - "**Helicopter Airborne**" benchmark, as appropriate.

- **Hazardous Materials**
  - "**Isolation of Hazard**" to recommended distances benchmark, as appropriate.
  - "**Hazard Mitigated**" benchmark.

In formulating and implementing the IAP, with particular attention toward accomplishing in the early command stages, Command shall:

- Ensure that a risk assessment is accomplished and the **critical incident factors are identified** and considered.

- Ensure that potential risks to operating personnel have been identified, and steps to reduce risk are incorporated into the IAP whenever possible.
    - **If personnel are operating in an IDLH, they shall do so under the protection of a charged hose line at all times. Ensure that a charged hose line is available on every floor where operations are taking place and fire spread is possible, and when opening overhead void spaces to check for fire travel and extension.** This includes special service companies. Either assign an engine company to operate on the same floor, or assign the special service company to advance a hose line to their assigned search floor. The only exception is if Command determines that a known life hazard exists and a rapid rescue is to be attempted after considering all critical incident factors, risks, and potential benefits.

- **Recognize indicators of fire location, travel, development, and behavior**. Indicators can include visible fire, smoke color, smoke velocity (from increased pressure from high temperatures), smoke density, and heat detected by thermal imager. Be particularly alert for extreme fire behavior.

- **Identify the expected flow path for fire development EARLY**. Assess the structure for any existing openings and their height in relation to the seat of the fire, and anticipate airflow and fire spread to the upper opening. Actively control non-tactical ventilation upon structure entry. Understand the following premises (Underwriters Laboratories, 2010):
    - **Keep ventilation-limited fires ventilation-limited until water is being applied.** Fires that have progressed beyond the incipient stage are likely to be ventilation-limited when the fire department arrives. Once a fire is ventilation-limited, ANY INCREASED AIR FLOW will result in increased fire development and heat release. Introducing airflow by entering and attacking a ventilation-limited fire can result in significant and catastrophic fire spread (typically occurs 1-3 minutes after airflow, whether intentional or non-tactical, is introduced).
    - **Limit unintended non-tactical ventilation** and do not place companies in attack positions where rapid fire spread is possible from likely events, such as when a window might suddenly fail.
        - Recognize the difference between "tactical ventilation" and "non-tactical ventilation", and understand the potential impact of both on fire development. Ensure companies take real and substantial efforts to control the flow path and eliminate or reduce unintentional non-tactical ventilation. Assure door operators are assigned at attack points as necessary to prevent unintentional influx of ventilation. Carefully apply tactical ventilation and fire control tactics in a well-*communicated* and well-*coordinated* manner.

    - **Anticipate ventilation profile changes** that can occur as a result of tactical action or fire effects on the structure (**such as a sudden window failure**). These events can change the flow path very quickly and can create untenable conditions for crews within seconds.
    - Recognize the potential impact of windy conditions on fire behavior and implement appropriate tactics to mitigate the potential hazards of wind-driven fire.

Ongoing Risk Assessment, Management, and Reassessment of Risk:

All commanders, supervisors, and firefighters shall continually assess the incident's existing and developing critical factors and the risk versus benefit associated with ongoing operations. The following must be continually addressed:

- Assure that emerging risks to personnel are continually re-assessed.
- Reassess and ensure operations are in the correct overall Incident Strategy.
- Reassess the ventilation flow path of the fire and ensure unintentional non-tactical ventilation is actively being limited.
- Assure that a charged hose line is available on every floor where operations are taking place and fire spread is possible.
- Quickly identify and react to emerging "**Safety Red Flags**", because they can end up injuring or killing us. Officers must always take a pessimistic approach when sizing-up, assuming the worst until determining otherwise. A red flag will not necessarily change the overall incident strategy or incident action plan, but it must be identified and addressed by Command and the rest of the Hazard Zone management team:
    - Non-tactical ventilation fire effects
    - Fire in the attic space
    - Fire in a basement
    - Operating above a fire (basements, floor above the fire)
    - Zero visibility
    - Encountering high heat
    - Reports of, "we can't find the fire"
    - Reports that state "fire control," but you can still see active fire conditions from the Command Post
    - Victims discovered
    - Wind-driven fires
    - Smoke or fire showing from cracks in walls
    - Reinforcing fire attack position more than once

Companies assigned to areas where IDLH conditions may be or rapidly become present shall be in appropriate protective equipment at all times. This equipment shall include full Personal Protective Equipment (PPE) and donned SCBA. Tactical and task level supervisors are responsible for the air management for their assigned crew or crews. Air supply shall be sufficient to exit the IDLH prior to the low air alarm sounding. The minimum number of personnel assigned to a crew or a team operating in a Hazard Zone shall be two firefighters with a least one portable radio. Crews or teams always go in and come out together, and remain in *close* contact while operating within the IDLH atmosphere. All personnel shall remain in contact with their company officer or assigned supervisor by voice (including radio), vision (thermal imager), or touch (hose line).

Command Progress Reports are radio reports that provide information on the evolution of an incident. Progress reports may indicate that an incident is continuing to escalate or is being brought under control. Progress reports should also represent a "picture" of the activities underway and the degree of success of the operation. The reports are intended to keep officers and companies informed on incident status as well as to provide a recorded documentation of the incident. Units that are still responding or

who have arrived at staging or base should pay particular attention to progress reports in order to have an understanding of the situation before becoming engaged.

Command shall transmit Command Progress Reports on the main incident channel whenever benchmarks and significant tactical objectives are achieved, and as needed throughout the incident. At a minimum, the first progress report shall be transmitted at approximately the ten minute point into an operation, and every ten minutes thereafter. The first progress report is quite comprehensive:

- Contact Howard Communications
- Confirm the address or location of the incident
- Define commitment of resources
- Define the hazard
- Describe the building or involved area
- Define strategic mode
- State status of search
- Define extent of involvement or hazard
- Provide a brief description of major tactical operations
- Describe the level of containment of the fire or hazard
- Describe the fire ground layout or operational area
- Estimate time prediction for holding units
    - *"Clocktower Lane Command to Howard. We are using all companies from the first alarm for a fire on the second floor of a large three-story apartment structure of wood-frame construction. We are operating in an offensive strategy. Primary search is negative on fire floor and still underway on the floor above. Fire is on one floor with about 25 percent involvement. We have three lines in operation and are still actively searching the structure and two exposures. We will be holding all units in excess of an hour."*

Subsequent progress reports may be shortened as appropriate.

- *"Clocktower Lane Command to Howard. We are continuing to use all companies. Fire is under control, but not yet out. We have a primary and secondary all clear for the primary fire building and both the Bravo and Delta exposures. We will be continuing to hold all units for more than an hour."*

Changing Overall Incident Strategies:

Command may at any point conclude that a change in Overall Incident Strategy is necessary. When moving from a defensive to an offensive overall incident strategy, Command should be methodical and thorough in assigning objectives and operating locations to units. When moving from an offensive to a defensive strategy, ***extreme care and a strong Command presence is essential***. Command must not hesitate to change from an offensive to defensive mode when it is indicated, and the change must be *decisive, clear,* and *rapid*. It must be executed in a specific, consistent, and standardized manner so that operational personnel can anticipate the steps of the process once initiated.

Offensive to Defensive Strategy:

- The announcement of a change from an OFFENSIVE TO DEFENSIVE strategy shall be made as follows:

- Command shall request that Howard Communications emergency dispatchers broadcast the **Emergency Tone** and **Emergency Traffic** channel marker.
  - *"Command to Howard."*
  - *"Howard to Command, go ahead."*
  - *"Transmit the Emergency Tone and initiate the Emergency Traffic channel marker."*
  - (Emergency Tone transmitted on all fire ground frequencies and Emergency Traffic channel marker is initiated)

- Command shall declare Emergency Traffic and transmit the change in strategy to all Hazard Zone units in the following manner:
  - *"Command to all fire ground units. Emergency traffic. Shifting to the defensive strategy. All interior units exit (or abandon, as appropriate) the structure. *All interior units report PAR's upon exit."*
    - *Alternatively, Command can instead order *"All units prepare for a role call PAR after exit"* if the number of interior units on the scene may present a communications problem.
    - **"Exit" the structure** will be defined as an immediate orderly withdrawal where interior lines and equipment will be withdrawn and repositioned when changing to a defensive strategy.
    - **"Abandon" the structure** will be defined as an immediate emergency retreat where all hose lines and heavy equipment will be left in place and all personnel in the Hazard Zone will exit the structure as quickly and as safely as possible.

- Command shall prompt the Howard Communications emergency dispatcher to repeat Command's statement verbatim.
  - *"Howard to all fire ground units. Emergency Traffic. Command advising shifting to the defensive strategy. All units exit the structure. *All interior units report PAR's upon exit."*

- Command shall account for all units in the Hazard Zone.
  - Company officers shall account for their crews and advise their supervisor (D-G supervisor, or Command) as to the status of their crew upon exiting. D-G supervisors shall notify Command of the PAR status of the individual crews assigned to them upon their exit.
  - Command's greatest priority once a strategic shift has been initiated is the safe exit of all units from within the Hazard Zone. Upon switching from an offensive to a defensive overall incident strategy, Command shall verify accountability for all units operating in the Hazard Zone as soon as possible. PAR reports should be conducted face-to-face if possible, and in accordance with General Order 300.02: Personnel Accountability.
    - Level One staged units and other units working outside the Hazard Zone shall maintain radio silence until all PARs from hazard zone units have been tallied (unless they have emergency or high priority traffic).

- Command shall transmit *"All Hazard Zone units have reported PAR"* once verification of Accountability is accomplished.
- Command shall transmit *"All units may resume normal radio traffic"* once a successful move from offensive to defensive has been achieved, and prompt Howard Communications to remove the Emergency Traffic channel marker.

The Command Transition Report and Transition From Tactical Command Mode to Strategic Command Mode:
If the Tactical Command Mode has been established by a first-in officer, upon arrival of the first chief or command officer, a Command transition to the Strategic Command Mode shall occur if an active Hazard Zone exists or if there are still tactical benchmarks to coordinate. The first arriving chief or command officer shall respond directly into the scene to a suitable Strategic Command Post location with a clear view of the incident scene. The objective of this initial command transfer is to strengthen the functions of command and provide increased support for operational resources. This chief or command officer's **Command Transition Report** shall include the following:

- Perform size-up of incident's critical factors
  - Verify overall incident strategy is appropriate
  - Verify that current operating positions match the current incident conditions.

- Transmit that your unit is on-scene
  - *"Battalion 1 on-scene"*

- Contact the initial IC (by face to face if possible) and transmit that you will be transferring Command:
  - The IC functioning in the Tactical Command Mode remains in command until the transfer of Command has been confirmed.
  - Confirm all achieved benchmarks and Hazard Zone operating positions and their objectives with Command (the IC functioning in the Tactical Command Mode). If a face-to-face transition cannot occur, this might sound like:
    - *"Battalion 1 to Command"*
    - *"Command to Battalion 1, go ahead."*
    - *"Confirming that you have Engine 61 operating interior on floor number one with a hose line from Engine 61 for primary search and fire control, Engine 11 is operating interior on floor number one with a hose line from Engine 11 for primary search and fire control, that you have a "Primary Clear" on floor number 2 and Truck 6 is operating with a hose line from E61 on floor number two for secondary search and rescue, is that correct?"*
    - *"Command to Battalion 1. That is correct."*
    - *"Battalion 1 to Command, I'll be taking command from here."*

- Advise Howard Communications that command is transferring
  - *"Battalion 1 to Howard."*
  - *"Howard to Command, go ahead."*
  - *"I'll be transferring Command from Engine 61 ..."*

- Re-announce the current overall incident strategy
    - *"... We will be continuing to operate in the offensive strategy ..."*

- Announce the Command Post location
    - *"...Command will be located on side alpha ..."*

- Make a resource determination and request
    - Assure appropriate staging established.
        - *"Staging will be located at the Park and Ride at Route 108 and 29."*

Field Communications:

Field Communications is a temporary set of communications procedures that can be activated by Command to control and limit radio transmissions from Howard Communications. These procedures allow all radio transmissions related to the active incident to be directed and routed through Command. Field Communications generally occur using Fire Ground Talk Groups, which are a specific sets of channels within the Howard County 800 MHz radio system that are identified as Alpha, Bravo, Charlie, and Delta. Each talk group has a set of tactical channels used for incident or other communications.

After Command has been established in the Strategic Command Mode, Command will normally declare the initiation of Field Communications on the incident's tactical channel. Once Field Communications has been placed in effect, Howard Communications and Command will communicate with each other as needed, but Command becomes the central point for communications to and from units operating on the incident scene and for units en route.

- *"Command to Howard, Command is initiating Field Communications."*
- "(Howard Communications sounds a single alert tone). *Attention all units on box alarm 9-1, Field Communications is now in effect."*

Once Field Communications is in effect, responsibilities of the Howard Communications emergency dispatchers include:

- Relay of any additional information received to Command.
- Notifications to Command and radio announcements for events as outlined in Department general orders, such as
    - Those required for changes in overall incident strategy
    - Those required and specified for Mayday and emergency situations
    - Single alert tones and incident duration updates every 15 minutes
    - Etc.

- Documentation of the incident in CAD and CAD comments, including the incident benchmarks
- Monitor other tactical channels being used for the incident
- Process any requests made by Command
- Monitor incident transmissions and act as a second set of ears for Command.
- Whenever possible, the Howard Communications emergency dispatcher shall track and notate assignment of resources and group and division supervisors in the CAD. This information may become invaluable should incident accountability become critical.
- Transmit the Emergency Tone as requested by Command

- Initiate the Emergency Traffic radio restriction and channel marker as requested by Command
- Repeat Command announcements as requested by Command

Howard Communications emergency dispatchers shall intervene by contacting Command anytime a message appears to NOT have been received or acknowledged by Command after the second attempt. In the case of an emergency message, such as a Mayday or emergency identifier activation, dispatchers need not wait for the second attempt before contacting Command to verify their receipt of the emergency message.

When the IC no longer wishes to have Field Communications in effect, the IC shall notify Howard.

- *"Command to Howard, Command is terminating Field Communications."*
- "(Howard Communications sounds a single alert tone). *Attention all units on box alarm 9-1, Field Communications is now terminated."*

Strategic Command and the Command Team:

Once Command is established at an incident that presents an on-going Hazard Zone, Command shall transition to the Strategic Mode within a Command Post as soon as possible. This transition shall be transmitted by radio to all incident personnel. It shall be a priority to establish a Strategic Command Team as soon as possible for ongoing Hazard Zones.

The **Strategic Command Team** is, at a minimum, comprised of an *IC functioning in the Strategic Command Mode* and a *Command Aide*. A Strategic Command Team should be assembled as soon as possible after establishing a Strategic Command Post. The team can be expanded as is required to support the command functions made necessary by the incident. The roles within the team are:

- An IC functioning in the **Strategic Command Mode**; typically a chief or command level officer that is commanding from *outside of the tactical environment, and within an environment that facilitates and enhances managing the functions of Command*. A stationary Command Post has been established, in which the IC and their Command Aide (and possibly others) are actively managing a tactical worksheet, recording the position and function of all assigned resources, assuring the IAP aligns with the critical incident factors, and monitoring radio transmissions closely in a noise and distraction-free environment, preferably using a headset. Command functions include, but are not limited to: confirming the overall incident strategy, confirming and continuing to formulate an IAP that aligns with the identified critical incident factors, establishing objectives based on the incident's critical factors, evaluating the need for additional resources, directing and assigning responding resources, and coordinating activities necessary for overall operational control.
    - This is in contrast to an IC functioning in the **Tactical Command Mode.** They are typically a company officer that is *performing all the responsibilities of Command while on-foot and from within the tactical environment*. They are maintaining an exterior position near the Hazard Zone, and are NOT committed within an IDLH or potentially rapidly evolving atmosphere. The difference for the IC functioning in the Tactical Command Mode is the conditions under which Command is typically being managed.

- The **Command Aide** is an officer or firefighter assigned and dedicated to assist the IC functioning in the Strategic Command Mode from *within the Command Post* whose primary function is to enhance the effectiveness of incident management through technical support of the IC. *The intent of the*

Command Aide position is NOT to involve the Aide in tactical or company-task level assignments during emergency incidents. They should not be assigned a firefighter or fire officer role outside of the Command Post on the fire ground unless their technical support of Command is being accomplished by another resource. Within the Strategic Command Post it is expected that the IC and their supporting Command Aide are actively managing a tactical worksheet, recording position and function of all assigned resources, assuring the IAP aligns with the critical incident factors, and monitoring radio transmissions closely in a noise and distraction-free environment, preferably using a headset. Specific operational duties can include:

- Assisting with incident tactical worksheet and documenting or recording incident resources and information
- Monitoring tactical radio channels and assisting with communications
- Building inspection or incident preplan review during incidents
- Functioning as the initial Accountability Manager and/or assisting with unit accountability
- Assisting with incident safety procedures as directed
- Assisting in the mobile command post on larger incidents
- Performing as a liaison with other agencies as directed
- Serving as an Assistant Accountability Manager when their BC is operating as a D-G supervisor and Level III Accountability is in place.
- Serving as a partner to the Battalion Chief should the need arise to operate in an IDLH environment.
- A Command Aide may have other assigned duties within the command post as directed by the IC.
- The **Battalion Aide** is a staffed Department position that shall serve as the Command Aide when a Strategic Command Post is established. In addition to the operational duties listed for the Command Aide, the Battalion Aide shall provide direct administrative support to the field Battalion Chief throughout the shift.
  - The radio designations for the Battalion Aide positions shall be "Battalion 1 Aide" and "Battalion 2 Aide."
  - Apart from responding to emergency incidents functioning in the role of Command Aide, duties shall include operating the BC vehicle, maintaining the BC field office, assisting with building and maintaining daily staffing plans, completing and maintaining daily overtime availability and other appropriate documentation (databases, logs and files), assisting with coordination of battalion training and shift training, coordination of battalion responsibilities such as project management, resource coordination, performance review completion, and other field battalion officer duties as assigned by the field Battalion Chief.

- (Optional) A **Senior Advisor** chief officer may be present within the Strategic Command Post supporting the IC, advising, and:
  - Verifying that enough resources are assigned to the incident.
  - Verifying that the overall incident strategy and IAP are current and in-line with forecasted incident conditions.
  - Confirming the incident organization chart matches the size and complexity of the incident, and determining the need for expansion to additional NIMS ICS positions.
  - Confirming the accountability system in place is both appropriate and effective.

- Assisting with the management and logistics of the Command Post.
- Potentially assuming Command should the need to expand the ICS system arise, with the previous IC often assuming the Operations Section Chief position.

- (Optional) A **Command Post Support Officer** may be designated and:
  - Coordinating the assignment of additional NIMS positions as called for by the IC.
  - Coordinating additional resources as they arrive at the incident.
  - Coordinating and communicating with an established Level Two Staging Area Manager.
  - Assisting with communications to established divisions and groups within the command structure.
  - Coordinating and documenting elements of safety, accountability, and logistics during the incident as called for by the IC.
  - Coordinating the resolution of Command Post needs as is appropriate.

- (Optional) A **Command Post Operator** may be assigned to operate the command post vehicle and the technology therein.

Demobilization and Command Termination:

- Command shall order the demobilization of resources when appropriate. Command may be transferred to officers of lower rank (e.g. from a Battalion Chief to a company officer) during demobilization.
- Care should be taken not to exceed an effective span of control.
- Officers that are given Command, even during demobilization, become accountable for all incident command responsibilities, including but not limited to: overall authority for management of the incident, the responsibilities and duties of all unassigned ICS positions, situational awareness for the position and function of all operating units, awareness of incident critical factors, revision of the IAP, management of unit task assignments, evaluation of progress, accountability of incident personnel, and incident risk assessment and safety.
- Command transitions that occur as part of demobilization MUST include:
  - A face-to-face transition between incident command officers.
  - A review of the IAP and overall strategy of the incident.
  - A complete understanding of units still on the scene, their current assigned tasks, and their operating position.
  - A PAR of each unit operating on the incident scene.
  - Must be announced on the radio.

- The announcement of a transition of Command during demobilization shall be made as follows:
  - *"Command to Howard."*
  - *"Howard to Command, go ahead."*
  - *"Battalion 1 has transferred Command to Truck 2. All units operating on the scene have been confirmed to be PAR."*
  - *"Howard is direct, Truck 2 is now in command."*

- Command shall terminate Command upon the conclusion of emergency service operations at the scene of an incident, usually upon the departure of the last unit from the scene.

- The announcement of the termination of Command shall be made as follows:
  - *"Command to Howard."*
  - *"Howard to Command, go ahead."*
  - *"Terminating Clocktower Command. All units will be going in service as ready."*

Incident Command Lessons Learned Analysis:

The organization shall maintain a proactive approach to quality improvement through routine analysis of incident management events and subsequent development of any lessons that could be learned, procedures that could be improved, and/or training that could be developed. Personnel that function as an IC shall actively participate in an established Lessons Learned educational and quality assurance process for those incidents designated by the Fire Chief, Department Operations Officer, or Emergency Services bureau chief as appropriate for quality assurance analysis.

Resource Deployment Models for Arriving Companies:

- Specific resource deployment and assignments may be outlined in General Order Deployment Models that pertain to specific types of structures or occupancies. These deployment models shall be considered the default unit task assignments as indicated. In these General Order Deployment Models, companies are expected to complete the listed tasks and responsibilities based upon their position in the arrival sequence, but should remain alert to being directed to different tasks and responsibilities by Command. Once Command is established, whether Command is an initial company officer or a chief officer, Command has the autonomy to deviate from an established resource deployment model and assign tasks and responsibilities to arriving companies in order to address Command's established incident action objectives.
- IC's shall transmit and declare whether the General Order Deployment Model is to be followed, or whether command shall be making unit assignments. *"Command to incoming units ...*
  - ***"... unit assignments will be made by Command."***
  - ***"... unit assignments will be by General Order."***

- When Command makes unit assignments, Command shall communicate the new objectives being assigned to arriving units, and each must be advised and acknowledged through radio communications or face-to-face interaction between supervisors.
- When Command assigns a task or establishes an ICS position (assigning an individual to manage the position), that action will be transmitted by radio, and confirmation of the assignment with those involved units will be obtained.
- When Command directs incoming units to assume unit assignments per General Order, or if Command is not yet established, arriving **companies shall announce their arrival order and the tasks assignments they are undertaking** as outlined in the General Order Deployment Model for the appropriate type of structure or occupancy.
  - *"E31 on location as the third arriving engine. We have our own hydrant supply and are positioned on side Charlie, and are stretching an inch and three quarter hose line from E31 to the side Charlie garage door to standby if needed for fire control."*

- Companies responding from an "out of position" location shall notify Command (if established), or the highest-ranking responding officer (e.g. a responding chief officer) if Command is not yet established.

- The process and discipline for control and accountability of each resource is of extreme importance. This is a responsibility of not only Command, but of all officers, firefighters, providers, unit leaders, branch directors, and D-G supervisors.

REFERENCES

- General Order 300.02: Personnel Accountability
- General Order 300.04: Mayday Operations
- General Order 300.11: Rapid Intervention Crews
- General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines
- General Order 310.02: High Rise Structure Fires
- General Order 310.04: Flammable Gas Fires
- General Order 410.01: Communications
- NFPA 1561(2014): *Emergency Services Incident Management System and Command Safety*
- Department of Homeland Security's National Incident Management System (December 2008), Appendix B: Incident Command System.
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SUMMARY OF DOCUMENT CHANGES

2016-10-31-1100

Significant updates that include:

- Includes and provides updates for many concepts of previous version
- Aligns with current Residential Structure Fires General Order
- Establishes the organizations overall Incident Risk Management plan
- Establishes strategic benchmarks for certain types of incidents
- Establishes the United States Fire Administration/National Fire Academy *Field Operations Guide* (Document ICS 420-1, July 2016) as our official reference for ICS
- Establishes a procedure for field (IC) based incident communications
- Incorporates many aspects of current officer training
    - Provides detailed structure of radio reports Defines specific command roles and responsibilities of the company officer
    - Establishes expectations of command strategic level ICs, including the use of a tactical worksheet
    - Outlines common operational flow and how it relates to command and control
    - Outlines local roles and responsibilities of the Level IV and V Command Team, including the Command Aide and Senior Advisor

    - Provides guidelines to assess and classify structure size
- Provides procedure for transfer of command
- Provides procedure for changing overall incident strategy
- Provides direction on reference to interior floors of multi-story structures
- Incorporates flow path and ventilation limited fire recognition and awareness
    - Defines Non-Tactical Ventilation and emphasizes positive control of unintended ventilation
- Establishes that all companies operating shall operate under the protection of a charged hose line
- Establishes participation in a Lessons Learned analysis of designated incidents as an IC responsibility
- Establishes a defined process for demobilization of Command
- Reinforces that ICs can deviate from General Order Deployment Models, and provides radio report structure and procedures to do so
- Defines and provides local Level One and Level Two staging procedures
- Defines Known Life Hazard
- Adopts the NFPA definition for Emergency Traffic
- Defines a Personnel Accountability Report (PAR)

FORMS/ATTACHMENTS

- Attachment A: Incident Critical Factors, Basement Type, and Building Size Quick Reference

APPROVED

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Attachment A - Critical Incident Factors, Basement Type, and Building Size Quick Reference Guide

OCCUPANCY

- occupancy (single family, multi family, strip mall, large comm, big box)
- occupancy type (business, mercantile, public assembly, institutional, industrial, residential, multi-residential, strip mall, commercial, manufacturing, storage, high rise)
- value
- status (open/closed, occupied/vacant, abandoned, under construction)
- type of contents
- loss control
- moral hazard

BUILDING (STRUCTURE)

- size
- interior arrangement/compartmentalization
- construction type and features
- age
- condition
- outside openings
  - Are any **susceptible to rapid failure and flow path impact?**
  - Do any need to be **actively controlled?**
- value
- utility characteristics
- effects of fire
- fuel load/how much is left to burn
- fire protection features

FIRE

- size, extent, location, and stage
  - Is fire **ventilation-limited?**
- What is the **current flow path**?
- most dangerous direction of extension
- time of involvement, fire load
- fuel type
- products of combustion liberation
- fire perimeter
- how widespread
- ability to operate on fire
- time projection on building
- is contents or structure on fire

LIFE HAZARD

- number of occupants
- location, condition
- in capacities, access
- search resources
- fire control for search
- EMS needs, exposures
- hazards for firefighters
- escape routes

ARRANGEMENT

- distance of external exposures
- combustibility of exposures
- access and arrangement of internal exposures
- most dangerous direction of fire extension
- barriers/obstructions to operations
- limitations on apparatus movement
- multiple buildings

RESOURCES

- anticipated arrival of tactical support
- staffing and equipment on scene, responding, and available
- condition of responders
- number and capability of responders
- capability of command staff
- hydrants
- after supply
- built-in protection systems

SPECIAL CIRCUMSTANCES

- weather (wind direction and intensity?)
- time of day
- day of week
- season, holidays
- special events
- social unrest

ACTION

- effect of current action
- areas not yet covered
- stage of operations as related to tactical priorities
- remote IC setup
- effectiveness of IAP
- worst case scenario
- are operating positions effective
- are resources adequate
- are operations safe
- are there layers of resources in place

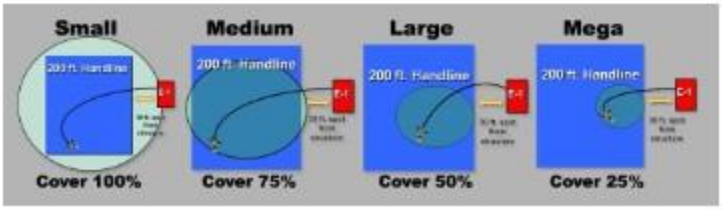
Basement Types Reference

- walk-out
- walk-up
- look-out windows
- window wells
- basement with no exterior openings
- no basement
- condition finished vs. unfinished

Building Size Reference

Given a 30' engine spot of the engine from the structure, a 200' hand line could reach ...

- SMALL - **100%** of the building interior
- MEDIUM - **75%** of the building interior
- LARGE - **50%** of the building interior
- MEGA - **25%** of the building interior



General Order 300.11: Rapid Intervention and IDLH Initial Entry Teams

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
300.11

Originating From	Issue Date	Revision Date	Attachments
Emergency Services Bureau	05-20-1995	06-04-2013 (05-21)	N/A

SUBJECT: Rapid Intervention and IDLH Initial Entry Teams
APPLICABILITY: All Operations Personnel

POLICY

A procedure for the deployment and rescue of operational personnel working in Immediately Dangerous to Life and Health (IDLH) atmospheres in accordance with NFPA 1500, Sec. 6-5, and OSHA 29 CFR 1910.134. The Howard County Department of Fire & Rescue Services (DFRS) shall maintain a safe practice of an Initial Entry Team and Initial Rapid Intervention Crew (IRIC), formerly known as "Two-In/Two-Out", while engaged in structural firefighting and other operations in IDLH atmospheres.

To further support the Department's responsibility for personnel safety, a Rapid Intervention Crew (RIC) shall be established while engaged in structural firefighting and other IDLH or oxygen deficient atmospheres for the rescue of operational personnel.

DEFINITIONS

1. Initial Entry Team – a team of at least two (2) qualified personnel equipped with full protective equipment and qualified to participate in interior structural firefighting operations. These personnel must maintain constant visual and/or voice contact with each other while entering and working in the IDLH atmosphere. At least one member of this team must be equipped with a radio, and all members of this team shall have a radio if possible.

2. Initial Rapid Intervention Crew (IRIC) – a team of at least two (2) qualified personnel who observe the initial entry team entering the IDLH atmosphere and are available, trained and equipped with full protective clothing and Self-Contained Breathing Apparatus (SCBA) for immediate response to rescue the initial entry team. One (1) of these members must maintain contact with the initial entry team either visually and/or by voice or radio contact. The team can include the IC that is operating in the Tactical Command mode. At least two members of this team must be equipped with a radio, and all members should have a radio if possible.

3. Initial Phases of an Incident – includes the phases of an incident where tasks are being performed by the first arriving company with an initial entry team assigned or operating in a hazardous area.

4. Rapid Intervention Crew (RIC) – a crew specifically designated by the Incident Commander (IC) at the scene of an emergency beyond the initial stages, consisting of a minimum of four (4) qualified personnel, one being the RIC Supervisor. The RIC shall be available for the rescue of firefighters should the need arise. Depending on the size and complexity of the

incident, the IC shall establish one or more RICs. The RIC replaces or enhances the IRIC that is required during the initial phases of the incident. ICs should consider reinforcing the RIC with a Special Service company in order to provide the most effective number of personnel and compliment of tools for a potential rescue.

5. Interior Structural Firefighting – the physical activity of fire suppression, rescue or both, inside buildings or enclosed structures that are involved in a fire situation beyond the incipient stage (fire growth beyond the first material ignited).

6. Immediate Danger to Life and Health (IDLH) - an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or impair an individual's ability to escape from a dangerous atmosphere.

7. Known Life Hazard – circumstances where responding personnel hear or see a person in distress or receive reliable information from emergency dispatchers at Howard County's Public Safety Answering Point (Howard Communications) or bystander that someone is in the IDLH atmosphere and in danger.

8. MAYDAY – a radio term used to alert the IC, Howard Communications, or other operational personnel on the emergency scene that operational personnel are in an imminently life-threatening situation.

9. Oxygen Deficient Atmosphere – an atmosphere with oxygen content below 19.5% by volume.

10. Personnel Accountability Report (PAR) – An organized reporting activity designed to provide positive confirmation of the location, assignment, and number of personnel assigned to a division, group, or unit operating within a hazard zone.

PROCEDURES

11. Initial Rapid Intervention Crew procedures shall be implemented during the initial stages of any operation within an IDLH atmosphere. They are established for the protection of the initial entry team and shall be maintained until the full RIC is in service and the IRIC is reassigned by the IC.

12. Unless there is a known life hazard, **NO** operation shall be conducted in an IDLH atmosphere until the IRIC is established.

13. When the first arriving unit does not have sufficient staffing to implement IRIC, the second arriving unit shall be responsible to establish and maintain the IRIC until relieved or reassigned by the IC.

14. Personnel making the decision to enter an IDLH atmosphere who are not in compliance with these procedures shall be required to justify their decision.

RAPID INTERVENTION CREW (RIC)

15. The Department has implemented the RIC procedure as a standard practice for all emergency incidents beyond the initial phases which have teams operating in a hazardous or IDLH atmosphere.

16. Regardless of which unit is assigned to the RIC, the IRIC requirements shall be maintained until a full RIC (minimum of four qualified personnel) is ready to assume the RIC responsibilities, unless there is a known life hazard.

17. A RIC shall be established any time one of the following conditions exists:
    - Structure fire where SCBA's and 1 ½" hose line (or larger) will be used.
    - Operational personnel are operating inside an IDLH or potentially IDLH atmosphere.
    - Incidents with the possibility of collapse or entrapment of operational personnel may exist.
    - Incidents where operational personnel might become lost or disoriented.
    - When deemed necessary by the IC.

18. It shall be the responsibility of the IC to ensure that RIC has been assigned and established.
    - Unless otherwise directed by the IC, the company responsible for RIC shall be as is outlined by THE resource deployment model found in the appropriate Department policy for that occupancy type (e.g. for a residential structure, as per the corresponding General Order)
    - If the IC deviates from the default RIC assignment outlined by the resource deployment model in Department policy, an IRIC and then RIC must still be assigned and accomplished using first alarm resources. The only possible exception to this is when KNOWN life hazard rescue operations are actively taking place. ICs should consider reinforcing the RIC with a Special Service company in order to provide the most effective number of personnel and compliment of tools for a potential rescue.

19. Once established, if any assigned RIC unit is redirected for other immediate life saving assignments, the IC shall ensure that additional resources are assigned to the RIC immediately, or as soon as is at all possible.

20. The RIC shall only be used for duties related to the safe evacuation and rescue of operational personnel.

21. The RIC shall remain within view or radio contact with the IC at all times and shall only carry out those assignments provided by the RIC supervisor at the direction of the IC.

22. On certain incidents, the RIC may be placed in a forward position to provide quicker access to operational personnel operating in the hazard area such as:
    - The floor below the fire on a high-rise or mid-rise building fire.
    - Near the point of entry on large buildings such as shopping centers, schools, or warehouses.
    - Where deemed appropriate by the IC.

23. DUTIES AND RESPONSIBILITIES OF THE INCIDENT COMMANDER, GROUP, DIVISION SUPERVISORS, COMPANY OFFICERS AND OPERATIONAL PERSONNEL

24. The IC and all fire ground supervisors (section chiefs, branch directors, group supervisors, and company officers) shall maintain constant awareness of the location and operational functions for all of their assigned units, groups, divisions, and personnel.

25. Officers assigned the responsibility for a specific tactical level management component (i.e. division or group Supervisor) at an incident shall directly supervise and account for companies / crews operating in their specific area of responsibility.

26. Company officers shall maintain an ongoing awareness of the location and condition of all members of their company.

27. When assigned to a company, operational personnel shall be responsible to remain under the supervision of their assigned Company Officer.

28. All operational personnel operating within an IDLH atmosphere shall ensure that their "PASS" device is operational.

29. Operational personnel shall operate in teams of no less than two (2), one of which shall have a portable radio.

30. It shall be the responsibility of all operational personnel to monitor changes in the fire conditions, structural stability, and changing ventilation conditions throughout the operation. Anything that could cause harm to operational personnel (sudden increased ventilation, extreme fire behavior, missing stairways, holes in the floor, open elevator shafts, partial structural collapses, etc.) shall be immediately reported to their supervisor and to Command. If you see something … say something.

31. Safety hazards shall be communicated to all operational personnel by the IC
    - Entry into hazardous areas shall be restricted by various methods such as rope, tape, or a firefighter assigned (if safe to do so).

32. Upon arrival on the scene, the RIC Supervisor shall meet face-to-face with the IC and be briefed on the following:
    - The current operational plan of action.
    - The location of all companies and divisions or groups supervisors operating within the structure
    - The location of the fire and possible areas of extension.

33. A copy of the building preplan or operational diagram shall be provided to the RIC by the IC.

34. The RIC Supervisor shall complete a 360 degree size up in order to develop a rescue plan. This plan shall typically include:
    - Identification of specific hazards.
    - Conditions and obstructions observed.
    - Size / height of building
    - Type of construction
    - Occupancy
    - Basement type
    - Confirm the location and probable progression of the fire
    - Assess the current ventilation factors impacting fire conditions
    - Confirm the location and number of operating personnel
    - Points of entry and exit

35. The RIC Supervisor shall:
    - Remain within view or radio contact with the IC at all times.
    - Develop the rescue plan based on the information provided during the briefing and size up that ensures sufficient egress is provided for interior crews and shall include ensuring that:
    - Ensure at least one ladder is located at each floor near the fire area
    - Ensure window bars are removed
    - Ensure all exterior door and gates are opened
    - Ensure any obstruction that would interfere with rapid evacuation of personnel from the structure is removed.
    - Ensure that the IC is aware of any additional resources necessary to implement the rescue plan without delay.
    - Be prepared to brief the IC regarding the rescue plan in writing if directed to do so.
    - When possible, the RIC shall not be used to accomplish these tasks if it will result in fatigue and an inability to carry out strenuous rescue efforts, which may be required.
    - Ensure that each member of the RIC has been briefed on the rescue plan and that each member understands their individual assignments.

36. The following minimum resources shall be compiled by the RIC at all incidents involving structural firefighting and other IDLH or oxygen deficient atmospheres:
    - Sufficient resources to implement the plan.
    - Spare SCBA with face piece
    - A dedicated hose line
    - Sufficient ground ladders
    - 125' life line
    - Forcible entry tools (flathead axe, haligan bar, hydraulic entry tool, bolt cutters), lights, power saws, and other equipment deemed necessary
    - One portable radio for each two-person team
    - The RIC shall obtain these resources from apparatus (engines, trucks, or squads) that are in close proximity to the incident.

37. After compiling the minimum resources noted above, the RIC shall work with the IC to obtain any other specialized equipment needed (stokes basket, hydraulic rescue tools, air bags, torches, collapse equipment, rappelling equipment, etc). The RIC Supervisor and RIC members shall have a minimum of two portable radios.

38. The RIC Supervisor shall monitor the radio for a MAYDAY or other distress / safety messages, progress reports, changes in the interior and exterior conditions or urgent messages.

39. DEPLOYMENT OF THE RAPID INTERVENTION CREW (RIC)

40. Mayday procedures outlined in General Order 300.04 shall be strictly adhered to by all operational personnel.

41. When a MAYDAY has been transmitted and immediate rescue cannot be affected by interior crews, the IC shall notify Howard Communications and typically deploy the RIC to the last known or reported location of firefighters calling the MAYDAY.

42. The RIC will be referred to as "Rapid Intervention".

43. The RIC Group Supervisor shall obtain as much information as possible from the IC regarding the exact nature of the problem and implement the rescue plan. This shall include determining how many firefighters are involved and if they are:
    - Missing, lost, trapped, cut off by fire
    - Injured or require immediate medical attention
    - In need of immediate SCBA equipment

44. To assist in obtaining the above information, the acronym "LUNAR" shall be used:
    - **L**ocation (last known location including floor number, quadrant, etc.)
    - **U**nit (identification of the crew and their unit assignment)
    - **N**ame (name of the individuals that need rescue or recovery)
    - **A**ssignment (the last known assignment given to the individuals)
    - **R**esources needed (what equipment is needed to implement the rescue plan)

45. The Rapid Intervention Unit or Group Supervisor shall communicate to the IC the progress being made and any changing conditions and other resources needed.

46. The IC shall be the only individual with the authority to cancel or terminate a Rapid Intervention operation.

REFERENCES
General Order 300.02 Accountability
General Order 300.04 Mayday
General Order 300.07 Incident Command System
General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines
General Order 410.01 Communications

FORMS/ATTACHMENTS
NONE

Approved:

John S. Butler
Deputy Fire Chief

General Order 310.01: Single Family and Townhouse Structure Fire Operational Guidelines

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
310.01

Originating From	Issue Date	Revision Date	Attachments
Emergency Services Bureau	**9/02/2002**	**06-04-2013**	**N/A**

SUBJECT: SINGLE FAMILY AND TOWNHOUSE STRUCTURE FIRE OPERATIONAL GUIDELINES

APPLICABILITY: All Operational Personnel

POLICY

This General Order provides a framework for safe operations during fire incidents involving structures that can be defined as Single Family and Townhouse structures. It outlines the responsibilities of the Incident Commander (IC) and company officers as they relate to firefighting operations and all support activities. Company officers, group/division supervisors and incident commanders are responsible for the safety, welfare and accountability of the personnel assigned to them. Personnel will follow the DFRS General Orders that relate to operational responses, including Limited Water Supply, Incident Command, Communications, Accountability, Mayday, and Rapid Intervention Crew.

DEFINITIONS

1 **NIMS** refers to the National Incident Management System and the defined positions and terminology for incident management and command structure.

2 A **Townhouse** is defined as a house attached to any number of other townhouses (three or more), each of which may have multiple floors, commonly side by side each with their own separate entrances.

3 A **Single Family,** or "detached house", is defined as a structure that is usually occupied by one household or family; has only outside walls, does not share an inside wall and does not touch any other dwelling.

4 The **Tactical Incident Commander** is typically the first arriving company officer that arrives on the scene and establishes command. They establish the initial overall incident strategy and provide direction to initial incoming units based on the current critical factors of an incident.

5 The **Strategic Incident Commander** is typically a chief officer or command level officer that operates while stationary inside of vehicle designated as the Command Post. The strategic incident commander confirms the overall incident strategy, develops an IAP that addresses the incident's strategic and tactical objectives, and coordinates activities necessary for overall operational control.

6 The **Command Aide** is a person assigned to assist the incident commander in the Command Post with documenting resources on a tactical worksheet and monitoring tactical radio channels. The command aide may have other assigned duties as directed by the incident commander.

7 The initial **Strategic Command Team** is, at a minimum, comprised of a Strategic IC and a dedicated officer or technician whose primary function is enhance the effectiveness of incident management through technical support of the incident commander (a **Command Aide**). The team can be expanded as is required to support the command functions required by the incident. Typically, a **Support Officer** for the Command Post would be the next expansion, who would then manage the assignment of additional Strategic Command Team NIMS positions and command post needs as is appropriate.

8 The Department's general **Incident Risk Management Plan** provides a framework for defining the level of acceptable risk given certain sets of circumstances. That plan translates into a clearly communicated incident strategy, either "offensive" or "defensive".

9 The **Initial Radio Report** is a highly structured radio report that is transmitted by the first arriving officer following their size-up of the incident critical factors. It officially establishes command for an incident, as well as the incident's overall strategy.

10 The **Initial Radio Report Follow-Up** is a structured report given following the Initial Radio Report that includes results of a 360 degree assessment, identifying the basement type of the structure, and reconfirms the overall incident strategy and location of accountability tag collection.

11 The **Command Transition Report** is transmitted by the arriving Strategic IC and officially transfers command from an initial IC that had been operating in the Tactical Command mode.

12 There are three distinct **Modes of Command**, and each implies that the IC is operating under different circumstances and in differing environments. Depending on which mode is declared, expectations of command capacity are adjusted.

13 If directed to **Level One Stage**, all companies except the first arriving engine and first arriving truck shall stage prior to arrival at the scene, nearby (within a block if possible) but in an uncommitted position that still allows access into the incident scene. Once staged, units shall be prepared to assume tasks as they are assigned by the IC. Engine companies should not stage past their last water source. Units arriving at their Level I staging positions shall transmit notification of their arrival to a Level I staging position to the IC. Unit personnel will remain on the apparatus and monitor the assigned incident radio channel.

14 The IC may declare **Level Two Staging** for arriving resources. When this occurs, arriving resources will then assemble at a centralized Level Two Staging area designated by the IC that is adjacent to the incident. The area should be close enough to the incident scene to provide timely access, but located out of the way and not exposed to the incident's hazards. When designated, the IC shall designate a Staging Officer to manage and report staging area resources. If no officer is designated, the Engine Company officer from the first engine to arrive in the Level Two Staging area shall assume the role of Staging Officer. Channel six (6) of the incident's assigned zone will be used for staging communications.

15 **On-Deck Staging** is the forward positioning of the crew of a unit, located just outside the immediate hazard zone and safely distanced from the entrance of a tactical position. On-deck crews are "ready for duty and next in turn", and their readiness and immediate availability is critical to being able to provide quick relief and facilitating effective air management strategy for interior crews. The most likely assignments given to on-deck companies are to provide immediate relief for crews operating in the hazard zone, to reinforce crews operating within the hazard zone, to reinforce a deployment of the designated Rapid Intervention Crew, or for a new assignment within the hazard zone. On-Deck crews will be supervised either by a division or group supervisor (if assigned) or their company officer. Once assigned, crews shall remain on-deck until given another assignment by the their supervisor or IC.

16 A **Hazard Zone** is any area or zone where there is a known or potential risk to the safety of operating personnel, including but not limited to environments that are Immediately Dangerous to Life and Health (IDLH), potential collapse zones, and areas at risk for rapid change in their safety profile.

17 A **Personnel Accountability Report** (PAR) is an organized reporting activity designed to provide positive confirmation of the location, assignment, and number of personnel assigned to a division, group, or unit. Being "PAR" signifies that *all personnel assigned to that division, group, or unit that are operating in the hazard zone have been identified, positively located, and are accounted for*. Example: "Engine 61 to Command, Engine 61 is PAR."

18 **Tactical Ventilation** occurs as a result of specific, coordinated tactical actions that are calculated to accomplish an *intended* objective relating to ventilation of a structure. **Non-Tactical Ventilation** is *unintentional* ventilation of a structure that results from other activities that taking place on the fireground, such as making access to a structure through a door or window, advancing a hose line into a structure, or creating a means of egress by removal of a window. Recent research has shown that unintentional Non-Tactical Ventilation can have unanticipated, rapid, and significant impact to fire intensity and spread, and has been attributed as a factor in several firefighter fatalities regionally and nationally.

PROCEDURES

RESPONSE

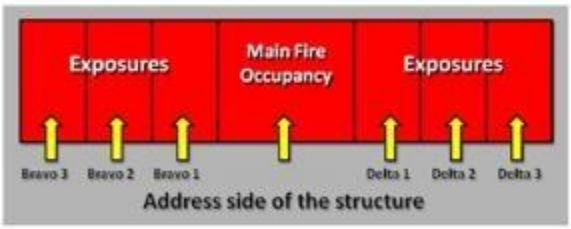
19 An exceptionally high level of discipline will be required of all officers and operational personnel during structural firefighting operations. Failure to follow any portion of the incident action plan (as defined by either general order or incident command) can lead to a breakdown of the entire operation and could have significant life-safety and other consequences.

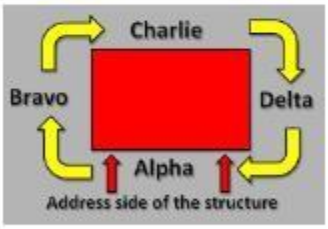
COMMUNICATIONS

20 Communicate in accordance with this General Order, the Communications General Order # 410.01, and the Incident Command System General Order # 300.07.

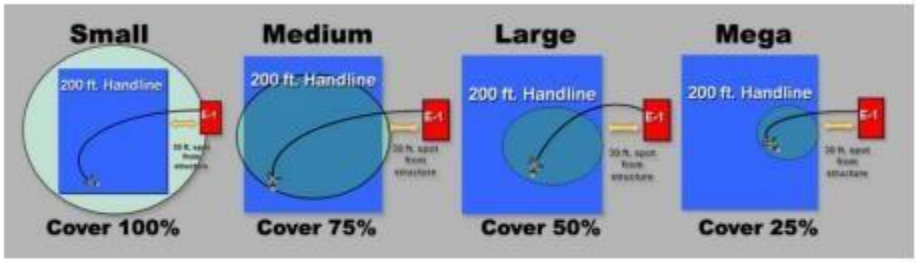
STRUCTURE REFERENCES

21 Exposures should be referenced as depicted below:





22 Structure size should be referenced as depicted below:



23 Basements should be categorized as follows:

- Type
  - Walk-out (grade-level access doors)
  - Walk-up (exterior stairwell access)
  - Look-out windows (grade-level basement windows)
  - Window Wells (below-grade basement window wells)
    - Specify if a window well window enlarged for egress is present
  - Basement with no exterior openings
  - No basement
- Condition
  - Finished
  - Unfinished
  - Unable to determine

SIZE-UP, OVERALL STRATEGY DETERMINATION, INITIAL ACTION PLAN, AND ESTABLISHING COMMAND

24 While companies are en route to an emergency, the highest ranking responding officer will make operational decisions related to the incident.

25 The first arriving officer shall conduct and communicate their size-up, their determination of overall incident strategy, their initial incident action plan, and establish command by transmitting an Initial Radio Report. The report should include:

- Unit ID and arrival to the scene
- Structure and area description
  - Size of structure
  - Number of stories
  - Occupancy type
- Problem description
  - Conditions (Nothing showing, working fire, etc.)
  - Location/floor
  - Location/side
- Initial IAP and actions taken
  - Engine 1 location
  - Water supply
  - Unit #1
    - Task (Lay out from ..., stretch a line ..., etc.)
    - Location (... into side alpha, 3rd floor, etc.)
    - Objective (... for primary search, fire control, investigate, etc.)
  - Unit #2 task, location, and objective
  - etc.
- Declaration of strategy
  - Offensive
  - Defensive
- Assumption of command
  - Naming of command
  - Mode of command
  - Accountability location
- Resource Determination
  - Consider additional alarm assignments if the fire has taken control of the structure or civilians are trapped.

26 If mutual aid units are first arriving, the first arriving Howard County DFRS officer will normally transition and assume command as the initial IC.

27 The first arriving company officer may elect to pass command in accordance with Incident Command System General Order # 300.07. This shall only be done when there is a known immediate critical life threat and when the value of quick action by the company officer outweighs the value of establishing command, or when a strategic incident commander arrives simultaneously and takes initial command.

SIZE-UP

28 The first arriving officer shall perform a size-up and establish command by transmitting an Initial Radio report that includes a command statement for all incidents where two or more units are investigating an incident or are actively engaged in operational tasks. Once Command is established, units that are en-route and on-scene shall coordinate and communicate any subsequent unit actions or observations through "Command". The size-up should include an assessment of the incident's critical factors. The critical factor categories include:

- Building Type
- Occupancy
- Arrangement
- Life safety
- Fire
- Resources
- Actions
- Special circumstances

OVERALL INCIDENT STRATEGY DETERMINATION

29 The incident's overall strategy must be determined prior to formulating the initial IAP. There are two distinct strategies; offensive and defensive. The two distinct strategic choices dictate in simple and understandable terms how close the emergency responders will get to the incident's hazard zone. NEVER combine offensive and defensive operations in the same fire area. This overall strategy will then serve as the basis for formulating the Incident Action Plan (IAP), which is the next step. Safety is the number one priority for both civilians

and responders, and effective safety practices begin by being in the right overall risk management strategy, either Offensive or Defensive. Which strategy is chosen depends on the incident's size-up assessment and critical factors weighed against the following Departmental **Incident Risk Management Plan**:

- We will risk a lot, in a calculated manner, to save savable lives.
  - If there is a possibility that there are savable lives inside a structure, and it is reasonably safe to conduct offensive interior firefighting, the offensive strategy is appropriate. If fire conditions indicate that the interior of the structure is not survivable or that interior firefighting would not be reasonably safe, interior firefighting is not an option, and the defensive strategy is required.
- We will risk a little, in a highly calculated manner, to save savable property.
  - We will risk a little in a highly calculated manner to save savable property. If civilian life safety is not a critical incident factor, and it is reasonably safe for firefighters to conduct offensive interior firefighting, a carefully calculated lower risk offensive strategy is appropriate.
- We will not take any risk at all to attempt to save what is already lost.
  - If fire conditions indicate that the interior of the structure is not survivable, or that interior firefighting would not be reasonably safe, interior firefighting is not an option. The defensive strategy is required.

Ongoing Assessment, Management, and Reassessment of Risk

30 All officers and firefighters shall continually assess the incident's existing and developing critical factors and the risk versus benefit associated with ongoing operations. The IC, all supervisors, and all firefighters MUST:

- Ensure that a Risk Assessment of personnel has been completed. If personnel are operating in an IDLH, they shall do so under the protection of a charged hose line.

- Ensure that a charged hose line is available on every floor where operations are taking place and fire spread is possible, and when opening overhead void spaces to check for fire travel and extension.

- Recognize indicators of fire location, travel, development, and behavior. Indicators can include visible fire, smoke color, smoke velocity, smoke density, and heat detected by thermal imager. Be particularly alert for extreme fire behavior.

- Recognize the potential impact of windy conditions on fire behavior and implement appropriate tactics to mitigate the potential hazards of wind-driven fire. Identify the expected flow path for fire development EARLY, based on the structure, any existing openings, and air flow direction and velocity.

- Recognize the difference between "tactical ventilation" and "non-tactical ventilation", and recognize the potential impact of both on fire development. Ensure companies take substantial efforts to eliminate or reduce unintentional non-tactical ventilation, and effectively apply ventilation and fire control tactics in a well communicated and well coordinated manner.

- Quickly identify and react to safety "Red Flags", because they can end up injuring or killing us. Officers must always take a pessimistic approach when sizing-up, assuming the worst until determining otherwise. A red flag will not necessarily change the overall incident strategy or incident action plan, but it must be identified and addressed by the IC and the rest of the hazard zone team:

    - Fire in the attic space
    - Fire in a basement
    - Operating above a fire (basements, floor above the fire)
    - Zero visibility
    - Encountering high heat
    - Reports of, "We can't find the fire"
    - Reports that state "fire under control," but you can still see active fire conditions from the command post
    - Victims discovered
    - Wind-driven fires
    - Smoke or fire showing from cracks in walls

- Reinforcing fire attack position more than once

31 Once the overall incident strategy is established, tactical priorities and the Initial Action Plan can be formulated. If the overall incident strategy changes, the IAP will also change and a structured process be used to communicate the change to all operating units. Incident size-up is an ongoing process.

THE INCIDENT ACTION PLAN: ESTABLISHING TACTICAL PRIORITIES

32 The IC must ensure that an adequate initial size-up of the incident scene has occurred, that the incident's critical factors have been identified, and that an overall strategy decision has been made and communicated PRIOR to formulating an initial IAP or beginning interior firefighting operations. Additionally, it is crucial that both the initial IC and the strategic IC (who will be assuming command in a command vehicle) *continually* reassess these things and *continually* evaluate the risk versus benefit of all tasks to be accomplished on every incident.

33 Always establish an action plan that is consistent with the overall incident strategy.

- Offensive and defensive operations shall never be simultaneously undertaken in the same fire area.
- Offensive operations are conducted inside a hazard zone.
  - Rescue
  - Fire control
    - Expect the "fire under control" benchmark within ten minutes of fire department arrival. If not achieved, revise overall strategy and IAP accordingly.
    - Re-evaluate overall incident strategy every five minutes.
    - The IC must verbally acknowledge each 15 minute notification from emergency dispatchers at Howard County's Public Safety Answering Point (Howard Communications) by re-announcing the incident's strategy over the assigned tactical radio frequency until the incident is placed under

control, or until command requests to discontinue or restructure the notifications.
    - Property conservation
    - Customer stabilization
- Defensive operations are NEVER conducted inside the hazard zone, but are conducted near the hazard zone – in safe locations.
    - Ensure firefighter safety
    - Define the hazard zone (including collapse zones)
    - Establish cut-offs
    - Search exposures
    - Protect exposures (preferably with master streams)
- The announcement of a change to a defensive strategy shall be made as follows:
    - The IC shall request that Howard Communications broadcast the Emergency Tone
    - The IC shall transmit to all hazard zone units *"Shifting to the defensive strategy. All units Exit (or Abandon, as appropriate) the structure. All units report PAR's upon exit."*
        - "Exit" the structure will be defined as an orderly withdrawal where interior lines and equipment will be withdrawn and repositioned when changing to a defensive strategy.
        - "Abandon" the structure will be defined as an emergency retreat where all hose lines and heavy equipment will be left in place and all operational personnel in the hazard zone will exit the structure as quickly and as safely as possible.
    - Howard Communications shall transmit the Emergency Tone again and repeat of the IC's statement verbatim.
    - A PAR shall be obtained for all units exiting the hazard zone after any switch from an offensive to a defensive strategy. Command's greatest priority once a strategic shift has been initiated is the safe exit of all units located in the hazard zone. Level One staged units and other units working outside the hazard zone shall maintain radio silence until all PAR's have been tallied (unless they have emergency or high priority traffic). Company officers shall account for their crews and advise their division or group officer or Command as to the status of

their crew upon exiting. Division and group officers shall notify Command of the status of the individual crews assigned to them upon their exit.

34 Operational considerations for structures include:

- Hazard Verification
  - Investigate to verify the exact location, nature, and extent of the hazard, including the specific location, fire floor, and the extent of fire extension.
- Occupant Control
  - Protect, remove, and provide care to endangered customers
    - Consider most effective method (evacuation or protection in place)
  - Primary search to obtain **"Primary all clear"** benchmark
  - Secondary search to obtain **"Secondary all clear"** benchmark
  - Provide short-term customer service to affected parties once hazard is mitigated
- Fire Control
  - Initial actions must include confining and putting water on the fire as early as possible by a fast, strong, well-placed attack in support of fire control and search operations.
  - **"Fire under control"** benchmark
  - **"Fire out"** benchmark
  - All operational personnel in the hazard zone shall work under the protection of a charged hose line
  - Take active measures to control unintentional non-tactical ventilation
  - Take early actions to establish uninterrupted water supply
  - Control utilities and building systems (gas, electric, HVAC ventilation systems)
  - Once the fire is extinguished, objective is to salvage, ventilate and overhaul so that incident conditions have ceased causing damage

35 Operational personnel assigned to areas where Immediate Dangerous to Life and Health (IDLH) conditions may be or rapidly become present will be in appropriate protective equipment at all times. This equipment shall include full PPE and donned SCBA. Tactical and task level supervisors are responsible for the air management for their assigned crew or crews. Air supply shall be sufficient to exit the IDLH prior to the low air alarm sounding.

ESTABLISHING COMMAND

36 The final things accomplished by the Initial Radio Report are the establishment of command and requesting further resources. The initial IC should provide a name for the command, communicate the mode of the command, identify the location of the accountability resource, and request further resources when appropriate.

37 There are three Modes of Command that can be assumed: Investigation, Tactical Command, or Strategic Command.

- **Investigation**: No hazard zone identified, IC is mobile and investigating.
- **Tactical Command**: IC is a company officer that is mobile near the hazard zone and monitoring a portable radio. The officer is not expected to have a Command Aid or manage a tactical worksheet. An exterior command position is being maintained and the IC is NOT committed in an IDLH or potentially rapidly evolving atmosphere. A transition to a Strategic Command is anticipated within five to seven minutes.
- **Strategic Command**: IC is a Chief or command level officer, and is stationary inside of vehicle designated as a Command Post. Within the Command Post it is expected that the IC and their Command Aid are actively managing a tactical worksheet, recording position and function of all assigned resources, assuring the IAP aligns with the critical incident factors, and monitoring radio transmissions closely in a noise and distraction-free environment preferably using a headset. A senior officer may be present advising and verifying that enough resources are assigned to the incident, that the overall incident strategy and IAP are current and in-line with forecasted incident conditions, confirming the incident organization chart matches the size and complexity of the incident, and managing the Command Post.

38 Once the Initial Radio Report is transmitted by the IC, the IC shall conduct or ensure a 360 degree assessment of the structure is that utilizes a thermal imager is quickly completed.

Once that information is available, the IC shall transmit an **Initial Radio Report Follow-Up** report that includes:

- Results of the 360 assessment
  - Number of stories in the rear
  - Basement type
  - Basement condition
  - Changes to problem identification
  - Changes to IAP
- Confirmation of the overall incident strategy
- Confirmation of the location of PAT tag accountability collection

TRANSITION OF COMMAND TO A STRATEGIC COMMAND POST

39 A Command Transition shall occur upon arrival of the first Chief or command officer, who will respond directly to the scene. If an active hazard zone still exists, or if there are still tactical benchmarks to coordinate, a command transition in accordance with Incident Command System General Order # 300.07 shall occur establishing the Chief or command officer as the Strategic IC. The Chief or command officer's Command Transition Report shall include the following:

- Perform size-up of incident's critical factors
  - Verify overall incident strategy is appropriate
  - Verify that current operating positions match the current incident conditions.
- Transmit that your unit is on-scene
  - "Battalion 1 on-scene"
- Contact the initial IC and transmit that you'll be transferring command:
  - "Taking it from out here".
- Confirm all hazard zone operating positions and their objectives with the initial IC, communicating face to face if possible.
- Advise Howard Communications that command is transferring
- Re-announce the current overall incident strategy

- Make a resource determination and request

40 The IC should actively request and receive ongoing **Unit Status Reports** from the units (or their division or group supervisors) that have been assigned tasks in the hazard zone. When reporting status, units should report the ***conditions*** they have, the ***actions*** they have taken, and their ***needs*** for additional resources or actions of others, and end the report with their PAR status.

41 ICs should assign division and group supervisors as needed to maintain an effective span of control.

- Division and group supervisors should remain exterior to the structure.
- Their ability to clearly and effectively communicate is imperative. Therefore, they should not be in a location that requires them to wear breathing apparatus.
- Division and group supervisors should be given responsibility for a specific geographic area if at all possible.
- When possible, division and group supervisors should be positioned at a point of entry to the structure. Once assigned there, all units that enter the structure by way of a point where there is a division supervisor assigned shall be assigned to a division supervisor. In turn, that division supervisor shall then be responsible to manage the accountability, air management, and work-rest cycles for all units assigned, including effective rotation of their crews and the On-Deck resources required to do so.
    - The division or group supervisor's management of assigned unit's air supply in no way diminishes the individual member's responsibility to manage their own air supply, or the company officer's responsibility for managing his/her crew's air supply.
    - The rule of thumb for managing the work-rest cycle of a Hazard Zone unit is to contact that unit about two minutes before they have reached their estimated air safety margin and remind them they are getting close to their work cycle ending, and they will need to exit the Hazard Zone soon.
- Crews that are rotated out of a hazard zone can be either Recycled or re-assigned to an established Rehabilitation area, at the discretion of their division supervisor or Command. Company officers and division and group officers are responsible to monitor the welfare of their personnel at all times. Companies exiting the Hazard Zone shall perform a face-

to-face with the division or group officer that shall include a report of the physical condition of their crew.

- **Recycled** implies that the crew does not need time for rehabilitation and/or medical monitoring. Usually these recycle activities are limited to changing air cylinders and hydration of personnel. If the company is able to recycle, they will retain their assignment to the division or group. During Level 3 Accountability, the division or group supervisor shall retain the unit's PAT tags on their accountability board and note the company is recycling.
- If the company is sent to an established Rehabilitation Division, they will be assigned to that division until they are released and ready to return to incident operations. *"Division Charlie to Command, I'm sending E-22 to Rehab and I need another engine company to replace them".*

RESOURCE DEPLOYMENT MODEL FOR ARRIVING COMPANIES

42 Unless directed otherwise by Incident Command, this order assigns specific tasks to companies based upon their order of arrival. Companies are expected to complete the listed responsibilities based upon their position in the arrival sequence, but should remain alert to being directed to different tasks and responsibilities by Incident Command, once it is established. Both the initial and subsequent incident commanders have full authority to direct resources to the priorities which they identify upon size-up and throughout incident progression.

Companies responding from an "out of position" location shall notify the highest ranking responding officer (e.g. a responding BC) or the Incident Commander if command has been established.

The initial arriving company officer is permitted flexibility to successfully stabilize the incident. When the initial arriving company officer is in command and changes assigned company responsibilities from those outlined in this order, specific objectives must be assigned to arriving units, and each must be advised and acknowledged through radio communications or face-to-face interaction between supervisors.

The process of control and accountability of each unit member is of extreme importance. This is a function of not only the Incident Commander, but is a responsibility of all officers, operational personnel, and group or division supervisors.

First Arriving Engine Company:

- Communicate that you are the 1st arriving engine.
- Make provisions for water supply by laying supply line and communicating the address of the layout, or split lay, etc. or securing your own water supply (30' maximum, 4" or larger "soft-sleeve" or "short-shot" supply line for securing your own water supply)
- Take a position to best accomplish incident objectives. Normally, this will be on side Alpha (street side front).
- Transmit Initial Radio Report (On scene report: Size of structure, Stories, Occupancy Type, Conditions Observed, Tactical Objective, Strategic Mode, Accountability Location, Establish and Name Command) if not already established.
- Assure the 360 degree survey of the structure is complete or assigned.
- Initiate fire control from a position that best protects occupants.
- If there is a possibility/confirmation that the fire is in the basement as you may see completing the 360, DO NOT advance down the interior stairs. If basement access can be obtained from the exterior, relocate the initial attack line to the basement for fire control and communicate the updated attack location over the radio. Protect the first floor if possible by closing the basement stair door and relocate to a position that is not in the structure on a floor above a working fire, or in line with likely heat and smoke ventilation pathways. Communicate your findings over the radio so that Command can assign companies accordingly.
- Position apparatus to assure access for other responding apparatus as much as possible.

Second Arriving Engine Company

- Communicate that you are the 2nd arriving engine.
- Unless otherwise advised, initial responsibility is to ensure the water supply for the first arriving engine company.
- In instances where the first arriving engine has secured their own water supply, the second arriving engine shall be placed in a position to stand-by/pump the initial hydrant to assure continuous water supply to the first arriving engine.
- If command has been passed from the first arriving unit, the Company Officer shall establish command and assume the role of Incident Commander until relieved by a command officer who has arrived on the scene. A transition of information and transfer of command should take place. This may be face to face or over the radio depending on type and complexity of information to be exchanged.
- Ensure an IRIC is in place; if not, provide the Initial RIC function.
- Ensure that the initial attack hose line from the 1st arriving engine has been advanced to the fire area and is capable of confining, controlling, and extinguishing the fire. This includes, but is not limited to, removing hose kinks, feeding more attack hose line, or making up staffing for the 1st arriving engine crew. Advance an attack hose line to back up the first arriving engine company.
- If the structure is two stories or more, advance an attack hose line via the interior stairs to confine, control, and/or extinguish vertical fire extension on the floor or area above the fire, assure the first attack line has control of the fire your company will be working above before advancing. If the fire is on the top floor, this hose line should be stretched to the attic/cockloft area of the structure.
- Position apparatus to assure access for other units as much as possible.

Third Arriving Engine Company

- Communicate that you are the 3rd arriving engine.

- Unless otherwise advised, make provisions for a secondary water supply by laying a supply line and transmitting the address of the layout (or split lay, etc.), or secure your own water supply (implies you have your own hydrant with 30' maximum of 4" or larger short-shot supply line hooked directly to the hydrant).

- Company shall stretch an attack hose line from the apparatus to the opposite side of the first engine, usually side Charlie. If not already accomplished, the officer shall transmit an updated status report that shall include:

    - Number of floors on side Charlie.
    - Number of levels below grade, access and conditions observed.
    - Any rescue problems.
    - Any needs or other information that might need tactical consideration.

- The attack hose line from the 3rd arriving engine shall be deployed and coordinated with the Incident Commander to the area or floor that is the most probable point of fire extension. This can be accomplished by using portable ladders if needed to keep the stairwell from being congested.

- If the basement is on fire or smoke is present in the basement, coordinate with first arriving companies and Incident Command before attacking the fire. Upon confirmation that companies are in a safe position, initiate fire confinement and attack control from a position that best protects occupants by proper placement of hose lines.

- Position apparatus to assure access for other units as much as possible.

Fourth Arriving Engine Company

- Communicate that you are the 4th arriving engine.

- Unless otherwise advised, augment the Initial RIC crew and establish a Rapid Intervention Crew and assemble the necessary tools and equipment.
- Position close to the scene, but assure access for other units if possible.

Fifth Arriving Engine Company
(Unit usually part of the supplemental Working Fire Assignment dispatch)

- Communicate that you are the 5th arriving engine.
- Unless otherwise advised,
- Ensure the water supply for the 3rd arriving engine company.
- In instances where the 3rd arriving engine has secured their own water supply, take a position to provide additional water supply if needed.
- If needed, assist the 3rd arriving engine in the placement and advancement of their attack line.
- Any attack hose lines from the 5th arriving engine shall be deployed and coordinated with the IC to the area, floor or exposure structure that is the most probable point of fire extension.
- Position close to the scene, but assure access for other units if possible.

First Arriving Special Service

- Communicate that you are 1st arriving Special Service.

- On scene report if 1st arriving: Size of structure, Stories, Occupancy Type, Conditions Observed, Tactical Objective, Strategic Mode, Accountability Location, Establish and Name Command if not already established.

- Unless otherwise advised, Apparatus will take a position on the same side as the 1st arriving Engine Company, normally Side Alpha considering the following:

    - Rescue
    - Tactical Ventilation (**tactical ventilation shall only take place if IC requested.)**
    - Exposures / Defensive Operations
    - Confinement / Extinguishment
    - If you are non-aerial, assure access for aerial apparatus and other units as much as possible.

- Work in minimum two-person teams, at least one member of each team must have a radio.

- The company's primary responsibility is Search and Rescue accomplished by forcible entry, ladders, well and coordinated ventilation and fire confinement/extinguishment.

- Secondary responsibilities are salvage and overhaul.

Second Arriving Special Service

- Communicate that you are 2nd arriving Special Service.

- Unless otherwise advised, If you are the 1st arriving aerial, apparatus is to position on the same side as the 1st arriving engine.

- If you are the 2nd arriving aerial, position on the opposite side of 1st arriving aerial, usually side Charlie. The crew is to report to the opposite side of the first arriving special service.

- Work in minimum two-person teams, at least one member of each team must have a radio.

- The company's primary responsibility is search and rescue accomplished by forcible entry, ladders well coordinated ventilation, fire confinement/extinguishment and ground ladder deployment to support operations and allow for egress to side Charlie.

- Secondary responsibilities are to verify the utilities are secure, salvage and overhaul.

- Position close to the scene, but assure access for other units if possible.

Third Arriving Special Service

- Communicate that you are 3rd arriving Special.

- Unless otherwise advised, If you are the 1st arriving Aerial, apparatus is to position on the same side as the 1st arriving engine.

- If you are the 2nd arriving Aerial, position on the opposite side of 1st arriving Aerial, usually side Charlie.

- The primary responsibility is to establish or support the Rapid Intervention Crew and assemble the necessary tools and equipment. This may include the Initial RIC and/or an assigned RIC engine, in accordance with the RIC General Order.

- Apparatus will be located close to the scene, yet position apparatus to assure access for other responding units as much as possible.

First Arriving EMS Transport Unit

- Unless otherwise advised, position close to the scene, allow for rapid transport to a hospital, but assure access for other units if possible.

- Crew will report in full gear and assume the Initial Rapid Intervention Crew (Initial RIC), formerly "two out".

- If operational personnel are **not** authorized as Firefighters:
  - Report status as "EMS Only" on the initial response and upon arrival at the incident.
  - Upon arrival, report to Incident Command for assignment.

- If not required for Initial RIC or RIC, crew should be prepared to provide EMS assistance for victims or fire personnel.

Second Arriving EMS Transport Unit

- Unless otherwise advised, position close to the scene, allow for rapid transport to a hospital, but assure access for other units if possible.

- Work with 1st arriving EMS unit to carry out EMS responsibilities.

- If not required for patient care, crew should assume the function of Medical Unit Leader and set up for responder rehabilitation.

First Arriving Chief or Command Officer

- The command officer shall transmit an Initial Radio Report if not already completed.

- The command officer must exchange information and may assume command. This exchange of information may be face to face or over the radio depending on type and complexity of information to be exchanged. Command shall be transferred by transmitting a Command Transition Report. The command post will normally be located at the command officer's vehicle, in what becomes the Strategic Command Post.

Additional arriving units

- Report to incident scene, Level 1 stage, or report to Level 2 staging as assigned by Incident Command.

REFERENCES

General Order 300.02 Accountability
General Order 300.04 Mayday
General Order 300.07 Incident Command System
General Order 300.11 Rapid Intervention Crew
General Order 410.01 Communications
ESB Threat Plan: Limited Water Supply

FORMS/ATTACHMENTS

None

Approved:

John S. Butler
Deputy Fire Chief

General Order 320.08: Medical Duty Officer

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER
320.08

Originating From	Issue Date	Revision Date	Attachments
Emergency Medical Services	**1/20/1995**	**1/5/2009**	**N/A**

SUBJECT: Medical Duty Officer
APPLICABILITY: All Personnel

POLICY:

This order establishes the standard operating procedure for the Howard County Department of Fire and Rescue Services (DFRS) Medical Duty Officer (MDO). This order shall be used as a guide to provide daily operational supervision and quality assurance in all areas of Emergency Medical Services (EMS).

1 GENERAL

1.1 The radio designation for the MDOs will be EMS 1 in the 1st Battalion and EMS 2 in the 2nd Battalion.

1.2 EMS 1 will be staffed at the Battalion Chief (BC) Paramedic level.

1.2.1 A Captain Paramedic, who meets the eligibility requirements, may fill the position in the absence of a Battalion Chief.

1.2.2 If an eligible Captain Paramedic is not available, with the approval of the Deputy Chief of EMS/Training or his/her designee, a Captain Paramedic who does not necessarily meet the eligibility requirements of a Battalion Chief may be used.

1.2.3 EMS1 will handle all personnel issues.

1.2.4 EMS1 will handle all complaints from Howard County General Hospital.

1.3 EMS 2 will be staffed at the Captain or Lieutenant Paramedic level.

2 DUTIES AND RESPONSIBILITIES

2.1 Assures employee accountability and daily staffing at the advanced life support level.

2.1.1 The MDO will conduct the EMS portion of the performance evaluation for Advanced Life Support (ALS) providers assigned to their shift.

2.2 Provides field supervision and quality assurance on emergency incidents.

2.3 Provides emergency medical supervision, expertise, and is an additional resource to DFRS incident commanders.

2.4 Provides supervision and assistance for research and development in DFRS projects.

2.5 Conducts system audits to include: incident reporting, skills performance, unit response times, patient outcomes, and vehicle and equipment performance.

2.6 Completes special projects or tasks as assigned.

2.7 EMS 1 will be the immediate supervisor for the captain and lieutenant assigned to the EMS 2 position.

2.8 First line infectious disease/significant exposure notification and follow-up, to include written documentation.

2.9 Prompt forwarding of subpoenas/summons to DFRS personnel.

2.10 Interacts with Howard County General Hospital Emergency Department on a regular basis.

2.11 DFRS liaison with specified medical facilities providing administrative and technical assistance for medical facility transfers.

2.12 Facilitates alert status situations.

2.13 Provide field personnel with prompt patient feedback for patient(s) transported to specialty referral centers.

2.14 May function as a preceptor for new and existing ALS personnel, students of EMS programs, and/or those in need of remedial training, as identified by the EMS Section.

2.15 Responsible for reviewing ambulance and paramedic engine, tower, or squad readiness.

2.16 Assures the security of controlled substance boxes and the documentation of controlled substance and glucometer logs.

2.17 Participates in the design, evaluation, and specification of EMS equipment, products, and vehicles.

2.18 Initial contact and fact finding for EMS complaints, and forwarding them through the

appropriate chain-of-command.

2.19 Facilitate collection and filing of Medical Incident Reports (MIRs).

2.20 Review all MIRs for completeness and for quality assurance purposes.

2.21 Complete a daily activity log, describing the activities of the shift.

2.22 Conduct formal counseling sessions and institute disciplinary action, if necessary.

2.23 Identify and make recommendations for EMS training and recertification.

2.24 Follow up on patient information for the purpose of outcome based study and recognition for awards.

2.25 Interacts with the EMS Program Manager and the DFRS Medical Director.

2.26 Functions as the Incident Commander when and where appropriate.

3 QUALIFICATIONS

3.1 EMS 1

3.1.1 Career Battalion Chief Paramedic
3.1.2 Nationally Registered and State of Maryland Paramedic
3.1.3 Three years of continuous advanced life support experience.

3.2 EMS 2

3.2.1 Career Captain or Lieutenant Paramedic
3.2.2 Nationally Registered and State of Maryland Paramedic
3.2.3 Two years of continuous advanced life support experience.

4 CHAIN OF COMMAND

4.1 The Battalion Chief MDO shall be the ranking operational EMS officer and shall fall into the incident chain of command.

4.2 EMS care and management shall be the primary mission of the MDO.

5 EMERGENCY OPERATIONS

5.1 The MDO shall be dispatched on call types set forth by the DFRS and the EMS Section based on call volume and operational needs.

5.2 The MDO has the authority to respond on any incident.

5.3 During incidents involving rescue or fire, the MDO shall report to the incident commander for an assignment.

5.4 Assignments may include, but are not limited to:

5.4.1 Medical branch or group.
5.4.2 Triage.
5.4.3 Medical rehabilitation.
5.4.4 Medical communications.
5.4.5 Photo documentation.
5.4.6 Safety Officer.
5.4.7 Personnel Accountability Officer.
5.4.8 Provide supervision and technical assistance to the incident commander or personnel.
5.4.9 Incident Commander.

5.5 The MDO, when on location of an emergency medical incident, shall observe and supervise patient care provided by DFRS personnel and provide constructive feedback.

5.6 The MDO has the authority and shall intervene whenever improper or unsafe actions are observed.

6 STAFFING

6.1 For the purpose of filling the MDO position, the following order will apply:

6.1.1 EMS 1
6.1.1.1 MDO on duty.
6.1.1.2 On duty Battalion Chief Paramedic.
6.1.1.3 On duty Captain Paramedic, if eligible to act as a BC
6.1.1.4 Off duty Battalion Chief Paramedic.
6.1.1.5 Off duty Captain Paramedic, if eligible to act as a BC.
6.1.1.6 Off duty Captain Paramedic.

6.1.2 EMS 2

6.1.2.1 On duty EMS Captain Paramedic.
6.1.2.2 On duty EMS Lieutenant Paramedic.
6.1.2.3 On duty Captain Paramedic.
6.1.2.4 On duty Lieutenant Paramedic.
6.1.2.5 Off duty Captain Paramedic.
6.1.2.6 Off duty Lieutenant Paramedic.
6.1.2.7 Off duty Battalion Chief Paramedic.

Approved:

Joseph A. Herr
Fire Chief

General Order 410.01: Communications

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

410.01

Originating From	Issue Date	Revision Date	Attachments
C.I.T.	12/20/1999	3/01/2005	A-N

SUBJECT: **Communications**

APPLICABILITY: This policy and procedure applies to the Howard County Department of Police, Information Technology Bureau, Communications Division, hereinafter referred to as Communications, – 911 call-taking and fire dispatch as they pertain to the Department of Fire and Rescue Services operations; and the Department of Fire and Rescue Services

POLICY:

The Howard County Department of Fire and Rescue Services (hereinafter referred to as the Department) will provide the standard of operation for Department radio communications.

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DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

410.01

1 GENERAL

1.1 All calls for service are to be considered emergency calls unless otherwise specified by Department policy.

1.2 Equipment usage addressed in this general order includes, but is not limited to, two-way radios – portables and mobiles, tone pagers, alpha-numeric pagers, and cell phones.

1.3 Department radio operator/dispatcher services are provided by Communications.

1.4 The radio identification of fire dispatch:

1.4.1 The Communication Center shall be referred to as "Howard" for internal communications.

1.4.2 The Communication Center shall be known as "Howard County" when communicating with another jurisdiction via the mutual aid channel (commonly known as FMARS).

1.5 The Howard County Department of Technology and Communications Services, Communications Services, oversees the technical operation of the radio system and radio equipment. Communications Services provides radio equipment and equipment maintenance services to the Department including, but not limited to, two-way radios – portables and mobiles, tone pagers, alpha-numeric pagers, and cell phones.

1.6 All Department communications equipment will be used in accordance with all applicable federal, state, County and Department policies.

1.7 The phonetic alphabet used by the Department is shown in Attachment A.

2 DEFINITIONS

2.1 Shared Crew – a status where two or more tactical units are typically in-service at the same time with sufficient staffing to only respond with one unit.

2.2 Tactical Unit

2.2.1 Term used to describe those types of units that are typically deployed to implement tactical objectives at a significant incident

2.3 Includes, but is not limited to, the following unit types: Engine, Rescue, Squad, Truck, Tower, Tanker, etc. CAD – Computer-Aided Dispatch System

2.4 Communications Center – the facility where 911 calls are received, and fire and police communication are coordinated.

2.5 Center Manager – a uniformed member of the Police Department responsible for the overall operation of the Communications Center.

2.6 Emergency Communications Supervisor (ECS) – the civilian employee responsible for coordinating the daily operational activities of the Communications Center.

2.7 Fire Dispatch – the area within the Communications Center where equipment and personnel are situated providing Department communications services.

2.8 Zone – a combination of channels. The grouping is designed to meet functional needs of the Department and/or users.

2.9 Fire Department Liaison – A Department officer, typically a captain or higher, assigned the responsibility of operational communications services between the Department and the Howard County Department of Police, Communications Division.

2.10 Shall – Indicates a mandatory requirement.

2.11 Should – Indicates a recommendation or that which is advised but not required.

2.12 Talk Group/Channel – a specific location within a particular zone. Each talk group has its own specific name (i.e. the normal dispatching channel in named FDP1, the channel used for releasing a Knox Box key is EMKX). A talk group or channel is typically referenced by its Zone and Number position (i.e. FDP1 is commonly referred to as Alpha 1, EMKX is commonly referred to as Alpha 8).

2.12.1 Note: The 800 MHz radio system within Howard County serves many different departments such as the Police Department, the Department of Public Works, etc. Each department will have an Alpha 1, Alpha 2, etc. which is designed to serve its communications needs. Personnel should be

aware that our Department's Alpha 1 is not the same as another county department's Alpha 1.

3 DOCUMENT CONVENTIONS

3.1 **Bold Underline** designates a dispatcher transmission or response

3.2 ***Bold Italics*** designates a field unit transmission or response

4 RECORDING OF TELEPHONE AND RADIO COMMUNICATIONS

4.1 Communications, in accordance with applicable laws and regulations, records all designated radio and telephone communications that go through the Communications Center.

4.1.1 All telephone conversations and radio transmission can potentially become public information under the Freedom of Information Act.

4.1.2 All internal requests for copies of recorded radio or telephone communications shall be directed to the Department's Deputy Chief of Communications, Information Technology and Training, or his or her designee, via the appropriate chain of command. Approved requests will be released by Communications to the Department's Deputy Chief of Communication, Information Technology and Training, or his or her designee.

4.1.3 At no time will information obtained for internal purposes be released to the public.

5 SCHEDULED ACTIVITIES FOR COMMUNICATIONS CENTER PERSONNEL

5.1 Morning Activities

5.1.1 The ECS shall assure a Department Daily Staffing Report has been received. This report should be delivered to Communications by 0800 hours by the Department. Typically a field battalion chief, or designee, will handle this task.

5.2 Daily Checks

5.2.1 The primary fire dispatcher in conjunction with the backup dispatcher shall, within a half hour of the start of each shift, assure the tasks shown in Attachment B, Daily Check Sheet, are accomplished. The completed sheet shall be submitted along with the ECS daily report.

5.3 Monthly Checks

5.3.1 All paper backup files shall be checked to assure they are complete.

5.3.1.1 The Department Liaison, or designee, shall be responsible for management of the monthly checks. These activities may be delegated.

5.3.1.2 Three backup files are located in Fire Dispatch and one is located at the ECS workstation.

5.3.1.3 Each backup shall contain current copies, as determined by comparing version dates on the bottom of the paper backup files with the date shown on the computer generated check sheet for the files shown in Attachment C.

5.3.1.4 Completed monthly check sheets shall be turned in to the Department Liaison.

6 STATION NUMBERING

6.1 Department fire stations are numbered as follows:

Station Number	Station Information
1	Elkridge Volunteer Fire Department 6275 Old Washington Road
2	Ellicott City Volunteer Fireman's Association – Montgomery Road 4150 Montgomery Road
3	West Friendship Volunteer Fireman's Association 12460 Frederick Road
4	Lisbon Volunteer Fire Company 1330 Route 94
5	Fifth District Volunteer Fire Department 5000 Signal Bell Lane
6	Savage Volunteer Fire Company 8925 Lincoln Street
7	Howard County Department of Fire and Rescue – Banneker Station 5818 Banneker Road
8	Ellicott City Volunteer Fireman's Association – Bethany Station 9601 Route 99
9	Howard County Department of Fire and Rescue – Long Reach Station 5950 Tamar Drive
10	Howard County Department of Fire and Rescue – Rivers Park Station 10155 Old Columbia Road
11	Howard County Department of Fire and Rescue – Scaggsville Station 11226 Scaggsville Road
17	Howard County Dept. of Fire and Rescue – Headquarters
18	Howard County Dept. of Fire and Rescue – Training Academy
19	Howard County Dept. of Fire and Rescue – Community Relations Unit

6.2 Special circumstances – incoming and outgoing mutual aid station numbering.

Station Number	Station Information
20	Johns Hopkins Applied Physics Laboratory Fire Department
50	Prince George's County Fire Department – Laurel VFD Station 10. Prince George's Station 10 is assigned this station number to avoid confusion with Howard County Station 10.
70	Howard County Station 6 units shall respond into Prince George's County as Station 70 units. See Attachment D – Prince George's County Response
71	Howard County Station 10 units shall respond into Prince George's County as Station 71 units. See Attachment D – Prince George's County Response
72	Howard County Station 11 units shall respond into Prince George's County as Station 72 units. See Attachment D – Prince George's County Response

7 APPARATUS AND STAFF IDENTIFICATION

7.1 All apparatus and staff identifiers are spoken using the unit prefix (Engine, Paramedic, Unit, etc.) and the assigned number as individual numbers.

7.1.1 Exceptions:

7.1.1.1 Any apparatus or staff identifier where the number component is three or more numbers shall be spoken in a format that assures the numeric identifier is clearly understood by all recipients.

7.1.1.1.1 When the number component contains a "0" in the ones and tens position, the "00" will be spoken as hundred as in Unit eighteen hundred.

7.1.1.1.2 When the number component has a "0" in the tens position, the "0" will be spoken as zero as in Engine one-zero-one or Unit seventeen-zero-two.

7.1.2 Examples:

7.1.2.1 Station 1 units – Engine one-one, Chief one, Chief one-A, Utility one, Utility one-A, Paramedic one-five

7.1.2.2 Station 10 units – Engine one-zero-one, Paramedic one-zero-five, Tower ten

7.1.2.3 Station 11 units – Engine one-eleven, Paramedic one-fifteen

7.1.2.4 Operations Bureau – Unit three, Unit three-zero-five, Unit three-hundred
7.1.2.5 Training Division – Unit eighteen-hundred, Unit eighteen-thirty-one

7.2 Station-based apparatus and personnel will be discreetly identified using the appropriate prefix plus an assigned number as shown in Attachment E.

7.2.1 When out-of-service apparatus is replaced by similar reserve apparatus or a similar unit from another station, the replacement apparatus will assume the identification of the out-of-service apparatus.
7.2.2 Communications will be advised of all unit changes.

7.3 Personnel assigned to Headquarters, the Training Division and other non-station-based assignments will be discreetly identified using the prefix "Unit" plus an assigned number as shown in Attachment F.

7.4 Exceptions to apparatus and staff radio identification guidelines as referenced above are shown in Attachment G.

7.5 Using Apparatus and Staff Identification with Portable and Mobile Radios

7.5.1 Staff personnel (Headquarters, Training Division, and other non-station based personnel) and volunteer chief officers will use their assigned identification no matter the unit from which they are operating except where they assume responsibilities within the Incident Command System (ICS).
7.5.2 The radio identifier for apparatus positions are defined as follows:

Function	Radio Identification	Portable ID
Company Officer	Apparatus Identifier (i.e., Engine seven-one)	"A" Portable
Riding Position Behind the Officer	Apparatus Identifier followed by 'B'. (i.e., Engine seven-one B)	"B" Portable
Riding Position Behind the Driver	Apparatus Identifier followed by 'C'. (i.e., Engine seven-one C)	"C" Portable
Driver/Operator	Apparatus Identifier followed by "Operator" (i.e., Engine seven-one Operator)	"D" Portable

7.5.2.1 When the original unit officer is assigned to a functional position within the Incident Command System, the individual who becomes the unit officer shall then assume the apparatus identifier, dropping the "B" or "C" designation as appropriate.

7.5.2.2 Portable IDs are used to enable fire dispatch personnel to identify a specific portable radio in the event of an emergency button activation as well as to aid in normal radio communications.

7.5.3 When providing additional portable radios to an incident of large magnitude (e.g., mass casualty, disaster, missing person search, etc.), the extra portables will be identified by a uniform numbering criteria established by the Incident Command System.

7.5.4 When a Department member is operating a vehicle normally assigned to a specific staff member the operator shall use the specific staff member's radio identification followed by the word "mobile" to indicate the operator is not the staff member.

7.5.4.1 Examples

7.5.4.1.1 ***Unit 4 mobile to Howard.***
7.5.4.1.2 ***Chief 1 mobile to Engine one-one***

7.6 Mutual Aid Use of Mobile and Portable Radios - When operating on another jurisdiction's radio system Department units will identify themselves as Howard County units by preceding their unit identification with the term "Howard County"

7.7 Relocating Portable and Mobile Radios - The 800 MHz radio system in Howard County, as in many surrounding jurisdictions, has the capability to determine exactly which radio is transmitting at any given time. This functionality is important to the communications process as well as to the safety of personnel.

7.7.1 Under no circumstances shall a mobile radio be moved from its assigned position.

7.7.2 Portable radios should not be moved from their assigned positions under normal circumstances.

7.7.2.1 A station officer, or an officer of higher rank, may approve the temporary reassignment (up to 3 hours) should the need arise. Fire dispatch shall be appraised of any moves of portable radio equipment.

7.7.2.2 Portable reassignments lasting greater than 3 hours shall require notification and approval of the appropriate battalion chief. The battalion chief shall inform both the Deputy Chief of Operations, and the Deputy Chief of Communications, Information Technology and Training as soon as practical.

7.7.3 The proper assigned position for a portable radio can be determined by the position marking on the antenna or the position information shown in the display. These two indicators of an assigned position shall match at all times.

8 JURISDICTIONS AND AGENCIES AUTHORIZED TO OPERATE ON DEPARTMENT TALK GROUPS

8.1 Attachment H shows those jurisdictions/agencies that are authorized to operate on Department talk groups and to which talk groups each of the jurisdictions/agencies have access.

9 CONDUCT AND OPERATION GUIDELINES FOR USE OF TWO-WAY RADIO EQUIPMENT

9.1 Professionalism - Personnel shall exhibit a courteous, conscientious, and generally business like manner at all times when operating on Howard County communications equipment.

9.1.1 If, at any time, one party to an exchange exhibits any unprofessional mannerisms, the other party shall not respond in kind.

9.2 Speaking Demeanor

9.2.1 Speak calmly, clearly, and distinctly exhibiting clarity of speech.
9.2.2 Keep a natural conversational tone. Shouting distorts the transmission, making comprehension difficult.
9.2.3 Speak steadily at medium speed. Do not hurry over seemly less important words as they may be important to the recipient.
9.2.4 All communications should be brief and to the point so as to not unnecessarily tie up the radio.

9.3 Exchanging Information

9.3.1 When initiating an exchange with another unit or fire dispatch, assure the other party is ready to receive your message.
9.3.2 The receiving party should repeat the calling unit's identity and acknowledge their readiness to receive a message.
9.3.3 Examples of the process of exchanging information.
9.3.3.1 ***Engine seven-one to Engine nine-one. Engine nine-one to Engine seven-one go ahead with your message.***
9.3.3.2 ***Paramedic two-five to Howard. Prepare to copy a phone number.*** **Howard to Paramedic two-five, go ahead with the phone number.**
9.3.4 The calling unit shall be responsible for assuring the intended recipient has received their message.

9.4 Initiating a Transmission - To transmit a message the user shall depress the transmit button and listen for a rapid series of tones.

9.4.1 If the tones are heard, the user may begin speaking when the tones have stopped.

9.4.2 If a user receives a honking tone upon depressing the transmit button, then the channel is busy. The radio system automatically places the user's radio in a queue and will notify the user when the channel is available. When the channel becomes available the radio will emit a rapid series tones. Once the tones have stopped the user may depress the transmit button and begin speaking.

9.5 Examples of acceptable radio communications are shown in Attachment I.

10 CONTACTING THE COMMUNICATIONS CENTER

10.1 Field personnel are not to call Communications Dispatchers and 911 Call-Takers. Specifically discouraged is calling on extension 2943 and 2944. The only two acceptable methods of contacting fire dispatch are via radio or by calling the ECS at extension 2950.

10.1.1 Radio contact should be used for normal operational communications.

10.1.1.1 Normal operational communications include such activities as incident response, unit status changes, logging on the air on a detail, placing a unit in-service or in reserve status, reporting dangerous or emergency situations, obtaining information for the police, and the like.

10.1.2 Phone contact should be reserved for significant issues.

10.1.2.1 Significant issues include discussing inappropriate radio traffic, obtaining or sharing information pertaining to appropriateness/inappropriateness of an assignment, and sharing information that needs to be kept secure or private.

10.1.2.2 These calls shall only be made to the ECS or Fire/Police Department Officer on-duty and shall only be made by a Station Officer or an officer of higher rank.

10.1.2.3 All issues requiring a phone call to the ECS shall be documented in the station logbook and the deputy chief of Operations, and Communications and Information Technology informed.

10.1.2.4 The appropriate Field Battalion Chief should be advised of the issues requiring Communications be called.

11 INCIDENT COMMUNICATIONS PRACTICES AND PROCEDURES

11.1 Time goals for dispatching of emergency incidents.

11.1.1 A new request for Department services shall be dispatched within 90 seconds of its receipt in the 911 Call-Taking Center or its receipt via mutual aid in fire dispatch.

11.1.1.1 This goal pertains to calls for service that are located within the County.

11.1.1.2 Occasional exceptions may be necessary. Examples include:

11.1.1.2.1 Handling a call for service involving criminal activity to assure adequate information is obtained and to assure the safety of response personnel.

11.1.1.2.2 Language barriers.

11.1.1.2.3 Exceptionally high call volume.

11.1.1.2.4 Unusual circumstances.

11.1.2 A request for assistance for Department services received via mutual aid shall be dispatched within 45 seconds of its acknowledgment by fire dispatch.

11.1.2.1 This goal is for calls for service that are located outside of Howard County. As the requesting jurisdiction will typically request a specific unit, the normal call processing tasks associated with entering and dispatching a new call for service should be minimal.

11.1.3 A request for additional assistance (task force, second alarm, additional ambulance, etc.) at the scene of an incident shall be dispatched within 45 seconds of its acknowledgment by fire dispatch.

11.1.3.1 This goal is for assistance at an existing incident, therefore the normal call processing tasks associated with entering a new event are not necessary.

11.2 Incident Alerting Procedure

11.2.1 Objectives of this alerting procedure

11.2.1.1 To minimize the call-received to on-scene time.

11.2.1.2 To provide response personnel adequate information to properly respond to the incident.

11.2.2 Standard Incident Alert

11.2.2.1 The alerting process shall consist of the following steps except where noted herein. Descriptions of the dispatch steps follow.

11.2.2.1.1 Step 1 - Initial Incident Alert

11.2.2.1.2 Step 2 - Station / Staff Tones

11.2.2.1.3 Step 3 - Fire Alert or Rescue Alert Tone

11.2.2.1.4 Step 4 - Full Incident Information Broadcast

11.2.2.1.5 Step 5 - Confirmation of Receipt of Alert by On-the-Air Units
11.2.2.1.6 Step 6 - Response of Units
11.2.2.1.7 Step 7 - Incident Information Rebroadcast
11.2.2.1.8 Step 8 - Additional Information

11.2.2.2 Step 1 - Initial Incident Alert

11.2.2.2.1 Communications shall precede **all** incident alerts with the Alert Tone and the keyword "Alerting".

11.2.2.2.2 The following information shall be provided in the Initial Incident Alert:

11.2.2.2.2.1 Alert Tone
11.2.2.2.2.2 "Alerting"
11.2.2.2.2.3 Incident alarm type - Incident alarm types are shown in Attachment J.
11.2.2.2.2.4 Box Area of the incident
11.2.2.2.2.5 Incident address or common place name (only one)
11.2.2.2.2.6 Response talk group

11.2.2.2.3 No additional information shall be given at this time unless it relates to responder safety.

11.2.2.2.4 When dispatching out-of-county units, fire dispatch will advise the respective county or counties to "Standby to Copy", then immediately dispatch the incident. The dispatch of an incident shall never be delayed while waiting for another jurisdiction to confirm the availability of their unit(s).

11.2.2.2.5 Examples:

11.2.2.2.5.1 **Alerting Medical Alarm seven-three Lorien Nursing Home, respond on Alpha 2**

11.2.2.2.5.2 **Alerting Rescue Alarm seventy-fifty-one Westbound Rt. 70 at Marriotsville Road, respond on Alpha 2**

11.2.2.2.5.3 **Alerting Medical Alarm one-four 1234 San Thomas Road, for a shooting, scene is not secure, respond on Alpha 2**

11.2.2.3 Step 2 - Station / Staff Tones

11.2.2.3.1 Communications shall alert stations in due order as recommended by CAD or as shown in the paper backup files.

11.2.2.3.2 Units not recommended for response but known to be in proximity to the incident shall be used in place of recommended units.

11.2.2.3.3 Communications personnel shall use the "Stacking" process, as opposed to the individual alerting of stations, at all times. Individually alerting stations typically adds time to the dispatch of equipment.

11.2.2.3.4 Only personnel in-station and those personnel using tone pagers (e.g. Motorola Minitors) are able to hear the station/staff alerting tones.

11.2.2.3.5 Units operating with 800 MHz radio equipment are **not** able to hear the station/staff alerting tones. **Personnel shall not initiate any non-urgent/non-emergency transmissions between the Initial Incident Alert and the Full Incident Information Broadcast.**

11.2.2.3.6 Fire dispatch shall always alert the first due station for a call in their area regardless of whether or not the first due station has a unit available to respond.

11.2.2.3.6.1 Regarding EMS calls. If the first due station does not have a unit to respond to an EMS call and the ALS/BLS ambulance is coming from a location further than the second, third, etc. due station, a unit from closer due station shall be dispatched in due order.

11.2.2.4 Step 3 - Fire Alert or Rescue Alert Tone

11.2.2.4.1 Communications shall send the fire or rescue alert tone as appropriate.

11.2.2.5 Step 4 - Full Incident Information Broadcast

11.2.2.5.1 The following information shall be provided in the Full Incident Information Broadcast:

11.2.2.5.1.1 Incident type

11.2.2.5.1.2 Box area

11.2.2.5.1.3 Street address and cross-street (major cross-street if possible) and common place name if available

11.2.2.5.1.4 Nature of the incident

11.2.2.5.1.5 Units assigned (in due order per CAD or backup run cards)

11.2.2.5.1.6 Map number

11.2.2.5.1.7 Response talk group

11.2.2.5.1.8 Time

11.2.2.5.2 During the Full Incident Information Broadcast fire dispatch shall identify those units that are on-the-air by stating "unit xx from the street" as part of the "units assigned" transmission. This does not apply to chief officers and staff personnel unless specific circumstances dictate that this is done.

11.2.2.5.3 Examples of dispatching an incident where all units are in-quarters:

11.2.2.5.3.1 **Rescue Alarm one-one: Route 1 and Montgomery Road; motor vehicle crash; Engine one-two, Rescue Squad one, Paramedic one-five due; respond on Alpha 2. 2130.**

11.2.2.5.3.2 **Box Alarm nine-one; ninety-five twelve Oakland Mills Road; fire in the bedroom; Engine nine-one, Engine seven-one, Engine six-one, Tower 7, Paramedic nine-five, Battalion One due; respond on Bravo one. 1510.**

11.2.2.5.4 Example of dispatching an incident where Engine seven-one and Paramedic seven-five are on-the-air:

11.2.2.5.4.1 **Box Alarm seven-one, ten thousand-three hundred Little Patuxent Parkway, fire in Bun Penny, Engine seven-one from the street, Engine nine-one, Engine two-two, Tower seven, Tower ten, Engine five-two, Paramedic seven-five from the street, Battalion Chief two due; respond on Delta one. 0301.**

11.2.2.6 Step 5 - Confirmation of Receipt of Alert by On-the-Air Units

11.2.2.6.1 Fire dispatch shall immediately confirm that any on-the-air unit dispatched on an incident received the call after the Full Incident Information Broadcast. This shall be accomplished by contacting each unit individually.

11.2.2.6.2 On-the-air units shall advise fire dispatch of their physical location when their location will likely change the due order of units so all responding units will be able to anticipate each other's arrival order.

11.2.2.6.3 Example:

11.2.2.6.3.1 **Engine seven-one, were you direct?** ***Engine seven-one is direct and responding with three personnel from Cedar Lane and Freetown Road.*** **Engine seven-one responding with three personnel. 1543.**

11.2.2.7 Step 6 - Response of Units

11.2.2.7.1 In-station units shall advise Communications they are responding once the crew is aboard and the vehicle begins its travel.

11.2.2.7.2 Units shall give their staffing number at time of response.

11.2.2.7.2.1 Ambulances should not give their staffing unless they have more or less than two personnel on board.

11.2.2.7.2.2 Examples:

11.2.2.7.2.2.1 ***Engine eight-two responding with 4 personnel.*** **Engine eight-two responding with 4 personnel, 1230.**

11.2.2.7.2.2.2 ***Ambulance three-six responding driver only.*** **Ambulance three-six responding driver only, 1230.**

11.2.2.7.3 Communications shall track unit staffing and shall advise the highest ranking responding officer of incident staffing.

11.2.2.7.4 Personnel shall advise fire dispatch their response will be delayed if they are unable to respond in a timely fashion, and shall not advise responding until the vehicle starts its travel. Delayed units shall provide fire dispatch the anticipated length of their delay.

11.2.2.7.4.1 Example:

11.2.2.7.4.1.1 ***Engine one-zero-one will have a delayed response of approximately five minutes.*** **Engine one-zero-one advising a delayed response of approximately five minutes. 1231.**

11.2.2.7.4.2 In the event a unit can not respond to an incident, for any reason, the unit shall immediately notify fire dispatch of their inability to respond. Fire dispatch shall immediately dispatch the next due unit.

11.2.2.7.5 Any unit that was not dispatched on the assignment but believe they are closer to the incident than a dispatched unit shall advise fire dispatch of their location and shall respond on the incident at this point in the alerting process.

11.2.2.7.5.1 Fire dispatch shall consult the appropriate unit/officer – as outlined in the Incident Command Authority section of this policy – for a disposition on the replaced unit.

11.2.2.7.5.2 This should be accomplished after all units have responded.

11.2.2.7.5.3 Typically the replaced unit should be placed in-service.

11.2.2.7.6 When a dispatched unit which has been replaced because of their late/delayed response becomes able to respond, the dispatcher will consult that unit and its replacement to determine their locations. Fire dispatch shall consult the appropriate unit/officer – as outlined in the Incident Command Authority section of this policy – for a disposition on one of the units.

11.2.2.7.6.1 Typically the further unit will be placed in-service.

11.2.2.7.6.2 The further due unit may place themselves in-service.

11.2.2.8 Step 7 - Incident Information Rebroadcast

11.2.2.8.1 The rebroadcast will be given on the assigned incident channel.

11.2.2.8.2 The following information shall be provided in the Incident Information Rebroadcast:

11.2.2.8.2.1 Units responding

11.2.2.8.2.2 Units alerted but not responding

11.2.2.8.2.3 Address with cross street (major cross street, if possible) and/or common place name

11.2.2.8.2.4 Nature

11.2.2.8.2.5 Map number

11.2.2.8.2.6 Any special information

11.2.2.8.2.7 Activity in progress

11.2.2.8.2.8 Staffing total of responding units
11.2.2.8.2.9 Hospital statuses
11.2.2.8.2.9.1 Shall be given when a local hospital is on an alert status. No hospital status should be given if all local hospitals are open.
11.2.2.8.2.10 Time
11.2.2.8.3 The rebroadcast of responding apparatus shall be transmitted in the due order as shown in CAD or on the backup run cards.
11.2.2.8.3.1 The only exception shall be that Communications personnel can break the rebroadcast into those units responding and those alerted but not responding. However, the units responding shall be read in due order.
11.2.2.8.4 Examples:
11.2.2.8.4.1 **Engine one-two, Squad one, Paramedic one-five responding; Rescue Alarm one-one, Route 1 and Montgomery Road for a personal vehicle crash, Refer to map 80-A, County Police on the scene. 1512.**
11.2.2.8.4.2 **Engine six-two, Squad one, Paramedic six-five responding, Paramedic nine-five alerted, Rescue Alarm six-three, Route 1 and Cedar Lane for a personal vehicle crash, Refer to map 80-A, County Police on the scene. 1012.**

11.2.2.9 Step 8 – Additional Information
11.2.2.9.1 All information received subsequent to the dispatch of an assignment shall be relayed to responding units.
11.2.2.9.1.1 When an assignment includes a chief officer or officer(s), additional information shall be directed to the officer(s).

11.2.3 Incident Alerting Other than the Initial Dispatch

11.2.3.1 Alerting Additional Units/Staff for an incident already in progress. – Additional Units, Task Forces, Upgrade of Assignments, Second Alarms, etc.
11.2.3.1.1 The Initial Incident Alert procedure shall be modified to include enough information to indicate to response personnel that additional units/staff are being assigned to an existing incident.
11.2.3.1.2 The phrases shown below shall be used as appropriate:
11.2.3.1.2.1 Additional Units – "additional units on"
11.2.3.1.2.2 Second Alarm – "the second alarm on"
11.2.3.1.2.3 Task Force – "the task force on"

11.2.3.1.3 The modified Initial Incident Alert process shall be as follows:

11.2.3.1.3.1 Alert Tone + "Alerting…" + modification information

11.2.3.1.3.2 The remainder of the alert shall follow the Standard Incident Alert procedure as previously outlined.

11.2.3.1.4 Examples

11.2.3.1.4.1 **Alerting the second alarm on Box Alarm eleven-five; ten-thousand three-hundred thirty-five Scaggsville Road. Respond on Charlie 6.**

11.2.3.1.4.2 **Alerting additional units on Rescue Alarm two-one; sixty-three forty-eight Main Street. Respond on Alpha 2.**

11.3 Working Fire Incident Task Force

11.3.1 Upon confirmation of a working incident, fire dispatch shall dispatch the task force.

11.3.1.1 If fire dispatch is unable to determine if the incident is a working fire from radio transmissions they shall contact the incident commander and request clarification.

11.3.1.2 If, during a working incident the task force is cancelled prior to dispatch by an on-scene officer, fire dispatch shall proceed to alert the following task force personnel as an advisory notification only.

11.3.1.2.1 Safety Officer (CAD: SAFETY), Battalion Chief (CAD: BC), EMS Officer (CAD: MDO), Public Information Officer (CAD: PIO)

11.3.1.2.1.1 **Information advisory for the task force Safety Officer, Battalion Chief, EMS Officer, and PIO. Units on the scene of a working structure fire at 5100 Long Look Lane. Units operating on Bravo 1. Task force cancelled prior to response. Information advisory only, no response necessary. 0031 hours.**

11.3.1.2.2 This advisory alert can not be cancelled except by a Department deputy chief or higher.

Incident Command Authority

11.3.2 Prior to arrival – The most senior responding officer is responsible for incident decision-making until the establishment of the incident command system (ICS) and an incident commander (IC) designated.

11.3.2.1 When there is no chief officer responding on the incident, the first due tactical unit is responsible for incident decision-making until the establishment of the incident command system (ICS) and an incident commander (IC) designated.

11.3.3 Once incident command has been established – All communications to and from units on the scene, units en route, and fire dispatch will be directed to the incident commander. The IC is responsible for incident decision-making.

11.4 Turnout Times

11.4.1 Stations 1, 2, 5, 6, 7, 8, 9, 10, 11 and 20

11.4.1.1 Fire dispatch shall allow 90 seconds for the first due tactical unit and an EMS unit to respond from that station. Additional tactical units and EMS units from the same station which have been alerted for the same incident shall have up to 5 minutes from initial alert to respond.

11.4.1.1.1 Station 7 and Station 10 shall have 90 seconds for each staffed tactical unit to respond. Both stations have staffing for all tactical units assigned.

11.4.1.1.1.1 Station 7 – Tactical units: Engine and Tower

11.4.1.1.1.2 Station 10 – Tactical units: Engine and Tower

11.4.1.2 If the units do not respond in the time allowed fire dispatch shall re-alert the station and attempt to contact the station by phone. If no response after an additional 30 seconds, and any response is deemed unlikely, fire dispatch shall promptly alert the next due.

11.4.1.2.1 Fire dispatch shall note in CAD that the unit or units failed to respond after alerting the next due unit or units.

11.4.2 Stations 3 and 4

11.4.2.1 Fire dispatch shall allow 90 seconds for a single unit – tactical or EMS – to respond from that station. Additional tactical units and EMS units from the same station which have been alerted for the same incident shall have up to 5 minutes from initial alert to respond.

11.4.2.2 If the units do not respond in the time allowed fire dispatch shall re-alert the station and attempt to contact the station by phone. If there is no response after an additional 30 seconds, and any response is deemed unlikely, fire dispatch shall promptly alert the next due.

11.4.2.2.1 Fire dispatch shall note in CAD that the unit or units failed to respond after alerting the next due unit or units.

11.4.3 Mutual Aid Units

11.4.3.1 Fire dispatch shall allow 180 seconds for a mutual aid company to respond.

11.4.3.2 If the unit has failed to respond after the allotted time, fire dispatch shall re-contact the mutual aid jurisdiction and ascertain the status of the mutual aid unit. If it is deemed unlikely that the unit will respond, fire dispatch shall promptly alert the next due.

11.4.3.2.1 Fire dispatch shall note in CAD that the unit or units failed to respond after alerting the next due unit or units.

11.4.4 Replacement of Units Which Have Failed to Respond

11.4.4.1 When units have arrived on the scene – Fire dispatch shall request permission to replace units that failed to respond from the highest ranking officer who is on the scene of the incident.

11.4.4.2 When no units have arrived on the scene – Fire dispatch shall promptly replace units that have failed to respond as indicated above without asking for permission from responding units.

11.5 Modification of Assignment/Alarm Level

11.5.1 Fire dispatch has the responsibility to dispatch the correct assignment based on fire department approved response criteria.

11.5.1.1 If, after dispatching an incident, fire dispatch receives information indicating an inadequate response has been alerted, fire dispatch shall promptly modify the assignment/alarm level to assure an appropriate response.

11.5.1.2 If, after dispatching an incident, fire dispatch receives information indicating the assignment is no longer necessary or should be reduced, fire dispatch shall consult the appropriate unit/officer – as outlined in the Incident Command Authority section of this policy – for permission to reduce or cancel the assignment.

11.5.2 The most senior responding officer may modify an assignment/alarm level as conditions warrant.

11.5.2.1 An assignment may be modified by a non-responding officer of the rank deputy chief or higher as deemed necessary by the officer. Responding units shall be advised of the modification.

11.5.2.2 An assignment may be modified by a Department officer assigned to work in the Communications Center. Responding units shall be advised of the modification.

11.5.3 On occasion the Department may modify apparatus response for defined periods of time. This will typically occur during periods of inclement weather.

11.5.3.1 The Department will advise the ECS of the modification(s) and the anticipated duration of the modification(s).

11.6 Talk Group Assignment and Usage

11.6.1 Department radio operations shall typically be conducted on Alpha 1 (FDP1) except as specified within this policy.

11.6.1.1 Starting May 1, 2005, Department radio operations shall be conducted utilizing two talk groups between the hours of 0700 and 1900, Monday through Friday, as Fire Dispatch staffing conditions permit.

11.6.1.1.1 Prior to initiating two talk group operations, the following notifications shall be accomplished. Information shall include the start and stop time of two talk group operations.

11.6.1.1.1.1 Each station will be notified by station printer.

11.6.1.1.1.2 Battalion Chief 1, Battalion Chief 2, EMS 1 will be notified by phone.

11.6.1.1.1.3 An informational message will be broadcast announcing the start of two talk group operations and the anticipated end time.

11.6.1.1.2 Two talk group operations shall be conducted as follows

11.6.1.1.2.1 Alpha 1 (FDP1) – This channel shall be used for all normal non-incident related radio communications and incident alerting.

11.6.1.1.2.2 Alpha 2 (OPS1) – This channel shall be used for all incident communications except as outlined in this policy.

11.6.1.2 Department personnel and fire dispatch personnel may request the use of talk groups as needed to conduct business.

11.6.2 When units are directed to respond and operate on a channel other than Alpha 1 they shall continue to operate on that channel until otherwise directed or until they are in-service. Units going in-service shall advise fire dispatch of their in-service status on the incident channel in use and then switch back to Alpha 1.

11.6.2.1 If incident conditions are such that having multiple units advising they are in-service will interrupt *critical* incident operations, the incident commander may direct that the in-service units advise their status information on Alpha 1. *This should be an infrequent occurrence.*

11.6.3 Circumstances requiring use of other talk groups.

11.6.3.1 Full box assignments or other major incidents where a battalion chief has been assigned – **units will be dispatched on Alpha 1 (FDP1) and be directed to respond and operate on a talk group in an incident zone**. Incident zones are Bravo, Charlie or Delta, which will be assigned on first available basis. The talk group for the initial response will be the first channel in the zone assigned (i.e. Bravo 1, Charlie 1, Delta 1).

11.6.3.1.1 When a full box assignment is dispatched and moved to an incident zone, a fire dispatcher shall be assigned to the incident. The assigned incident dispatcher shall not be required to perform any activities that are not related to the incident.

11.6.3.1.1.1 The ECS shall make an effort to supply an additional dispatcher to the fire dispatch area to assist with normal Department activities during the incident.

11.6.3.2 Heavy radio traffic as the result of numerous non-full box assignment incidents – fire dispatch can move units to other talk groups to facilitate radio communications as necessary. Typically this should be Alpha 3 (OPS2)

11.6.3.3 Significant events such as hurricanes, blizzards, etc. where a significant increase in workload and radio traffic is anticipated – the Department, in cooperation with Howard County Police Department, Bureau of Communications, will develop a talk group usage plan to accommodate anticipated needs.

11.6.4 Additional units being dispatched to an incident already operating in Bravo, Charlie or Delta zone shall be dispatched on Alpha 1 (FDP1) and advised to respond and operate on the appropriate staging channel. Channel 6 is the pre-designated staging channel in Bravo, Charlie, and Delta zones. Example: an incident operating in the Charlie Zone would have Charlie 6 as its staging channel.

11.6.4.1 Communications shall advise the incident commander that additional units are being assigned to the staging channel.

11.6.4.1.1 The incident commander may request units be placed on the active incident channel on dispatch.

11.6.4.2 Fire dispatch shall monitor the staging channel for the response of dispatched units, their arrival on the scene and any other radio traffic that may be directed to fire dispatch.

11.6.4.2.1 Once a staging officer is assigned by the incident commander, fire dispatch will only monitor the staging channel for unit response and arrival. All communications should go through the staging officer.

11.6.4.3 Fire dispatch shall advise the incident commander of all units dispatched and assigned to the staging channel. This should be accomplished in a single transmission to the incident commander.

11.6.4.4 The incident commander can either switch to the staging channel to assign tasks to the additional units or go through fire dispatch to make assignments.

11.6.4.5 Responding units should use a separate radio to monitor incident communications so as to be informed of incident activities.

11.6.5 The highest ranking responding officer or incident commander has the authority to request the use of any available talk group to meet incident needs.

11.6.6 Mutual Aid Talk Group Usage

11.6.6.1 Incoming Mutual Aid

11.6.6.1.1 Fire dispatch shall assign the appropriate incident talk group to units responding into Howard County.

11.6.6.2 Outgoing Mutual Aid

11.6.6.2.1 Fire dispatch shall request the incident channel from the requesting jurisdiction if it is not provided. This information shall be given to responding Department units.

11.6.6.2.2 After advising fire dispatch of their response, Department units assigned to a mutual aid talk group shall switch and operate on that talk group until released by the requesting jurisdiction.

11.6.6.2.2.1 While operating on the mutual aid talk group, units shall provide the mutual aid jurisdiction all statuses such as en route, on location, and the like.

11.6.7 Attachment K shows the zones the associated talk groups available to the Department and Attachment L shows the radio templates used in Department radios.

11.6.7.1 Fire dispatch personnel shall understand all County zones and talk groups used by the Department and should be familiar the radio templates as this knowledge may be useful when handling communications issues.

11.6.7.2 Department personnel shall understand the radio zones, talk groups and templates used by the Department.

11.7 Unit and Incident Statuses

11.7.1 Unit Statuses

11.7.1.1 Department personnel are responsible for providing, and fire dispatch personnel are responsible for recording in CAD, the following unit statuses as they relate to incident activities. Timely entry into CAD is important as the Department uses this information in analyzing its performance. Comments should be entered into CAD when appropriate.

11.7.1.1.1 Responding/En Route

11.7.1.1.2 On the scene

11.7.1.1.3 At patient side

11.7.1.1.4 Available on the scene

11.7.1.1.5 Transporting to the hospital
11.7.1.1.6 At the hospital
11.7.1.1.7 In-service returning
11.7.1.1.8 Out-of-service returning
11.7.1.1.9 In-quarters

11.7.1.2 When a unit is not placed in a status of which fire dispatch was advised within sixty (60) seconds it shall be considered a late entry.

11.7.1.2.1 When this situation occurs, fire dispatch personnel shall properly set the unit's status, enter a comment into CAD advising the status was set late and the approximate elapsed time.

11.7.1.2.2 Other information shall be entered as needed to appropriately document the late status change.

11.7.1.3 When an incident is placed on an incident talk group other than Alpha 1(FDP1) on the initial alert, fire dispatch shall advise the response status of those units on Alpha 1. Response status shall include a listing of those units that have been alerted and have not responded, and the talk group being used.

11.7.1.3.1 Example

11.7.1.3.1.1 **Box Alarm 7-1, Columbia Mall, all units responding except Engine two-one and Tower ten. Units operating on Charlie 1. 1530.**

11.7.2 Incident Statuses

11.7.2.1 Incident command should provide fire dispatch with incident statuses as dictated by Department policy.

11.7.2.1.1 Statuses should include, but are not limited to, the following:

11.7.2.1.1.1 Initial status report

11.7.2.1.1.1.1 Occurs on the arrival of the first unit.

11.7.2.1.1.2 Secondary status report(s)

11.7.2.1.1.2.1 Occurs approximately five (5) minutes after the establishment of incident command.

11.7.2.1.1.2.1.1 If the incident commander has not provided a secondary status report after five (5) minutes, fire dispatch should request a status update.

11.7.2.1.1.2.2 Following the updated status report, fire dispatch should determine from Incident Command if they need any support services (e.g., Fire Investigator, Building Inspector, Gas and Electric, Canteen, etc.)

11.7.2.1.1.3 Progress Report(s)

11.7.2.1.1.3.1 Occur approximately fifteen (15) minutes after the arrival of the first unit.

11.7.2.1.1.3.2 If the incident commander has not provided a progress report after fifteen (15) minutes, fire dispatch should request a progress report approximately fifteen (15) minutes after arrival of the first unit and every fifteen (15) minutes thereafter.

11.7.2.1.1.3.3 Other periodic progress reports will be provided/requested based upon the incident conditions.

11.7.2.1.1.4 Search statuses such as; primary search complete, secondary search complete, victims located on the second floor, all clear.

11.7.2.1.1.5 Incident update statuses such as; fire under control, fire out, extrication complete, leak controlled.

11.7.2.2 All incident statuses will be recorded in the CAD system as part of the incident documentation.

11.7.2.3 Fire dispatch shall advise the incident commander of the duration of the working incident at fifteen (15) minute intervals throughout the incident.

11.7.2.3.1 The incident commander can request the fifteen (15) minute time advisories be discontinued when he or she deems it is no longer necessary.

11.7.2.4 All statuses of an incident operating on a talk group other than Alpha 1 (FDP1) shall be repeated on Alpha 1.

11.7.3 Attachment M – Staff Notifications. This attachment contains additional incident related notifications that shall be handled by Communications.

11.8 Critical Transmissions/Situations

11.8.1 General

11.8.1.1 Any critical communication shall be appended with the words "emergency traffic" to gain the attention of fire dispatch and other units operating on the channel.

11.8.1.1.1 Example:

11.8.1.1.1.1 ***Unit 838 to Howard, Emergency Traffic***

11.8.1.2 Polling of Units

11.8.1.2.1 To ensure receipt of a critical message, units shall be "polled." "Polling" requires fire dispatch, or the incident command, to contact each unit operating on an incident to assure receipt of information.

11.8.1.2.1.1 This shall be done when the message is of a critical nature concerning safety, response, or incident operations (e.g. placing units in-service).

11.8.1.2.1.2 When "polling" is conducted by fire dispatch, the message tone should precede the "polling" of units.

11.8.2 Emergency Button Activation

11.8.2.1 When the emergency button of a unit *on the scene of an incident* is activated fire dispatch shall immediately advise incident command of the activation and the unit's identity. The incident commander shall handle contacting the unit to determine whether the activation was intentional or accidental.

11.8.2.2 When the emergency button of a unit *not on the scene of an active incident* is activated, fire dispatch shall attempt to contact the unit directly.

11.8.2.2.1 The dispatcher will call the unit twice, waiting 10 seconds for a reply after each attempt.

11.8.2.2.2 If a contact attempt is successful, the fire dispatcher shall transmit the following message: "**Howard to [unit#], Advise your status**"

11.8.2.2.2.1 To ensure safety of personnel, the term "emergency" shall **not** be used by Communications during attempts or actual contact with sending unit.

11.8.2.2.2.2 A reply blatantly inconsistent with the request or incident to which the unit is assigned should be considered an indication of a unit in trouble. The dispatcher will immediately initiate a police response to the unit's last known location.

11.8.2.2.3 If contact attempts are unsuccessful, the dispatcher shall immediately initiate a police response to the unit's last known location, advise the appropriate battalion chief, and continue to attempt contact with the unit at 15 second intervals. Attempts to contact the unit should continue until advised to discontinue by a chief officer.

11.8.2.2.4 If the Emergency Button is accidentally pressed, depress and hold the Emergency Button until the activation is cleared (approximately 2 seconds) and promptly advise Communications of the accidental activation.

11.8.3 May Day

11.8.3.1 This is an incident status where a unit operating on the incident has declared an emergency. Incident command will request fire dispatch involvement as needed.

11.8.3.1.1 **If a person is unable to give a voice message or no immediate response to an emergency voice message is received from fire dispatch, press the Emergency Button.**

11.8.3.2 Further information is available in the Department's mayday policy.

11.8.4 Call for Evacuation

11.8.4.1 Fire dispatch shall sound the evacuation tone (no longer than 15 seconds in duration) followed by a message advising all personnel to evacuate the structure when requested by the incident commander. Tone and message are to be repeated twice.

11.8.4.1.1 Example:

11.8.4.1.1.1 (evacuation tone) **All personnel operating in the building are to evacuate the structure immediately.** (evacuation tone) **All personnel operating in the building are to evacuate the structure immediately. 1730.**

11.8.4.2 The evacuation tone and message shall be broadcast over the announcement channel. The Announcement channel is located on Channel 7 in the Bravo (ANN1), Charlie (ANN2) and Delta (ANN3) zones.

11.8.5 Vehicle Accidents Involving Fire Department Equipment

11.8.5.1 In the event a DFRS vehicle is involved in a motor vehicle crash, the officer or operator will immediately notify fire dispatch.

11.8.5.1.1 Fire dispatch will replace the unit, if on a response, and make appropriate notifications.

11.8.5.1.2 Notifications shall be made in accordance with Attachment M, DFRS Staff Notification Criteria.

11.8.6 Calls for Police Assistance at the Scene of an Emergency

11.8.6.1 For routine requests of police assistance (ALS Critical, vehicle crashes, fires, traffic control, crowd control, etc.), Department personnel shall provide fire dispatch with the reason for police assistance as well as the number of officers needed at the scene.

11.8.6.1.1 HCPD will respond as appropriate and as available.

11.8.6.2 For requests of police assistance when **imminent danger exists** to DFRS personnel, the requesting unit shall notify fire dispatch by stating their unit identifier followed by "10-78".

11.8.6.2.1 Example:

11.8.6.2.1.1 ***Paramedic one-fifteen, 10-78.***

11.8.6.2.2 HCPD shall be requested to initiate an expedited response.

11.8.6.2.3 When possible, the requesting unit should state the reason for the urgent request and identify any hazards which may be encountered by responding units (i.e. man with a gun on roof, hostile crowd, mental subject, etc.).

11.8.7 Hostage Situation, Bomb Threats, Special/Unique Incidents

11.8.7.1 A request for Department apparatus to respond to hostage situations, bomb threats or other unique incidents shall be dispatched promptly.

11.8.7.1.1 Communications personnel shall notify the appropriate battalion chief after dispatching the requested apparatus to advise of situation specifics.

11.8.7.2 Even if no fire department units are requested, police dispatch should keep fire dispatch informed of these types of incidents to reduce the likelihood of fire department units unknowingly responding into an area or situation where police department units are already operating.

11.8.8 Condition Overload

11.8.8.1 When the conditions in the Communications Center become such that its ability to manage the workload is adversely impacted, the ECS or designee may authorize placing non-incident zone channels (zones other than Bravo, Charlie, and Delta) on Condition Overload. This status is intended to last no longer than 45 minutes. Fire dispatch shall make the following announcement on channels Alpha 1 (FDP1) and Alpha 2 (OPS1), "Howard operating on Condition Overload." Additionally, a notification shall be sent via alpha pager to the "fire group".

11.8.8.1.1 Specific notification shall immediately be made to the Department's Deputy Chief of Communications and Information Technology and both Battalion Chief 1, Battalion Chief 2, EMS 1 and the Department Communications Liaison.

11.8.8.1.1.1 Specific information detailing the circumstances necessitating Condition Overload and corrective actions being taken shall be provided.

11.8.8.2 During Condition Overload:

11.8.8.2.1 Radio transmissions on non-incident zone channels should be limited to the following incident necessary messages:

11.8.8.2.1.1 Responding/En Route

11.8.8.2.1.2 On the scene (first unit only)

11.8.8.2.1.3 Status changes (includes releasing units from incident)

11.8.8.2.1.4 In-Service

11.8.8.3 When conditions improve or 45 minutes has passed the ECS should discontinue Condition Overload. Fire dispatch shall make the following announcement on channels Alpha 1 (FDP1) and Alpha 2 (OPS1), "Howard is no longer on Condition Overload." Additionally, a notification shall be sent via alpha pager to the "fire group".

11.9 Status Timers in CAD

11.9.1 Currently, the timers in CAD can only be set in one (1) minute increments.

11.9.2 Statuses with timer settings

11.9.2.1 Pending – 1 minutes
(Department standard - call receipt to dispatch – 90 seconds)

11.9.2.2 Dispatch – 2 minutes
(Department standard is 90 seconds)
11.9.2.3 En Route – 15 minutes
11.9.2.4 Arrive – 30 minutes
11.9.2.5 Transport – 20 minutes
11.9.2.6 At-Hospital – 30 minutes

11.9.3 When the unit alarm goes off, fire dispatch personnel shall contact the unit to obtain a status.

11.9.3.1 When a unit advises they are in a status other than the one indicated in the CAD system, fire dispatch personnel shall modify the status as appropriate

11.9.3.2 No unit alarms for the statuses shown above shall be reset to an inactive status except as shown below.

11.9.3.2.1 Units known to be operating on an incident do not have to be queried for their status and the Arrive alarm can be reset to inactive.

12 Non-Incident Communications Practices and Procedures

12.1 Unit Statuses

12.1.1 Department personnel are responsible for providing, and fire dispatch personnel are responsible for recording in CAD, the following unit statuses as they relate to non incident activities. Timely entry into CAD is important as the Department uses this information in analyzing its performance. Comments should be entered into CAD when appropriate.

12.1.1.1 In-service on the air

12.1.1.1.1 Department personnel shall provide a reason and/or destination.

12.1.1.1.2 Units leaving their first due area will provide an expected time they will be out of their first due area in addition to their destination.

12.1.1.1.2.1 Fire dispatch shall change the location of the unit in CAD to the stated destination and change them back to their home station when the unit advises.

12.1.1.2 In-quarters
12.1.1.3 Out-of-service

12.1.1.3.1 Department personnel should provide a reason for the status, and expected duration.

12.1.1.4 In-service in quarters
12.1.1.5 Unit in reserve

12.1.1.6 Shared crew

12.1.1.6.1 The station officer, or his or her designee, shall provide this status for a unit normally sharing a crew with another unit when the "shared" unit becomes staffed with a dedicated crew or a when it is no longer staffed with a dedicated crew.

12.2 Special Events - Event Channel (Alpha 5)

12.2.1 This channel is primarily to be used for Department activities where multiple units are providing standby service. (e.g. Merriweather Post Pavilion medical standby during a concert.)

12.2.1.1 When a special event assigned to this channel changes from a standby activity to an emergency incident requiring the dispatch of a chief officer and additional units, the incident shall be moved over to an incident zone. (e.g. Bravo, Charlie, Delta)

12.3 Non-Emergency Messages

12.3.1 General

12.3.1.1 Fire dispatch shall not transmit non-emergency personal communications over the 800 MHz radio system.

12.3.1.2 Fire dispatch can provide messages to all Department personnel or groups of personnel via tone pagers, CAD printers, alpha pagers and cell phones as outlined in this section.

12.3.1.3 When important messages are sent to all station printers, fire dispatch shall advise units over the radio to check their printer for a message as well as provide the nature of the message.

12.3.2 Natural Hazard Information

12.3.2.1 Communications will notify all fire stations and the on-duty battalion chief(s) (via station printers or alphanumeric pagers, as appropriate) of any weather watches/warnings issued by the National Weather Service. This will include activation of the snow emergency plan.

12.3.2.1.1 Additional notifications will be at the discretion of the battalion chief(s).

12.3.2.2 Tornadoes

12.3.2.2.1 Besides the station printer notification, station tones for the identified warning area will be activated along with the "All-Call" tone.

12.3.2.3 Earthquakes

12.3.2.3.1 Communications will immediately notify an Emergency Management representative and the on-duty battalion chief(s) of any reports of tremors regardless of intensity or damage.

12.3.3 Howard County Communications Center Status
12.3.4 Significant Events
12.3.5 Staff Notifications as Required in Attachment M.
12.3.5.1 This attachment contains additional non-incident related notifications that shall be handled by the Communications Center personnel.
12.3.6 Contacting Individuals
12.3.6.1 Department personnel should attempt to contact an individual via phone or alpha pager prior to requesting fire dispatch to tone page the individual.
12.3.6.2 The process for contacting an individual via a tone shall consist of the following steps:
12.3.6.2.1 Step 1 – Initial Alert
12.3.6.2.2 Step 2 – Staff Tone(s)
12.3.6.2.3 Step 3 – Message
12.3.6.3 Example
12.3.6.3.1 **Paging Unit 2** (*paging tones*) **Howard to Unit 2 contact unit 3 in his office. 1634.**

12.4 After Hours Accountability

12.4.1 This section is intended for those units/personnel who normally travel alone and shall be effective between the hours of 1900 and 0700. This includes, but is not limited to, Battalion Chiefs, Medical Duty Officers, Volunteer Chief Officers and non-field DFRS operational and staff personnel.
12.4.2 Objective:
12.4.2.1 Assure the welfare of Fire and Rescue personnel who normally travel alone by assuring they remain accounted for between destinations between the hours of 1900 and 0700.
12.4.3 Units/personnel shall provide the following statuses as appropriate:
12.4.3.1 In-service-on-the-air when initiating travel on Fire and Rescue related activities or upon clearing an incident and remaining "on-the-road."
12.4.3.2 In-quarters or off-the-air when reaching their "final" destination (e.g. quarters or residence) for the evening.
12.4.4 Fire Dispatch Personnel shall perform the following:
12.4.4.1 Track in CAD the status of all units/personnel to assure they are accounted for as intended by this procedure.
12.4.4.2 Initiate radio contact with those units/personnel whose in-service-on-the-air status is not reasonable.
12.4.4.2.1 If radio contact is unsuccessful, Communications personnel shall attempt to contact personnel normally assigned to the unit via another communications means such as; tone pager, alpha-numeric pager, cell phone, or telephone.

12.4.4.2.2 Unsuccessful contact shall be reported to the ECS and the proper field battalion chief for further action if necessary.

12.4.5 Examples:

12.4.5.1 ***Battalion Chief 2 in-service remaining on-the-air.*** **Battalion Chief two remaining on-the-air. 2132.**

12.4.5.2 ***Chief 1-B off-the-air at my residence.*** **Chief 1-B off-the-air. 2333.**

13 Blue Alert Status

13.1 A Blue Alert is a Department operating status that *supersedes all* hospital bypass statuses. Under Blue Alert units will transport to the closest hospital regardless of hospital status.

13.1.1 Blue alert indicates the operating status of the Department, not the hospitals, and will be announced as follows: "**Howard to all stations. Howard County Department of Fire and Rescue is on blue alert. 1514."**

13.2 Communications will contact the on-duty battalion chief(s) when conditions warrant a blue alert (e.g., weather, apparatus availability, etc.)

13.3 The on-duty battalion chief(s) will authorized blue alert, or in his/her absence the On-Call Deputy Chief.

13.4 A blue alert will automatically be enacted whenever the snow emergency plan is placed into effect and will be canceled when lifted, if not canceled earlier.

13.5 Communications will send a message to all station printers and the alpha pager 'Fire Group' immediately before announcing both the activation and cancellation of a blue alert.

13.6 Howard County General Hospital emergency room and EMRC will be notified of the blue alert.

14 Types of 800 MHz System Failures

14.1 Radio system failures and corrective actions described in this section only pertain to the Howard County 800 MHz radio system. Other 800 MHz radio systems to which a radio may have access will still function properly.

14.2 Site Trunking

14.2.1 Communications Center is unable to talk on radio system at their consoles.

14.2.1.1 The radios – mobiles and portables - will display "Site Trunking".

14.2.1.2 Fire dispatch will be able to work via portables or other backup equipment.

14.2.2 Station Alerting may not be available. Phone alerting and alerting via direct contact over radio should be anticipated.

14.2.3 Field Operations should continue to function as normal.

14.3 Fail Soft

14.3.1 The radio system's ability to trunk radio traffic has failed.

14.3.1.1 Portable and mobile radios will display "Fail Soft" in the display when the radio system has gone into Fail Soft mode.

14.3.2 Radio system functionality has been reduced to 15 frequencies as shown in Attachment N. DFRS has primary use of four (4) of those frequencies – which are referred to as channels for the purpose of this discussion on Fail Soft operations. The four channels allocated to the Department are Channels 6, 7, 8, and 9. Most 800 MHz talk groups will be placed into one (1) of the fifteen (15) channels to provide a minimum level of radio communications capability. Department talk groups are indicated in **bold**. Talk groups not allocated to a Fail Soft frequency will sound a "honk" and indicate "Out of Range" in the display when selected.

14.3.2.1 Channel 1 (digital) – The following talk groups will be sharing a common frequency: CIB, V&N1, V&N2, CID1, CID2, WARR, STAFF, IAD, **ARSN**, YSS, TES, TAC, SRO

14.3.2.2 Channel 6 (analog) – The following talk groups will be sharing a common frequency: **FDP1**, **OPS1**, **OPS2**, **HCGH**, **EMKX**, **BAT1**, **BAT2** ,**FIOP10**, **FIOP11**, **FIOP12**, PIOP1, PIOP2, HEALTH

14.3.2.3 Channel 7 (digital) – The following talk groups will be sharing a common frequency: (Bravo Zone talk groups only) **FI10**, **FI11**, **FI12**, **FI13**, **WTR1**, **STG1**

14.3.2.4 Channel 8 (digital) – The following talk groups will be sharing a common frequency: (Charlie Zone talk groups only) **FI20**, **FI21**, **FI22**, **FI23**, **WRT2**, **STG2**

14.3.2.5 Channel 9 (digital) – The following talk groups will be sharing a common frequency: **FI30**, **FI31**, **FI32**, **FI33**, **WTR3**, **STG3**, **ADMN**, **SRST**, **OPNS**, **CIT**, **SUSV**, **TRNG**, **VCHF**, **LFSF**, **EVT1**

14.3.2.6 Talk groups that are not assigned to a Fail Soft frequency/channel – **VOL1**, **VOL2**, **VOL3**, **VOL4**, **VOL5**, **VOL6**, **EMRC**, **MED4**, **MED8**, **ANN1**, **ANN2**, **ANN3**

14.3.3 All radio traffic is to be limited under these conditions.

14.4 Complete 800 MHz System Failure

14.4.1 The radio system is non-operational.

14.4.2 The best option for radio use under these circumstances is to utilize the Regional Interoperability Network System (RNS) channels.

14.4.2.1 RNS is basically a line of site communications system and will work best when radios are in close proximity to each other such as on the scene of an incident.

14.4.2.1.1 In the Alpha/Bravo/Charlie/Delta Zones RNS5 is on Alpha 14 and RNS6 is on Alpha 15.

14.4.2.1.2 Additional RNS channels are available in the Oscar Zone. RNS1 is on Oscar 6, RNS2 is on Oscar 7, RNS3 is on Oscar 8, RNS4 is on Oscar 9, RNS5 is on Oscar 10, RNS6 is on Oscar 11.

14.4.2.2 Communicating over any distance will require using resources other than RNS.

14.4.2.2.1 Cell phones should be considered as a means to communicate between units, and between units and fire dispatch.

14.4.3 Station Alerting may not be available. Phone alerting should be anticipated.

15 Knox Box Key Release Procedure

15.1 Procedure for field units equipped with a Knox Box key.

15.1.1 From the channel in use (Alpha 1, Bravo 1,…), notify fire dispatch that you need to release a Knox Box key and are switching to Alpha 8.

15.1.1.1 If you are in Zones B, C or D, the key release can be accomplished on Channel 8 (Bravo 8, Charlie 8, or Delta 8). Bravo 8, Charlie 8 and Delta 8 can still be referred to as Alpha 8. The dispatch consoles do not display Bravo 8, Charlie 8 or Delta 8.

15.1.2 Advise fire dispatch you are on Alpha 8 and provide the key number to be released.

15.1.3 After the release tone has been transmitted, advise dispatch if key has been successfully released or not.

15.1.3.1 If the key has been released, return to the channel in use.

15.1.3.2 If the key did not release, confirm the key number with fire dispatch and attempt the release again. Two attempts shall be made before considering the release to be unsuccessful.

15.1.3.2.1 If the release is unsuccessful, the crew shall:

15.1.3.2.1.1 Notify the Station Officer upon return to quarters so corrective actions can be initiated.

15.1.3.2.1.2 Initiate other actions to gain entry into the secure property. Other actions can include obtaining a Knox Box key from another unit on the call, forcing entry, waiting for a resident with a key, or the like as dictated by the nature of the incident.

15.1.4 Notify fire dispatch on the channel in use when the Knox Box key has been secured.

15.2 Release Procedure for Fire Dispatch Personnel

15.2.1 A field unit requests the release of a Knox Box key and advises they are switching to Alpha 8.

15.2.1.1 Field units have Alpha 8 programmed into Zones B, C or D on Channel 8 (Bravo 8, Charlie 8, or Delta 8). Fire personnel may refer B8, C8 or D8 as Alpha 8. The fire dispatch consoles do not display Bravo 8, Charlie 8 or Delta 8.

15.2.1.2 Always use Alpha 8 when you need to speak with a Fire Department Unit on B8, C8 or D8.

15.2.2 The field unit switches to Alpha 8 and advises fire dispatch they are on Alpha 8 and need a specific Knox Box key released. Fire personnel will give the specific key number at this time.

15.2.3 Once the field unit advises they are on Alpha 8 and have given a key number, switch to the appropriate Knox Box tab on the CentraCom Gold Elite console and transmit the release tone.

15.2.4 The field unit will advise whether or not the key has been successfully released.

15.2.4.1 If the key did not release, contact shall be made with the requesting unit on Alpha 8 to confirm the key number and retransmit the release tone. Two attempts at releasing the key shall be made before considering the release unsuccessful.

15.2.5 The field unit will switch back to the channel in use.

15.2.6 The field unit will advise on the channel in-use when the Knox Key has been secured.

15.3 Examples of the Knox Box key release procedure:

15.3.1 ***Engine two-one to Howard.*** **Engine two-one.** ***Need to release a Knox Box key, switching to Alpha 8.*** **Engine two-one switching to Alpha 8.** ***Engine two-one is on Alpha 8, release Knox Box key 38.*** Knox Box release tones transmitted. ***Engine two-one Howard key release successful, switching back to Alpha 1.***

15.3.2 ***Paramedic five-five Howard.*** **Go ahead Paramedic five-five.** ***Need to release a Knox Box key, switching to Charlie 8.*** **Okay Paramedic five-five, switch to Charlie 8.** ***Paramedic five-five is on Charlie 8, release key 18.*** **Releasing key 18.** Knox Box release tones transmitted. ***Paramedic five-five to Howard, the key did not release. Attempt to release key 18 again.*** Knox Box release tones transmitted. ***Paramedic five-five to Howard, the key did not release. Have Engine five-two release their Knox Box key.*** **Okay Paramedic five-five, we will contact Engine five-two. 1821.** ***Paramedic five-five is back on Charlie 1.*** **Paramedic five-five on Charlie 1. 1822.**

15.3.3 ***Engine two-one to Howard, key 38 has been secured.*** **Okay Engine two-one. 0221.**

16 Suggestions and Problem Reporting

16.1 All suggestions and/or problem reporting pertaining to Department communications shall be directed through the appropriate channels, in writing, to the deputy chief of Communications, Information and Technology, or his or her designee. The Deputy Chief, or designee, will review the comments and initiate appropriate action.

16.2 Communications Problems

16.2.1 Problems requiring immediate attention should be handled as outlined in this document under Section 11, "Contacting the Communication Center".

16.2.2 Problems not requiring immediate attention should be documented in writing to the deputy chief of Communications, Information and Technology via the appropriate chain of command.

17 Fire Dispatch CentraCom Gold Elite Configuration

17.1 The information shown below is to assure the CentraCom Gold Elite consoles in fire dispatch are properly configured.

17.1.1 Fire Dispatch Positions 1 & 2 shall use the "Trunked Fire1" template/file.

17.1.2 Fire Dispatch Positions 3 & 4 shall use the "Trunked Fire2" template/file.

17.2 The name of the template/file is shown in the upper left hand corner of the CentraCom Gold Elite dispatch screen. *Example: "Trunked Fire1 – CENTRACOM Gold Elite Dispatch"*

Approved:

Joseph A. Herr
Fire Chief

Attachment A – Phonetic Alphabet

Alpha	**N**ovember
Bravo	**O**scar
Charlie	**P**apa
Delta	**Q**uebec
Echo	**R**omeo
Foxtrot	**S**ierra
Golf	**T**ango
Hotel	**U**niform
India	**V**ictor
Juliet	**W**hisky
Kilo	**X**-ray
Lima	**Y**ankee
Mike	**Z**ulu

Attachment B – Daily Check Sheet

Fire Dispatch

This check sheet has been developed to provide guidance for fire dispatch personnel at the start of each shift. It is to be completed by the **primary** fire dispatcher within ½ hour of the start of each shift, once at 0700 hours and again at 1900 hours. It is **not** required to be completed each time the primary dispatcher changes during a normal shift.

Date _____ ____ 0700 Check ____ 1900 Check

Shift Lineup			
Primary Dispatcher - Alpha 1	**Times**	**Operations Dispatcher – Alpha 2**	**Times**

Shift Checks		
Task	**"√"**	**Comments**
The Patch is on terminal FD____ • "Alpha 1 and Fire Patch" • Always with the primary dispatcher		
Msel 1 set to "*Fire 1 and Alpha 1*"		
FMARS turned up		
Weather computer up		
NAWAS volume audible		
Contact station's 1 – 11 by phone to verify unit statuses		
Ensure 'shared crews' are properly entered • E61 & T6 (Crew# *25*), • AE211 & AT21 (Crew# *21*) • CE123 & CL12 (Crew# *64*) • BE351 & BE352 (Crew# 351) • BM355 & BA355 (Crew# 35) • BM356 & BA356 (Crew# 36) • E22 & SQ2 (Crew# 7) (0700-1700 M-F) • E11 & SQ1 (Crew# 1) (0400-1600 M-F) • E501, E502, E503, TWR50 (Crew# 501) • PRE49 & PSQ49 (Crew# 49) • E201 & A205 (Crew# 20) • CA129 & CP129 (Crew# 29) • CA128 & CP128 (Crew# 28) • CA18 & CP18 (Crew# 18) • CA19 & CP19 (Crew# 19)		
Hospital Statuses Utilize computer under TV to access the following web sites for statuses: • http://miemss.umaryland.edu/Chats/Reg3.html • http://miemss.umaryland.edu/Chats/Reg5.html		

_____

Signature of Primary Dispatcher at Start of Shift

Attachment C – List Backup Files to be Maintained in the Communication Center

- DFRS Deployment Plans
- Event Type Priorities
- Classification Types
- Line-Up Back-Up
- Equipment Master List
- Mutual Aid Capabilities
- Special Box Areas
- Mutual Aid Units in CAD
- Response List
- Balance of Alarm
- Station Master
- Radio Identifiers
- CAD Alpha Paging Chart
- Staff Notification Criteria

Attachment D – Unit IDs for Prince George's County Response

Station	Unit	Prince George's ID
Savage (Station 6)	Engine 61	Engine 701
	Engine 62	Engine 702
	Paramedic 65	Paramedic 70
	Ambulance 66	Ambulance 705
	Brush 67	Brush 70
	Truck 6	Truck 70
	Chief 6	Chief 70
	Chief 6 A	Chief 70 A
	Chief 6 B	Chief 70 B
	Chief 6 C	Chief 70 C
Rivers Park (Station 10)	Engine 101	Engine 711
	Paramedic 105	Paramedic 715
	Tower 10	Tower 71
Scaggsville (Station 11)	Engine 111	Engine 721
	Paramedic 115	Paramedic 725

Attachment E – Guidelines for Identifying Station-based Units

Prefix	Description	Assigned Number
Engine	Class A engine carrying 500-1000 gallons of water	Station number plus a second number in the range 1 – 3.
	Class A engine carrying vehicle rescue equipment or greater than 1000 gallons of water	Station number plus the second number 4
Squad	A heavy rescue unit carrying tools for vehicle rescue, firefighting, and other emergency operations	Station number only
Rescue	A unit carrying tools for vehicle rescue only	Station number only
Tower	An aerial unit with an aerial ladder 75 feet or greater and a platform	Station number only
Truck	An aerial unit with an aerial ladder 75 feet or greater	Station number only
Quint	An aerial unit with an aerial ladder 75 feet or greater, a pump, hose and carrying 300 gallons or more of water	Station number only
Ambulance	A basic life support (BLS) unit with transport capability	Station number plus a second number in the range 5 – 6.
Paramedic	An advanced life support (ALS) unit with transport capability (paramedic level)	
Medic	An advanced life support (ALS) unit with transport capability (cardiac rescue technician [CRT] level)	
Canteen	Vehicle equipped to provide food services at the scene of an incident.	Station number only
Brush	A vehicle carrying a small amount of water and firefighting equipment capable of off-road operation	Station number plus a second number in the range 7-8.
Tanker	Any vehicle carrying more than 1000 gallons of water and not classified as a Class A engine	Station number only
Air Unit	Any vehicle capable of supplying a large quantity of breathing air	Station number only
Boat	Any self-propelled watercraft towed on a trailer	Station number only
Emergency Support Vehicle (ESV)	Any vehicle carrying emergency incident equipment and supplies	Station number only

Prefix	Description	Assigned Number
Utility	Any vehicle used to transport fire and rescue personnel and/or equipment	The first utility vehicle uses the station number only. Additional utilities shall use the station number plus a sequential number beginning with the number "1".
Chief	Volunteer chief officers	• Chief uses the station number only. • Assistant and deputy chiefs use the station number plus a sequential alpha character beginning with the letter "A".

Attachment F – Guidelines for Identifying Non-Station-based Units

Bureau	Bureau Number(s)	Assigned Number
Office of the Fire Chief	1 and 2	• Chief, Chief Deputy and Deputy Chief use their bureau number only. (i.e. Unit 1, Unit 2, Unit 3) • Battalion Chiefs use a number starting with their bureau number plus a zero plus a number in the range 0 to 9. (i.e. Unit 300, Unit 301) • Captains use a number starting with their bureau number plus a number in the range 1 to 9 plus a zero. (i.e. Unit 310, Unit 320) • Lieutenant and other staff (uniformed and non-uniformed) use a number starting with the numbers of their bureau/division assignment plus a number in the range 1 to 9 (i.e. Unit 311, Unit 321)
Operations	3	
Communications and Information Technology	4	
Services	5	
Life Safety	6	
Training	18	
Light Duty Personnel	17	Radio identifiers will be created as necessary being with 1701

Attachment G – Exceptions to Unit/Staff Identification Guidelines

Apparatus/Staff Position	Radio Identification
Public Information Officer	Unit 40
Canteen 1 – stored at varying stations	Canteen 1
Mobile Command Post	Mobile 1
Battalion Chief for the first battalion	Battalion Chief 1
Battalion Chief for the second battalion	Battalion Chief 2
EMS Officer for the first battalion	EMS 1
EMS Officer for the second battalion	EMS 2
Reserve apparatus	Ambulances and engines – prefix will be "Reserve" , number determined by the Support Service Bureau

Attachment H – Jurisdictions/Agencies with Authorized Access to Department Talk Groups

Jurisdictions/Agencies Authorized to Operate on Department Talk Groups

- All Howard County Government Departments and their agents.
- Anne Arundel Fire Department and its agents.
- Prince George's Fire Department and its agents.
- Montgomery County Department of Fire and Rescue and its agents.
- Carroll County Fire Department and its agents.
- Frederick County Fire Department and its agents.
- Baltimore County Fire Department and its agents.
- Baltimore City Fire Department and its agents.
- Maryland Department of the Environment
- Johns Hopkins Applied Physics Laboratory Fire Department
- Baltimore Washington Airport

Talk Group Capabilites

1. Jurisdictions with 800 MHz digital capable radios and available space are expected to install the following sixteen Department talk groups. Using these talk groups allow mutual aid companies to operate directly with Department units without any intermediate actions such as patching.

	Zone and Channel (Common Name)	Talk Group Name
1	A1	FDP1
2	A2	FIR1
3	A3	EMS1
4	A4	HCGH
5	A5	EMKX
6	B1	FI10
7	B2	FI11
8	B3	FI12
9	B4	FI13
10	B5	WTR1
11	B6	STG1
12	C1	FI20
13	C2	FI21
14	C3	FI22
15	C5	WTR2
16	C6	STG2

2. Jurisdictions with 800 MHz radio that are not digital capable are expected to install the following three 800 MHz analog talk groups. Using these talk groups will allow mutual companies to operate directly with Department units via patching performed by fire dispatch personnel. Fire dispatch will manage the use of these talk groups.

	Zone and Channel (Common Name)	Talk Group Name
1	Fire Dispatch Use Only	FIOP10
2		FIOP11
3		FIOP12

Attachment I – Example of Radio Communications

1. All acknowledgments from fire dispatch (unit ID, a paraphrase of unit's message, time):

   Engine seven-one on the air. 1315.

2. Acknowledging a call from fire dispatch or another unit (receiving unit's ID, acknowledgement of calling unit's ID):

   Howard to Engine three-one. ***Engine three-one. Go ahead Howard.***

3. Reporting on the air for an emergency response (unit ID, staffing):

   Engine nine-one responding with four.

   a. All responding units will report their staffing, except ambulances with a normal staffing of two personnel.
   b. Communications will advise the highest ranking responding officer the total staffing for the incident.

4. Example of an initial status report (unit ID, status)

   Engine six-two to Howard. On the scene, side A with a three (3) story wood frame apartment building with smoke showing on the second floor, quadrant 4, captain has command. **Box alarm six-one. Engine six-two on the scene side A wood frame apartment building with smoke showing, quadrant 4, captain has command. 0003.**

5. Example of an updated status report of an incident:

   Engine eight-one to Howard. We have one room and contents fire, the fire is knocked down - will be holding all units. **Box alarm eight-two, 1234 St. Johns Lane. Engine eight-one reporting the fire knocked down, holding all units. 1854.**

6. Reporting on the air for non-emergency activities (unit ID, message):

   Engine five-two to Howard. On-the-air for a public education detail at the Clarksville Middle School. **Engine five-two on-the-air for a pub. ed. at Clarksville Middle School. 1325.**

   a. Any unit reporting on the air will advise the reason (area familiarization, map work, first-due area, etc.)

7. Returning to service from an incident (unit ID, availability status):

   Engine two-one Howard. We're ready. **Engine two-one, In-service. 0926.**

8. Reporting in station (unit ID, "in quarters"):

Tower seven Howard. In quarters. **Tower seven in the quarters. 0458.**

a. If available status has changed, say so when placing the unit in the station.

9. Ambulance/paramedic unit en-route to the hospital (unit ID, receiving facility, patient priority):

   Paramedic six-five to Howard. En route to Howard County General with a priority three patient. **Paramedic six-five transporting to Howard County General Hospital. 2234.**

10. At patient's side (APS); given by first arriving BLS and ALS providers (unit ID, "APS"):

    Paramedic nine-five to Howard. APS. **Paramedic nine-five APS. 2345.**

11. Arrival at the hospital (unit ID, facility name):

    Paramedic one-five Howard. At St. Agnes. **Paramedic one-five at St. Agnes. 2350.**

12. Non-emergency transport (unit ID, statement of non-emergency transport, receiving facility):

    Paramedic three-five to Howard. Out-of-service on a non-emergency transport to Harmony Hall. **Paramedic three-five en route to Harmony Hall. 1211.**

Attachment J – Incident Alarm Types

Alarm Type	Description
RESCUE	• Confined space rescues • Cave-ins • Building collapse • Drowning • Elevator Rescue • Water rescue • Bus accidents • Train Crashes (passenger/freight) • Aircraft Crashes • Transportation crashes with injury
BOX	• Single family dwelling (detached) • Gas or fuel leaks on interior of any structure • Outbuilding/shed • Detached garage • Barn • Trailer • Multiple family buildings (apartments, condos) • Townhouse • High-rise • Business structure • Schools • Institutional • Medical facility (includes: nursing homes) • Motel/Hotel • Any report of entrapment within any structure (includes: single family dwelling)
HAZ-MAT BOX	• Confirmed hazardous material incident
VEHICLE	• Automobiles • Trucks (all types) • Farm tractors • Lawn tractors • Construction equipment
MISCELLANEOUS	• Electrical hazards • Fill-in • Investigation (includes: gas or fuel leak on exterior) • Landfill fire • Lock-out/in • Wash down • Miscellaneous (fire reported out) • Tree/pole fire
BRUSH	• Brush • Field • Grass • Straw/hay bales • Woods
MEDICAL	• Emergency ambulance/medic unit calls

Attachment K – Zones and Associated Talk Groups

Alpha Zone		Primary zone for normal daily activities.	Fail Soft Channel
A1	FDP1	Alerting/Dispatch and primary operating channel. Typically patched to high band channel used for station alerting.	6
A2	OPS1	Minor/small fire incidents. Use as needed, multiple incidents acceptable.	6
A3	OPS2	Minor/small EMS incidents. Use as needed, multiple incidents acceptable.	6
A4	HCGH	Howard County General Hospital. Used for non-consult notifications. (Set up for Page function.)	6
A5	EVT1	Used for non-emergency events. (i.e. medical standby at Meriwether PP)	9
A6	BAT1	Non-incident chat channel.	6
A7	BAT2	Non-incident chat channel.	6
A8	EMKX	Emergency/Knox Box channel. Not to be used for any other purpose.	6
A9	NDP1	HC Police Northern Dispatch (Police Alpha 1)	2
A10	SDP1	HC Police Southern Dispatch (Police Bravo 1)	3
A11	FIOP10	Analog channel. Typically used for patching by communications.	6
A12	FIOP11	Analog channel. Typically used for patching by communications.	6
A13	FIOP12	Analog channel. Typically used for patching by communications.	6
A14	RNS5	Regional Interoperability Network System. Non-trunked channels (conventional resources). Most jurisdictions with 800 MHz systems will support this channel. **No emergency button and no radio identifier functionality.** **Set to operate in direct mode (radio to radio) only.**	n/a
A15	RNS6		
A16	FDP1	Alerting/Dispatch and primary operating channel.	6

Bravo Zone		Incident One – used for first significant incident.	Fail Soft Channel
B1	FI10	Initial operational channel for the incident. Incident Command operations shall remain on this channel as an operation expands to use more channels.	7
B2	FI11	Used as necessary.	7
B3	FI12	Used as necessary.	7
B4	FI13	Used as necessary.	7
B5	WTR1	Water Supply channel. Used for other incident activities as necessary.	7
B6	STG1	Staging channel. Used for other incident activities as necessary.	7
B7	ANN1	Announcement channel for Bravo Zone. Transmits on Bravo 1 – 6.	n/a
B8	EMKX	Emergency/Knox Box channel. Not to be used for any other purpose.	6
B9	PI10	HC Police Incident 10 (Police Charlie 1)	4
B10	PI17	HC Police Incident 17 (Police Charlie 7)	4
B11	FIOP10	Analog channel. Typically used for patching by communications.	6
B12	FIOP11	Analog channel. Typically used for patching by communications.	6
B13	FIOP12	Analog channel. Typically used for patching by communications.	6
B14	RNS5	Regional Interoperability Network System. Non-trunked channels (conventional resources). Most jurisdictions with 800 MHz systems will support this channel. **No emergency button and no radio identifier functionality. Set to operate in direct mode (radio to radio) only.**	n/a
B15	RNS6		
B16	FI10	Initial operational channel.	7

Charlie Zone		Incident Two – used for second significant incident.	Fail Soft Channel
C1	FI20	Initial operational channel for the incident. Incident Command operations shall remain on this channel as an operation expands to use more channels.	8
C2	FI21	Used as necessary.	8
C3	FI22	Used as necessary.	8
C4	FI23	Used as necessary.	8
C5	WTR2	Water Supply channel. Used for other incident activities as necessary.	8
C6	STG2	Staging channel. Used for other incident activities as necessary.	8
C7	ANN2	Announcement channel for Charlie Zone. Transmits on Charlie 1 – 6.	n/a
C8	EMKX	Emergency/Knox Box channel. Not to be used for any other purpose.	6
C9	PI20	HC Police Incident 20 (Police Delta 1)	5
C10	PI27	HC Police Incident 27 (Police Delta 7)	5
C11	FIOP10	Analog channel. Typically used for patching by communications.	6
C12	FIOP11	Analog channel. Typically used for patching by communications.	6
C13	FIOP12	Analog channel. Typically used for patching by communications.	6
C14	RNS5	Regional Interoperability Network System. Non-trunked channels (conventional resources). Most jurisdictions with 800 MHz systems will support this channel. **No emergency button and no radio identifier functionality. Set to operate in direct mode (radio to radio) only.**	n/a
C15	RNS6		
C16	FI20	Initial operational channel.	8

Delta Zone		Incident Three – used for third significant incident. Can be used for training when available. Emergency incidents get priority.	Fail Soft Channel
D1	FI30	Initial operational channel for the incident. Incident Command operations shall remain on this channel as an operation expands to use more channels.	9
D2	FI31	Used as necessary.	9
D3	FI31	Used as necessary.	9
D4	FI33	Used as necessary.	9
D5	WTR3	Water Supply channel. Used for other incident activities as necessary.	9
D6	STG3	Staging channel. Used for other incident activities as necessary.	9
D7	ANN3	Announcement channel for Delta Zone. Transmits on Delta 1 – 6.	n/a
D8	EMKX	Emergency/Knox Box channel. Not to be used for any other purpose.	6
D9	PI10	HC Police Incident 10 (Police Charlie 1)	4
D10	PI17	HC Police Incident 17 (Police Charlie 7)	4
D11	FIOP10	Analog channel. Typically used for patching by communications.	6
D12	FIOP11	Analog channel. Typically used for patching by communications.	6
D13	FIOP12	Analog channel. Typically used for patching by communications.	6
D14	RNS5	Regional Interoperability Network System. Non-trunked channels (conventional resources). Most jurisdictions with 800 MHz systems will support this channel. **No emergency button and no radio identifier functionality. Set to operate in direct mode (radio to radio) only.**	n/a
D15	RNS6		
D16	FI30	Initial operational channel.	9

Echo Zone		Medical Zone 1	Fail Soft Channel
E1	EMRC	Howard County EMRC call channel	n/a
E2	MED4	Howard County Med 4	n/a
E3	MED8	Howard County Med 8	n/a
E4	HCGH	Howard County General Hospital. Used for non-consult notifications. (Set up for Page function.)	6
E5	MCEMRC	Montgomery County EMRC call channel	n/a
E6	MCMED6	Montgomery County Med 6	n/a
E7	MCMED8	Montgomery County Med 8	n/a
E8	MGH	Montgomery General Hospital via Montgomery County 800 MHz system. Used for non-consult notifications. (Set up for Page function.)	n/a
E9	HCH	Holy Cross Hospital via Montgomery County 800 MHz system. Used for non-consult notifications. (Set up for Page function.)	n/a
E10	MPTY	Unused	n/a
E11	MPTY	Unused	n/a
E12	FCEMRC	Frederick County EMRC call channel	n/a
E13	FCMED4	Frederick County Med 4	n/a
E14	FCMED8	Frederick County Med 8	n/a
E15	MPTY	Unused	n/a
E16	MPTY	Unused	n/a

Foxtrot Zone		Medical Zone 2	Fail Soft Channel
F1	CCEMRC	Carroll County EMRC call channel	n/a
F2	CCMED4	Carroll County Med 4	n/a
F3	CCMED8	Carroll County Med 8	n/a
F4	MPTY	Unused	n/a
F5	BCEMRC	Baltimore County EMRC call channel	n/a
F6	BCMED4	Baltimore County Med 4	n/a
F7	BCMED8	Baltimore County Med 8	n/a
F8	MPTY	Unused	n/a
F9	AAEMRC	Anne Arundel EMRC call channel	n/a
F10	AAMED4	Anne Arundel Med 4	n/a
F11	AAMED8	Anne Arundel Med 8	n/a
F12	MPTY	Unused	n/a
F13	BFEMRC	Baltimore City EMRC call channel	n/a
F14	BFMED	Baltimore City Med channel	n/a
F15	MPTY	Unused	n/a
F16	MPTY	Unused	n/a

Golf Zone		Department Division and Bureau, and Volunteer Department Channels	Fail Soft Channel
G1	ADMN	Administration (Set up for Page function.)	9
G2	SRST	Senior Staff	9
G3	OPNS	Operations (Set up for Page function.)	9
G4	CIT	Communication and Information Technology (Set up for Page function.)	9
G5	SUSV	Support Services (Set up for Page function.)	9
G6	LFSF	Life Safety (Set up for Page function.)	9
G7	TRNG	Training Division (Set up for Page function.)	9
G8	MPTY	Unused	n/a
G9	MPTY	Unused	n/a
G10	VCHF	Volunteer Fire Chiefs (Set up for Page function.)	9
G11	VOL1	Elkridge VFD	n/a
G12	VOL2	Ellicott City VFD	n/a
G13	VOL3	West Friendship VFD	n/a
G14	VOL4	Lisbon VFD	n/a
G15	VOL5	Fifth District VFD	n/a
G16	VOL6	Savage VFD	n/a

Arson Zone		Arson Zone (Only available to DFRS Arson Team personnel issued a secure radio.)	Fail Soft Channel
AR1	ARSN	Fire and Police Arson Investigations (Secure, Police Echo 8)	1
AR2	CIB1	HC Police (Police Alpha 10, Bravo 10)	2
AR3	CIB2	HC Police (Secure, Police Alpha 11, Bravo 11)	2
AR4	CID1	HC Police (Secure, Police Echo 2)	1
AR5	CID2	HC Police (Secure, Police Echo 3)	1
AR6	MPTY		n/a
AR7	MPTY		n/a
AR8	MPTY		n/a
AR9	MPTY		n/a
10	MPTY		n/a
11	MPTY		n/a
12	MPTY		n/a
13	MPTY		n/a
14	MPTY		n/a
15	MPTY		n/a
16	MPTY		n/a

Hotel Zone		Anne Arundel County
H1	AAAL	Alpha – Main dispatch channel. Respond on transfers on this channel. Remain on this channel until instructed otherwise. Used for on-the-air non-response activities.
H2	AABR	Bravo – Primary response channel anywhere in Anne Arundel County for Local Boxes - brush, mulch, Medical Boxes, Brush, Auto Fire, MVA's with no entrapment. (Generally - calls with one or two units)
H3	AACH	Charlie – Overflow for primary response channel (AABR). Used during periods of exceptionally high call volume.
H4	AADE	Delta – Incident command channel for AAEC (Echo) and AAFO (Foxtrot).
H5	AAEC	Echo – Tactical Channel for Commercial Box Alarm, Rescue Box with entrapment, minor HazMat, and Fire Alarms anywhere in AA Co., Still Boxes (Fire Alarms)
H6	AAFO	Foxtrot – Tactical Channel for Commercial Box Alarm, Rescue Box with entrapment, minor HazMat, and Fire Alarms anywhere in AA Co., Still Boxes (Fire Alarms)
H7	AAGO	Golf – Administrative Use
H8	AAHO	Hotel – Special Operations Incidents (technical rescue, water rescue, etc.)
H9	AAIN	India – Special Operations Incidents (technical rescue, water rescue, etc.)
H10	AAJU	Juliet – Incident command channel for AAKI (Kilo) and AALI (Lima)
H11	AAKL	Kilo – Tactical Channel for Commercial Box Alarm, Rescue Box with entrapment, minor HazMat, and Fire Alarms anywhere in AA Co., Still Boxes (Fire Alarms)
H12	AALI	Lima – Tactical Channel for Commercial Box Alarm, Rescue Box with entrapment, minor HazMat, and Fire Alarms anywhere in AA Co., Still Boxes (Fire Alarms)
H13	AAMI	Mike – Standby and Training channel
H14	BWT2	BWI Tac 2
H15	BWT1	BWI Tac 1
H16	BWDS	BWI Dispatch

India Zone		Baltimore County
I1	BCMN	Main dispatch talk group
I2	BC4	West Side – primary talk group
I3	BC22	West Side – First incident talk group (Chief Involved) – Main Channel
I4	BC23	West Side – First incident talk group – Sub-Channel
I5	BC52	West Side – Second incident talk group (Chief Involved)
I6	BC53	West Side – Second incident talk group – Sub-Channel
I7	BC2	Central – primary talk group
I8	BC12	Central – Incident talk group (Chief Involved) – Main Channel
I9	BC13	Central – Incident talk group – Sub-Channel
I10	BC62	Not in use
I11	BC3	East Side – primary talk group
I12	BC32	East Side – First incident talk group (Chief Involved) – Main Channel
I13	BC33	East Side – First incident talk group – Sub-Channel
I14	BC42	East Side – Second incident talk group (Chief Involved) – Main Channel
I15	BC43	East Side – Second incident talk group – Sub-Channel
I16	BCMN	Main dispatch talk group

Juliet Zone		Carroll County
J1	CC1	Fire dispatch channel, all units in-service (on-the-air) monitor Channel 1, channel to be used when transferring, channel to use to notify CC of incidents when in their county.
J2	CC2	Miscellaneous type calls - non high priority
J3	CC5	Primary medical channel, rescue without entrapment
J4	CC6	Rescue with entrapment, flyouts, etc
J5	CC10	Talk group for first major incident - box alarms (local alarms), building collapse, large brush fie, etc.
J6	CC11	First incident related channel - not monitored - up to incident commander to determine use.
J7	CC12	First incident related channel - not monitored - up to incident commander to determine use.
J8	CC15	Talk group for second major incident
J9	CC16	Second incident related channel
J10	CC17	Second incident related channel
J11	CC20	Talk group for third major incident
J12	CC21	Third incident related channel
J13	CC22	Third incident related channel
J14	CC25	Talk group for fourth major incident
J15	CC26	Fourth incident related channel
J16	CC27	Fourth incident related channel

Kilo Zone		Frederick County
K1	FCMN	Fire Dispatch
K2	FC20	Fire Alarms, auto fires, miscellaneous calls, etc.
K3	FC10	EMS
K4	FC50	EMS
K5	FC30	First Tact channel for Serious PIs and Structures Fires
K6	FC31	Related incident channel for FC30 incident
K7	FC32	Related incident channel for FC30 incident
K8	FC40	Second Tact channel
K9	FC41	Related incident channel for FC40 incident
K10	FC42	Related incident channel for FC40 incident
K11	FC70	Third Tact channel
K12	FC71	Related incident channel for FC70 incident
K13	FC72	Related incident channel for FC70 incident
K14	FC80	Fourth Tact channel
K15	FC81	Related incident channel for FC80 incident
K16	FC82	Related incident channel for FC 80 incident

Lima Zone		Montgomery County
L1	MC7A	Dispatch
L2	MC7B	Standard Operations
L3	MC7C	Alternate Channels
L4	MC7D	Alternate Channels
L5	MC7E	Alternate Channels
L6	MC7F	Alternate Channels
L7	MC7G	First working incident
L8	MC7H	First working incident – Sub-group
L9	MC7I	First working incident – Sub-group
L10	MC7J	First working incident – Sub-group
L11	MC7K	Second working incident
L12	MC7L	Second working incident – Sub-group
L13	MC7M	Second working incident – Sub-group
L14	MC7N	Second working incident – Sub-group
L15	MC7O	Talk Around (Regional Interoperability Network System talk group)
L16	MC7B	Standard Operations

Mike Zone		Baltimore City
M1	BFA2	Dispatch Channel
M2	BFA1	Minor Incidents – non-EMS
M3	BFA3	EMS Incidents
M4	BFA4	Talk around
M5	BFA5	Administrative
M6	BFA6	Administrative
M7	BFB1	Major incidents Fireground
M8	BFB5	Major incidents Fireground
M9	BFC1	Major incidents Fireground
M10	BFC5	Major incidents Fireground
M11	MPTY	Unused
M12	MPTY	Unused
M13	MPTY	Unused
M14	MPTY	Unused
M15	MPTY	Unused
M16	BFA2	Dispatch Channel

Oscar Zone		Inter-Jurisdictional Zone – Non-Trunked Resources (Common to every 800 MHz radio except Department of Corrections)	Fail Soft Channel
O1	8CLL	NPSPAC Call (National Channel, monitored in Maryland by MEMA, currently available from Frederick County east and Harford County south to Richmond, VA)	n/a
O2	8TC1	NPSPAC Tactical Channel 1. **No emergency button and no radio identifier functionality.**	n/a
O3	8TC2	NPSPAC Tactical Channel 2. **No emergency button and no radio identifier functionality.**	n/a
O4	8TC3	NPSPAC Tactical Channel 3. **No emergency button and no radio identifier functionality.**	n/a
O5	8TC4	NPSPAC Tactical Channel 4. **No emergency button and no radio identifier functionality.**	n/a
O6	RNS1	Regional Interoperability Network System. Non-trunked channels (conventional resources). Most jurisdictions with 800 MHz systems will support this channel. **No emergency button and no radio identifier functionality. Can be used in both direct and repeater mode.**	n/a
O7	RNS2		
O8	RNS3		
O9	RNS4		
O10	RNS5		
O11	RNS6		
O12	MPTY	Unused	n/a
O13	MPTY	Unused	n/a
O14	MPTY	Unused	n/a
O15	??????	Contains template and template version information	n/a
O16	911	Intended for emergency and non-emergency use by any County agency that does not have 24 hour dispatcher services. (Emergency revert channel for all non-public safety radios.)	15

Sierra Zone		Intra-County Zone (Common to every 800 MHz radio except Department of Corrections)	Fail Soft Channel
S1	911	Intended for emergency and non-emergency use by any County agency that does not have 24 hour dispatcher services. (Emergency revert channel for all non-public safety radios.)	15
S2	CNY1	Countywide channel 1	15
S3	CNY2	Countywide channel 2	15
S4	CNY3	Countywide channel 3	15
S5	EOC	Emergency Operations Center channel	15
S6	COEX	County Executive channel (Secure)	15
S7	BEEM	Board of Education Emergency	13
S8	CALL HELP	Stolen/Misappropriated radios will be dynamically regrouped so they will only be able to operate on this channel.	n/a
S9	8CLL	NPSPAC Call (National Channel, monitored in Maryland by MEMA, currently available from Frederick County east and Harford County south to Richmond, VA) **No emergency button and no radio identifier functionality.** **Can be used in both direct and repeater mode.**	n/a
S10	8TC1	NPSPAC Tactical Channel 1. **No emergency button and no radio identifier functionality.** **Can be used in both direct and repeater mode.**	n/a
S11	8TC2	NPSPAC Tactical Channel 2. **No emergency button and no radio identifier functionality.** **Can be used in both direct and repeater mode.**	n/a
S12	8TC3	NPSPAC Tactical Channel 3. **No emergency button and no radio identifier functionality.** **Can be used in both direct and repeater mode.**	n/a
S13	8TC4	NPSPAC Tactical Channel 4. **No emergency button and no radio identifier functionality.** **Can be used in both direct and repeater mode.**	n/a
S14	RNS6	Regional Interoperability Network System. Non-trunked channels (conventional resources). Most jurisdictions with 800 MHz systems will support this channel. **No emergency button and no radio identifier functionality.** **Set to operate in direct mode (radio to radio) only.**	n/a
S15	FLT1	HC Highways – Fleet Channel	13
S16	911	Intended for emergency and non-emergency use by any County agency that does not have 24 hour dispatcher services. (Emergency revert channel for all non-public safety radios.)	15

Attachment L – 800 MHz Radio Templates

Fire & Rescue 800MHz Radio Template - PROFILE F0 (Master)

ZONE	NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	RCGH	EVT1	BAT1	BAT2	EMRC	MDP1	SDP1	FIOP10	FIOP11	FIOP12	RBS5	RBS6	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WRT1	STG1	AIR1	EMRC	FI10	FI17	FIOP10	FIOP11	FIOP12	RBS5	RBS6	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WRT2	STG2	AIR2	EMRC	FI20	FI27	FIOP10	FIOP11	FIOP12	RBS5	RBS6	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WRT3	STG3	AIR3	EMRC	FI30	FI37	FIOP10	FIOP11	FIOP12	RBS5	RBS6	FI30
E Echo	EMS1	EMRC	MED4	MED8	RCGH	MCEMRC	MCMED8	RCMED8	MED1	RCR	MPTY	MPTY	FCEMRC	FCMED4	FCMED8	MPTY	MPTY
F Foxtrot	EMS2	CCEMRC	CCMED4	CCMED8	MPTY	RCEMRC	RCMED4	RCMED8	MPTY	AAEMRC	AAMED4	AAMED8	MPTY	RTEMRC	RFMED4	MPTY	MPTY
G Golf	STAFF	ADMIN	SRST	OPNS	CIT	SSSV	LTSF	TRNG	MPTY	MPTY	MCHF	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
AR Arson	ARSON	ARSN	CID1	CID2	CID1	CID2	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY
H Hotel	AA COUNTY INTEROP NEW BWI AIRPORT	AAAL	AABR	AACH	AADE	AAEC	AAFO	AAGO	AAHO	AAIB	AAJU	AAKL	AALI	AAMB	BWT3	BWT1	BWDS
I India	BALTO COUNTY INTEROP	BCMB	BC4	BC22	BC23	BCS2	BCS3	BC2	BC42	BC43	BC62	BC3	BC32	BC33	BC42	BC43	BCMB
J Juliet	CARROLL COUNTY INTEROP	CC1	CC2	CC5	CC6	CC10	CC11	CC12	CC15	CC16	CC17	CC20	CC21	CC22	CC25	CC26	CC27
K Kilo	FREDERICK COUNTY INTEROP	FCMB	FC29	FC10	FC50	FC30	FC31	FC32	FC40	FC41	FC42	FC70	FC71	FC72	FC80	FC81	FC82
L Lima	MONTGOMERY COUNTY INTEROP	MC7A	MC7B	MC7C	MC7D	MC7E	MC7F	MC7G	MC7H	MC7I	MC7J	MC7K	MC7L	MC7M	MC7N	MC7O	MC7P
M Mike	BALTIMORE CITY	BFA2	BFA1	BFA3	BFA4	BFA5	BFA6	BFB1	BFB5	BFC1	BFC5	MPTY	MPTY	MPTY	MPTY	MPTY	BFA2
O Oscar	ITAC - RMTS - Non-Trunked Resources	RCLL	RTC1	RTC7	RTC3	RTC4	RBS1	RBS7	RBS3	RBS4	RBS5	RBS6	MPTY	MPTY	MPTY	MEMAIR	911
S Sierra	COUNTY	911	CBV1	CBV3	CBV3	EOC	CODX	BBEM	CALL HELP 911	RCLL	RTC1	RTC7	RTC3	RTC4	RBS1	FLTY	911

HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

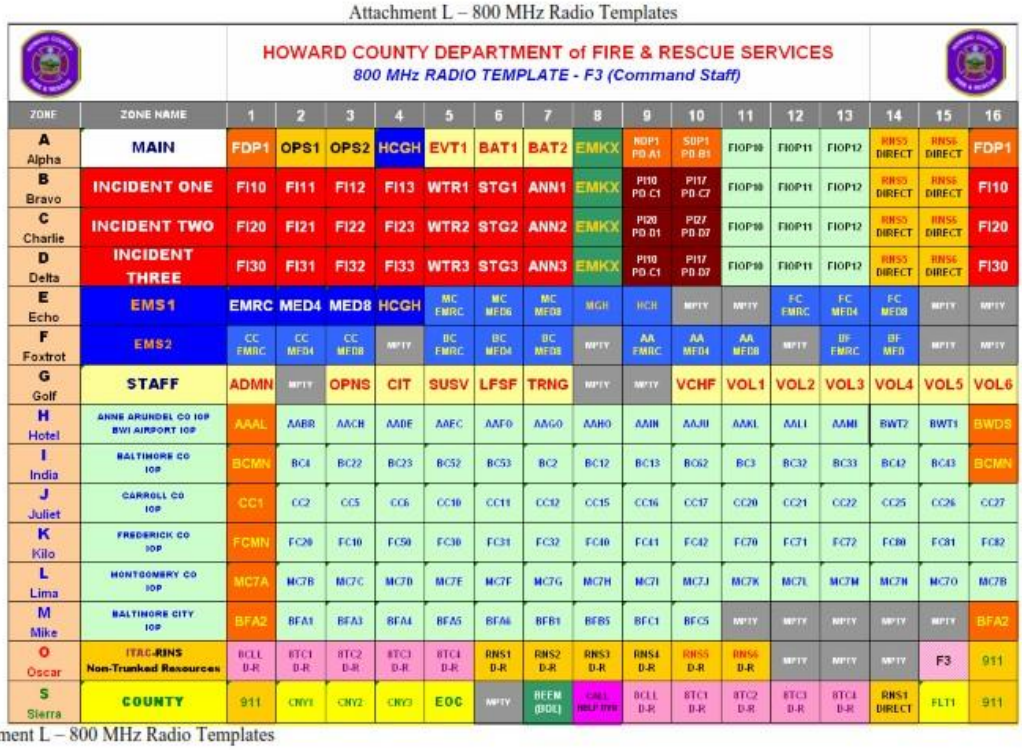
800 MHz RADIO TEMPLATE - F1 (Fire Chief)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	XDP1 PD-A1	SDP1 PD-B1	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD-C1	PI17 PD-C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD-D1	PI27 PD-D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI10 PD-C1	PI17 PD-D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MC EMRC	MC MED6	MC MED8	MGH	HCH	MPTY	MPTY	FC EMRC	FC MED4	FC MED8	MPTY	MPTY
F Foxtrot	EMS2	CC EMRC	CC MED4	CC MED8	MPTY	BC EMRC	BC MED4	BC MED8	MPTY	AA EMRC	AA MED4	AA MED8	MPTY	BF EMRC	BF MED	MPTY	MPTY
G Golf	STAFF	ADMN	SRST	OPNS	CIT	SUSV	LFSF	TRNG	MPTY	MPTY	VCHF	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
H Hotel	ANNE ARUNDEL CO IOP BWI AIRPORT IOP	AAAL	AABR	AACH	AADE	AAEC	AAF0	AAG0	AAH0	AAIN	AAJ0	AAK1	AAL1	AAM1	BWT2	BWT1	BWDS
I India	BALTIMORE CO IOP	BCMN	BC1	BC22	BC23	BC52	BC53	BC2	BC12	BC13	BC62	BC3	BC32	BC33	BC42	BC43	BCMN
J Juliet	CARROLL CO IOP	CC1	CC2	CC5	CC6	CC10	CC11	CC12	CC15	CC16	CC17	CC20	CC21	CC22	CC25	CC26	CC27
K Kilo	FREDERICK CO IOP	FCMN	FC20	FC10	FC50	FC30	FC31	FC32	FC40	FC41	FC42	FC70	FC71	FC72	FC80	FC81	FC82
L Lima	MONTGOMERY CO IOP	MC7A	MC7B	MC7C	MC7D	MC7E	MC7F	MC7G	MC7H	MC7I	MC7J	MC7K	MC7L	MC7M	MC7N	MC7O	MC7B
M Mike	BALTIMORE CITY IOP	BFA2	BFA1	BFA3	BFA4	BFA5	BFA6	BFB1	BFB5	BFC1	BFC5	MPTY	MPTY	MPTY	MPTY	MPTY	BFA2
O Oscar	ITAC-RINS Non-Trunked Resources	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 D-R	RNS2 D-R	RNS3 D-R	RNS4 D-R	RNS5 D-R	RNS6 D-R	MPTY	MPTY	MPTY	F1	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	COEX	BEEM (DOI)	CALL HELP 800	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 DIRECT	FLT1	911

HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

800 MHz RADIO TEMPLATE - F2 (Senior Staff)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	NDP1 PD A1	SDP1 PD B1	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD C1	PI17 PD C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD D1	PI27 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI10 PD C1	PI17 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MC EMRC	MC MED6	MC MED8	MGH	HCH	MPTY	MPTY	FC EMRC	FC MED4	FC MED8	MPTY	MPTY
F Foxtrot	EMS2	CC EMRC	CC MED4	CC MED8	MPTY	BC EMRC	BC MED4	BC MED8	MPTY	AA EMRC	AA MED4	AA MED8	MPTY	BF EMRC	BF MED	MPTY	MPTY
G Golf	STAFF	ADMN	SRST	OPNS	CIT	SUSV	LFSF	TRNG	MPTY	MPTY	VCHF	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
H Hotel	ANNE ARUNDEL CO IOP BWI AIRPORT IOP	AAAL	AABR	AACH	AADF	AAFC	AAFO	AAGO	AAHO	AAIN	AAJU	AAKL	AALI	AAMI	BWT2	BWT1	BWDS
I India	BALTIMORE CO IOP	BCMN	BC1	BC22	BC23	BC52	BC53	BC2	BC12	BC13	BC62	BC3	BC32	BC33	BC42	BC43	BCMN
J Juliet	CARROLL CO IOP	CC1	CC2	CC5	CC6	CC10	CC11	CC12	CC15	CC16	CC17	CC20	CC21	CC22	CC25	CC26	CC27
K Kilo	FREDERICK CO IOP	FCMN	FC20	FC10	FC50	FC30	FC31	FC32	FC10	FC41	FC42	FC70	FC71	FC72	FC80	FC81	FC82
L Lima	MONTGOMERY CO IOP	MC7A	MC7B	MC7C	MC7D	MC7E	MC7F	MC7G	MC7H	MC7I	MC7J	MC7K	MC7L	MC7M	MC7N	MC7O	MC7B
M Mike	BALTIMORE CITY IOP	BFA2	BFA1	BFA3	BFA4	BFA5	BFA6	BFB1	BFB5	BFC1	BFC5	MPTY	MPTY	MPTY	MPTY	MPTY	BFA2
O Oscar	ITAC-RINS Non-Trunked Resources	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 D-R	RNS2 D-R	RNS3 D-R	RNS4 D-R	RNS5 D-R	RNS6 D-R	MPTY	MPTY	MPTY	F2	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	MPTY	BEEM (BIDL)	CALL HELP ITAC	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 DIRECT	FLT1	911

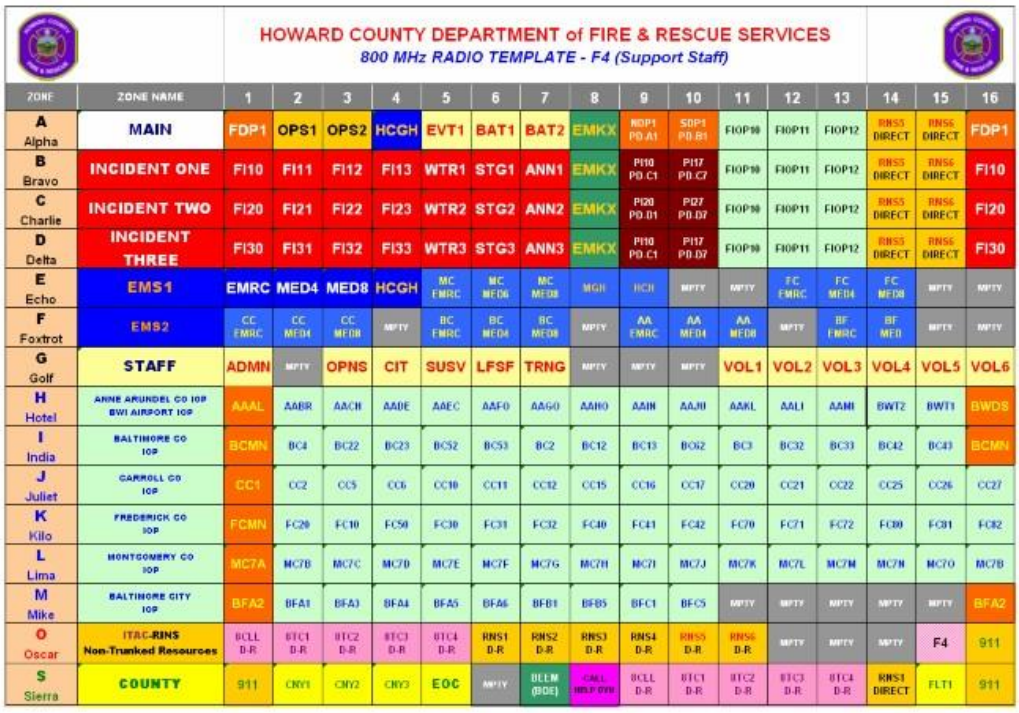


HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

800 MHz RADIO TEMPLATE - F3 (Command Staff)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	NDP1 PD A1	SDP1 PD B1	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD C1	PI17 PD C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD D1	PI27 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI10 PD C1	PI17 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MC EMRC	MC MED6	MC MED8	MGH	HCH	MPTY	MPTY	FC EMRC	FC MED4	FC MED8	MPTY	MPTY
F Foxtrot	EMS2	CC EMRC	CC MED4	CC MED8	MPTY	BC EMRC	BC MED4	BC MED8	MPTY	AA EMRC	AA MED4	AA MED8	MPTY	BF EMRC	BF MED	MPTY	MPTY
G Golf	STAFF	ADMN	MPTY	OPNS	CIT	SUSV	LFSF	TRNG	MPTY	MPTY	VCHF	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
H Hotel	ANNE ARUNDEL CO IOP BWI AIRPORT IOP	AAAL	AABR	AACH	AADF	AAFC	AAF0	AAG0	AAH0	AAIN	AAJU	AAKL	AALI	AAMI	BWT2	BWT1	BWDS
I India	BALTIMORE CO IOP	BCMN	BC1	BC22	BC23	BC52	BC53	BC2	BC12	BC13	BC62	BC3	BC32	BC33	BC42	BC43	BCMN
J Juliet	CARROLL CO IOP	CC1	CC2	CC5	CC6	CC10	CC11	CC12	CC15	CC16	CC17	CC20	CC21	CC22	CC25	CC26	CC27
K Kilo	FREDERICK CO IOP	FCMN	FC20	FC10	FC50	FC30	FC31	FC32	FC10	FC41	FC42	FC70	FC71	FC72	FC80	FC81	FC82
L Lima	MONTGOMERY CO IOP	MC7A	MC7B	MC7C	MC7D	MC7E	MC7F	MC7G	MC7H	MC7I	MC7J	MC7K	MC7L	MC7M	MC7N	MC7O	MC7B
M Mike	BALTIMORE CITY IOP	BFA2	BFA1	BFA3	BFA4	BFA5	BFA6	BFB1	BFB5	BFC1	BFC5	MPTY	MPTY	MPTY	MPTY	MPTY	BFA2
O Oscar	ITAC-RINS Non-Trunked Resources	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 D-R	RNS2 D-R	RNS3 D-R	RNS4 D-R	RNS5 D-R	RNS6 D-R	MPTY	MPTY	MPTY	F3	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	MPTY	REEM (DOL)	CALL HELP ITAC	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 DIRECT	FLT1	911

Attachment L – 800 MHz Radio Templates



HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

800 MHz RADIO TEMPLATE - F4 (Support Staff)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	MDP1 PD.A1	SDP1 PD.B1	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD.C1	PI17 PD.C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD.D1	PI27 PD.D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI10 PD.C1	PI17 PD.D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MC EMRC	MC MED6	MC MED8	MGH	HCH	MPTY	MPTY	FC EMRC	FC MED4	FC MED8	MPTY	MPTY
F Foxtrot	EMS2	CC EMRC	CC MED4	CC MED8	MPTY	BC EMRC	BC MED4	BC MED8	MPTY	AA EMRC	AA MED4	AA MED8	MPTY	BF EMRC	BF MED	MPTY	MPTY
G Golf	STAFF	ADMN	MPTY	OPNS	CIT	SUSV	LFSF	TRNG	MPTY	MPTY	MPTY	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
H Hotel	ANNE ARUNDEL CO IOP BWI AIRPORT IOP	AAAL	AABR	AACH	AADE	AAEC	AAFO	AAGO	AAHO	AAIN	AAJH	AAKL	AALI	AAMI	BWT2	BWT1	BWDS
I India	BALTIMORE CO IOP	BCMN	BC4	BC22	BC23	BC52	BC53	BC2	BC12	BC13	BC62	BC3	BC32	BC33	BC42	BC43	BCMN
J Juliet	CARROLL CO IOP	CC1	CC2	CC5	CC6	CC10	CC11	CC12	CC15	CC16	CC17	CC20	CC21	CC22	CC25	CC26	CC27
K Kilo	FREDERICK CO IOP	FCMN	FC20	FC10	FC50	FC30	FC31	FC32	FC40	FC41	FC42	FC70	FC71	FC72	FC80	FC81	FC82
L Lima	MONTGOMERY CO IOP	MC7A	MC7B	MC7C	MC7D	MC7E	MC7F	MC7G	MC7H	MC7I	MC7J	MC7K	MC7L	MC7M	MC7N	MC7O	MC7B
M Mike	BALTIMORE CITY IOP	BFA2	BFA1	BFA3	BFA4	BFA5	BFA6	BFB1	BFB5	BFC1	BFC5	MPTY	MPTY	MPTY	MPTY	MPTY	BFA2
O Oscar	ITAC-RINS Non-Trunked Resources	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 D-R	RNS2 D-R	RNS3 D-R	RNS4 D-R	RNS5 D-R	RNS6 D-R	MPTY	MPTY	MPTY	F4	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	MPTY	BELM (BOE)	CALL HELP CYB	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 DIRECT	FLT1	911

HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

800 MHz RADIO TEMPLATE - F5 (Field Operations)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	MPTY	MPTY	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD C1	PI17 PD C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD D1	PI27 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI10 PD C1	PI17 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MC EMRC	MC MED6	MC MED8	MGH	HCH	MPTY	MPTY	FC EMRC	FC MED4	FC MED8	MPTY	MPTY
F Foxtrot	EMS2	CC EMRC	CC MED4	CC MED8	MPTY	BC EMRC	BC MED4	BC MED8	MPTY	AA EMRC	AA MED4	AA MED8	MPTY	BF EMRC	BF MED	MPTY	MPTY
G Golf	STAFF	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
H Hotel	ANNE ARUNDEL CO IOP BWI AIRPORT IOP	AAAL	AABR	AACH	AADE	AAEC	AAFO	AAGO	AAHO	AAIN	AAJU	AAKL	AALI	AAMI	BWT2	BWT1	BWDS
I India	BALTIMORE CO IOP	BCMN	BC4	BC22	BC23	BC52	BC53	BC2	BC12	BC13	BC62	BC3	BC32	BC33	BC42	BC43	BCMN
J Juliet	CARROLL CO IOP	CC1	CC2	CC5	CC6	CC10	CC11	CC12	CC15	CC16	CC17	CC20	CC21	CC22	CC25	CC26	CC27
K Kilo	FREDERICK CO IOP	FCMN	FC20	FC10	FC50	FC30	FC31	FC32	FC10	FC41	FC42	FC70	FC71	FC72	FC80	FC81	FC82
L Lima	MONTGOMERY CO IOP	MC7A	MC7B	MC7C	MC7D	MC7E	MC7F	MC7G	MC7H	MC7I	MC7J	MC7K	MC7L	MC7M	MC7N	MC7O	MC7B
M Mike	BALTIMORE CITY IOP	BFA2	BFA1	BFA3	BFA4	BFA5	BFA6	BFB1	BFB5	BFC1	BFC5	MPTY	MPTY	MPTY	MPTY	MPTY	BFA2
O Oscar	ITAC-RINS Non-Trunked Resources	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 D-R	RNS2 D-R	RNS3 D-R	RNS4 D-R	RNS5 D-R	RNS6 D-R	MPTY	MPTY	MPTY	F5	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	MPTY	REEM (DOL)	CALL HELP ITAC	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 DIRECT	FLT1	911

HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

800 MHz RADIO TEMPLATE - F6 (Arson)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	NDP1 PD-A1	SDP1 PD-B1	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD-C1	PI17 PD-C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD-D1	PI27 PD-D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI30 PD-C1	PI37 PD-D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MC EMRC	MC MED6	MC MED8	MGH	HCH	MPTY	MPTY	FC EMRC	FC MED4	FC MED8	MPTY	MPTY
F Foxtrot	EMS2	CC EMRC	CC MED4	CC MED8	MPTY	BC EMRC	BC MED4	BC MED8	MPTY	AA EMRC	AA MED4	AA MED8	MPTY	BF EMRC	BF MED	MPTY	MPTY
G Golf	STAFF	ADMN	MPTY	OPNS	CIT	SUSV	LFSF	TRNG	MPTY	MPTY	VCHF	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
AR ARSON	ARSON	ARSN PD-E8	CIR1 PD-A10	CIR2 PD-A11	CID1 PD-E1	CID2 PD-E2	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY
H Hotel	ANNE ARUNDEL CO IOP BWI AIRPORT IOP	AAAL	AABR	AACH	AADE	AAEC	AAFO	AAGO	AAHO	AAIN	AAJU	AAKL	AALI	AAMI	BWT2	BWT1	BWDS
I India	BALTIMORE CO IOP	BCMN	BC4	BC22	BC23	BC52	BC53	BC2	BC12	BC13	BC62	BC3	BC32	BC33	BC42	BC43	BCMN
J Juliet	CARROLL CO IOP	CC1	CC2	CC5	CC6	CC10	CC11	CC12	CC15	CC16	CC17	CC20	CC21	CC22	CC25	CC26	CC27
K Kilo	FREDERICK CO IOP	FCMN	FC20	FC10	FC50	FC30	FC31	FC32	FC40	FC41	FC42	FC70	FC71	FC72	FC80	FC81	FC82
L Lima	MONTGOMERY CO IOP	MC7A	MC7B	MC7C	MC7D	MC7E	MC7F	MC7G	MC7H	MC7I	MC7J	MC7K	MC7L	MC7M	MC7N	MC7O	MC7B
M Mike	BALTIMORE CITY IOP	BFA2	BFA1	BFA3	BFA4	BFA5	BFA6	BFB1	BFB5	BFC1	BFC5	MPTY	MPTY	MPTY	MPTY	MPTY	BFA2
O Oscar	ITAC-RINS Non-Trunked Resources	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 D-R	RNS2 D-R	RNS3 D-R	RNS4 D-R	RNS5 D-R	RNS6 D-R	MPTY	MPTY	MPTY	F6	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	MPTY	BEEM (BOE)	CALL HELP RNS	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 DIRECT	FLT1	911

HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

800 MHz RADIO TEMPLATE - F7 (Support Staff Non-Essential)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	NDP1 PD-A1	SDP1 PD-B1	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD-C1	PI17 PD-C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD-D1	PI27 PD-D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI10 PD-C1	PI17 PD-D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MC EMRC	MC MED6	MC MED8	MGH	HCH	MPTY	MPTY	FC EMRC	FC MED4	FC MED8	MPTY	MPTY
F Foxtrot	EMS2	CC EMRC	CC MED4	CC MED8	MPTY	DC EMRC	DC MED4	DC MED8	MPTY	AA EMRC	AA MED4	AA MED8	MPTY	DF EMRC	DF MED	MPTY	MPTY
G Golf	STAFF	ADMN	MPTY	OPNS	CIT	SUSV	LFSF	TRNG	MPTY	MPTY	VCHF	VOL1	VOL2	VOL3	VOL4	VOL5	VOL6
O Oscar	ITAC-RINS Non-Trunked Reseurees	BCLL D.R	BTC1 D.R	BTC2 D.R	BTC3 D.R	BTC4 D.R	RNS1 D.R	RNS2 D.R	RNS3 D.R	RNS4 D.R	RNS5 D.R	RNS6 D.R	MPTY	MPTY	MPTY	F7	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	MPTY	BEEM (BOE)	CALL HELP DYK	BCLL D.R	BTC1 D.R	BTC2 D.R	BTC3 D.R	BTC4 D.R	RNS1 DIRECT	FLT1	911

HOWARD COUNTY DEPARTMENT of FIRE & RESCUE SERVICES

800 MHz RADIO TEMPLATE - F8 (JHU Applied Physics Lab)

ZONE	ZONE NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A Alpha	MAIN	FDP1	OPS1	OPS2	HCGH	EVT1	BAT1	BAT2	EMKX	NDP1 PD A1	SDP1 PD B1	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FDP1
B Bravo	INCIDENT ONE	FI10	FI11	FI12	FI13	WTR1	STG1	ANN1	EMKX	PI10 PD C1	PI17 PD C7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI10
C Charlie	INCIDENT TWO	FI20	FI21	FI22	FI23	WTR2	STG2	ANN2	EMKX	PI20 PD D1	PI27 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI20
D Delta	INCIDENT THREE	FI30	FI31	FI32	FI33	WTR3	STG3	ANN3	EMKX	PI10 PD C1	PI17 PD D7	FIOP10	FIOP11	FIOP12	RNS5 DIRECT	RNS6 DIRECT	FI30
E Echo	EMS1	EMRC	MED4	MED8	HCGH	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY	MPTY
O Oscar	ITAC-RINS Non-Trunked Resources	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 D-R	RNS2 D-R	RNS3 D-R	RNS4 D-R	RNS5 D-R	RNS6 D-R	MPTY	MPTY	MPTY	F8	911
S Sierra	COUNTY	911	CNY1	CNY2	CNY3	EOC	MPTY	BEEM (BOL)	CALL HELP BTN	BCLL D-R	BTC1 D-R	BTC2 D-R	BTC3 D-R	BTC4 D-R	RNS1 DIRECT	FLT1	911

DFRS Staff Notification Criteria

(Alpha Paging is the Preferred Method of Staff Notification[1])

STAFF OFFICER / GROUP / EVENT	FIRE GROUP	FIRE CHIEF	CHIEF DEPUTY	D/C OPNS	D/C COMM / IT	D/C SUPP SERV	D/C LIFE SAFTEY	B/C EXEC. OFF.	PIO	B/C SAFETY	VOL. FIRE CHIEF	PRES. LOCAL 2000	CHAPLAIN	CISM
RADIO ID (UNIT)		*1*	*2*	*3*	*4*	*5*	*6*	*100*	*40*	*305*				
Job related firefighter death or life-threatening injury	X	R	R	R	R	R	R	R	R	R	X	X	R	X
Job related firefighter injury (requiring medical treatment)	X	R	R	R				R	R	R	X	X		
Off-duty firefighter death or serious injury		R	R	R	R	R	R	X	X	R	X	X	X	X
Civilian death or injury as a result of fire		R	X	R	X	X	X		X		X		X	X
Working fire or incident[2]	X	X	X	X					X	X				
DRFS vehicle involved in accident		R		R				X	R	R	X[3]			
Severe weather information	X													
Blue alert	X													

Explanatory Detail:

X Notification is made by Communications.

R Notification is made by Communications, **Telephone Response Required**. DFRS personnel should respond within 15 minutes.

1 Alpha paging is the preferred method of DFRS staff notification. If the alpha paging system is known to be down or Communications personnel did not receive a response from DFRS personnel who are required to reply to a page, then Communications personnel shall handle notification using the tone paging system.

2 First notification is made when unit arrives on scene and advises of a working incident. Minimum updates thereafter should be: first status report, fire under control, and all units clear.

3 If the vehicle is assigned to a volunteer station (Stations 1, 2, 3, 4, 5, 6, or 8) then the appropriate volunteer chief shall be notified.

Attachment M – DFRS Staff Notification Criteria

To accomplish DFRS Staff Notification the following procedure shall be used:

Use FD paging groups from within the CAD Messaging Service as shown in the "**Using the CAD Messaging Feature to accomplish DFRS Staff Notification"** section that follows.
If a response is **NOT** received from DFRS personnel who are to call-in to confirm they have received the page then Communications personnel shall initiate individual alpha pages to those personnel who did not reply and request they contact Communications immediately.
If personnel have not replied to a direct page or the paging system does not appear to be functioning properly then Communications shall handle staff notification using the tone paging system.

Using the CAD Messaging Feature to accomplish DFRS Staff Notification

DFRS paging notification requirements can be met by using the following CAD Message Groups. An "X" indicates which groups should be paged from within CAD to accomplish appropriate notification. The "OTHER PAGES" section indicates additional paging that must be done to meet DFRS paging requirements for the particular event.

CAD Paging Group / Event	FD-CFS 2,4,5,6	FD-CHAPLAINS	FD-FFINJ/DEATH	FD-PIO	FD-SAFETY	FD-SR STAFF	FD-WORKING INC	FD-MVA	FD-CISM	OTHER PAGES
Job related firefighter death or life-threatening injury.			X							Volunteer Chiefs 1 and 3, and the Fire Group For Volunteer Chief 2 use Sta. 2 Fire Tone
Job related firefighter injury (requiring medical treatment)			X							Volunteer Chiefs 1 and 3, and the Fire Group
Off-duty firefighter death or serious injury			X							Volunteer Chiefs 1 and 3
Civilian death or injury as a result of fire	X	X		X		X			X	Volunteer Chiefs 1 and 3
Working fire or incident							X			
DFRS vehicle involved in accident								X		Volunteer Chiefs 1 and 3 For Volunteer Chief 2 use Sta. 2 Fire Tone
Severe weather information							X			
Blue alert							X			

Attachment N – Fail Soft Chart

Fail Soft Talk Group Frequency Assignments - All Digital Except Channel 6																
Channel 1 Police	Channel 2 Police	Channel 3 Police	Channel 4 Police	Channel 5 Police	Channel 6 Police Digital Radios	Channel 7 Police	Channel 8 Police	Channel 9 Police	Channel 10 Police	Channel 11 Police	Channel 12 Police	Channel 13 Police	Channel 14 Police	Channel 15 Police	Not Assigned
866.86250	866.03750	867.48000	867.03750	867.71250	866.98750	866.86250	866.68750	866.53500	866.53750	866.38750	866.46250	866.03750	867.23750	867.23750	
LE	INCP1	SDP1	FD1	SO	DDP1	FD	FD8	FB1	FADM	ADM	SNAD	FAT	ESC1		COU1
CMH	INCP2	SDP2	FD1	SO1	OPS1	FD	FD1	FB1	FAC1	DOP	SNCS	FAO	ADM1	TAC1	COU2
EMS	FAT1	FAT	FD2	SO2	OPS2	FD	FD2	FB2	FAC2	DOP	SNOP	FFAO	ADM2	DIV2	COU3
CO	FAT2	FAT	FD4	SO3	HLCM	FD	FD3	FB3	FAC3	DOT	SNFT	FCOP	ADM3	DIV3	COU4
FIRE	FAT3	FAT	FD5	SO4	EAT1	FD	FD4	FB4	FAC4	DOT1	SNOP	FCOP		DIV4	COU5
MED	FAT4	FAT	FD6	SO5	EAT2	FD	FD5	FB5	FAC5	DOT2	SNAD	FCOP		FOD	COU6
TSAR	FAT5	FAT	FD7	SO6	EAT3	DT01	DT02	FB6	ADM6	DT03	SNFT	CSO1		DIS2	SU1
AU	INT01		FD8	SO7	FD2D1				SDS1	DT1	SNFT	CSO2		FD3	CO1
DPSH	SDR1			SO8	FD2D2				SPD5	WARTF	SNFT	CPT1		CDR1	MRC
FSS	SDR2				FD2D3				DT	DT4D	SNFT			CDR2	MED1
ES	CB1				FD2P1				SUSU	EDUR	SNW1			CDR3	MED2
FAC	CB2				FD2P2				TRAS	FOR	SNW2			CDR4	ANI1
ERO	AC1				HEALTH				CAF	EOC	SNFT			DSP1	ANI2
	INCP3								FST	DTHN	SNTO			DSP2	ANI3
									EVT	EADM	SNM				INFO1
															INFO2
															CITY
															LOG1
															SPARE SHIP
															ANI4
															FLEET SHIP
															FLEET1
															FLEET2
															FLEET3
															FLEET4
															FLEET5
															FLEET6
															FLEET7
															FLEET8
															FLEET9
															FLEET10
															FLEET11
															FLEET12
															FLEET13
															GAIN
															FREEZE

General Order 500.01: Annual Service Testing and Inspections

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

500.01

Originating From	Issue Date	Revision Date	Attachments
Support Services	**12/10/1995**	**N/A**	**N/A**

SUBJECT: Annual Service Testing and Inspections
APPLICABILITY: All Personnel

POLICY:
Service testing and inspections, as a minimum, shall be conducted annually to insure that all equipment and apparatus in the Howard County Department of Fire and Rescue Services (DFRS) is in a constant state of operational readiness. This annual procedure shall help minimize equipment failure and increase safe and efficient operations during emergency incidents

1 General

1.1 All equipment and apparatus shall be tested and/or inspected annually to ensure proper operational safety. More frequent testing/inspections may be required for certain equipment as stated in this procedure.

1.2 All equipment and apparatus shall be tested and/or inspected after any suspected damage or extensive repairs.

1.3 All equipment and apparatus will be tested in accordance with NFPA standards or manufacturer recommendations.

1.4 Testing and inspections shall be conducted each spring during the months of March, April, and May, unless otherwise stated.

1.5 Apparatus or equipment that fails any portion of the service test will be placed out of service. Repairs, if appropriate, will be accomplished in a timely manner.

1.6 Failed apparatus or equipment shall be retested after repairs have been completed prior to returning to full performance emergency service.

1.7 An annual inventory shall be conducted of all equipment carried, to verify there are no Aunauthorized devices@ present.

1.8 A preventative maintenance program shall be in place for all apparatus and equipment in accordance with manufacturers' recommendations, DOT regulations and/or applicable NFPA standards

2 Equipment Requiring Annual Testing and/or Inspection:

2.1 Fire Service Pumps

2.1.1 Shall be conducted in accordance with NFPA 1911.

2.2 Hose

2.2.1 Shall be conducted in accordance with NFPA 1962, Chapter 5.

2.2.2 All new hose will be tested prior to being placed in service.

2.2.3 All Fire Service Hose that has any suspected damage or has been repaired will be service-tested prior to returning to emergency operations.

2.3 Rope, Life Safety Harnesses and Hardware

2.3.1 There is no approved method to service-test rope without compromising its strength. The DFRS shall use only NEW rope for rescue work.

2.3.2 Rope and accessories shall be inspected and/or removed from service in accordance with NFPA 1983, sec. 3.6 and manufacturer recommendations.

2.3.3 Life Safety Rope shall be downgraded after any use and altered in such a manner to prevent future accidental emergency service.

2.3.4 Training Ropes will be scheduled for replacement at regular intervals. Training Rope shall be destroyed after signs of wear, damage or impact loading.

2.4 Ground Ladders

2.4.1 Shall be tested in accordance with NFPA 1932.

2.4.2 Strength Service-testing and Hardness Testing of ground ladders will be conducted by an independent ladder-testing vendor. Interpretation of non-destructive test results must be performed only by certified personnel.

2.4.3 Testing agencies will provide certification documents stating that their personnel meet the American Society of Non-destructive Testing Requirements.

2.4.4 All Ground Ladders will be identified by: Serial Number, where applicable, and engraved on the beam with the unit radio identification number followed by the number 1, 2 or 3 (example: 21-1 = 35' 3-section ladder).

2.4.5 Heat Sensor Labels will be checked after every use. If a change in the label is noted, the ground ladder shall be removed from service and tested prior to returning to operational use.

2.5 Aerial Ladders and Elevating Platforms

2.5.1 All Aerial Ladders and Aerial Tower Apparatus will be tested in accordance with NFPA Standard 1914.

2.5.2 The inspections and tests will be performed by an independent vendor. Those selected vendors shall comply with the American Society for Testing and Materials Standard E543.

2.6 Breathing Apparatus and Cascade Systems, Pass Devices

2.6.1 SCBA of the open circuit design shall be positive pressure and shall meet the performance requirements of NFPA Standard 1981.

2.6.2 Compressed Breathing Air shall meet the requirements of the Compressed Gas Association G-7.1, Commodity Specification for Air, with a minimum air quality of Grade E, with a Dew Point greater than -55EF.

2.6.3 Sources of Compressed Breathing Air such as air compressors and cascade systems shall be tested every 3 months to assure compliance with Section 2.6.2.

2.6.4 SCBA Cylinders shall be hydrostatically tested according to applicable Federal Standards.

2.6.5 Annual performance testing and inspection of SCBA regulators shall be conducted in accordance with manufacturer specifications.

2.6.6 PASS devices shall be inspected and maintained according to manufacturer recommendations. Batteries shall be changed annually or when needed.

2.7 Air Quality Monitoring Devices/Explosive Meter

2.7.1 Monitoring devices shall be calibrated, inspected, and maintained according to manufacturer recommendations.

2.8 Portable Fire Extinguishers

2.8.1 Shall be inspected annually by a certified private vendor according to NFPA 10. This shall include vehicle mounted and station mounted units.

2.9 All Emergency Vehicles

2.9.1 All DFRS vehicles shall be maintained and inspected in accordance with established DFRS periodic maintenance and inspection procedures and with the Motor Vehicle Administration, Commercial Vehicle Inspections Division.

2.10 Boats

2.10.1 DFRS boats shall be maintained and equipped in compliance with Department of Natural Resources regulations.

2.11 Generators, Gas/Pneumatic/Hydraulic Tools and Miscellaneous Equipment

2.11.1 Shall be inspected annually and maintained according to manufacturer recommendations.

2.12 EMS Equipment

2.12.1 Ambulances, oxygen regulating equipment and related miscellaneous EMS equipment shall be inspected/tested every three years by a representative from MIEMS. The inspection/certification process shall be in accordance with the Maryland Voluntary Ambulance Inspection Program (VAIP).

2.12.2 An annual inventory shall be conducted of all equipment carried, to verify there are no Aunauthorized devices@ present.

2.12.3 Medical Defibrillators shall be inspected/maintained according to manufacturer specifications and MIEMSS.

2.12.4 Mechanical CPR devices shall be inspected/calibrated according to manufacturer specifications.

3 Records

3.1 Appropriate records of tests and maintenance shall be maintained at each station.

3.2 Annual service test results shall be forwarded to the Deputy Chief of Operations in a timely manner.

Approved:

Joseph A. Herr
Fire Chief

General Order 510.03: Vehicle Maintenance and Repair

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

510.03

Originating From	Issue Date	Revision Date	Attachments
Support Services	**3/07/2002**	**N/A**	**A-C**

SUBJECT: Vehicle Maintenance and Repair
APPLICABILITY: All Personnel

POLICY:
All vehicles owned by Howard County shall be maintained according to the standards in this order via a cooperative effort between the Howard County Department of Fire and Rescue Services (DFRS) personnel and county shop personnel. Volunteer corporations utilizing vendors other than the county shop for vehicle maintenance shall uphold county-owned vehicles to these standards and adhere to these reporting procedures. Volunteer corporations owning their own apparatus are expected to maintain their vehicles in a safe condition.

1 DFRS personnel shall be responsible in part for both the maintenance and minor repair of county-owned vehicles.

1.1 Daily and weekly checks shall be performed by the vehicle's assigned driver/operator in accordance with the DOT and COMAR inspection standard and then recorded on the appropriate DFRS check sheet. **(See attachments A-C).**

1.2 Daily and weekly checks on reserve and detail apparatus shall be performed and recorded by personnel in the station where the apparatus is currently housed.

1.3 DFRS personnel shall be responsible for ensuring that vehicles under their purview are scheduled for preventive maintenance as outlined in Section 2 below.

1.3.1 Preventive maintenance for vehicles assigned in the field is to be scheduled by the company captain.
1.3.2 Preventive maintenance for staff vehicles is to be scheduled by the Fleet Maintenance Division upon input from the vehicle's driver/operator.

1.4 DFRS personnel shall be responsible for maintaining the vehicle in the following areas between scheduled service intervals:

1.4.1 Ensure proper fluid levels;
1.4.2 Ensure sufficient lubrication of aerial ladders. To this end, station personnel shall lubricate the ladder slides according to the vehicle owner's manual on the first Monday of each month;
1.4.3 Ensure sufficient lubrication of door hinges and locks. To this end, station personnel shall lubricate these devices on the first Monday of each month with

WD-40;

1.4.4 Ensure sufficient lubrication of keystone valves, gated intakes and 6" caps. To this end, station personnel shall remove and lubricate the threading of the devices with white lithium grease on the first Monday of each month.

1.5 DFRS personnel may attempt minor vehicle repairs which include, but are not limited to:

1.5.1 Replacement of light bulbs;
1.5.2 Replacement of light lenses or assemblies;
1.5.3 Replacement of siren/dimmer switches;
1.5.4 Replacement of wiper blades;
1.5.5 Replacement of petcock drain valves;
1.5.6 Replacement of broken mirrors;
1.5.7 Cleaning of battery terminals.

1.6 DFRS personnel shall not adjust brakes or attempt repairs of brakes on any vehicle. County shop personnel shall be solely responsible for the maintenance of braking systems.

1.7 An annual evaluation shall be performed on each major piece of county-owned apparatus by the personnel assigned to maintenance where the apparatus is currently housed. This evaluation will determine the overall condition of the vehicle.

2 Requests for routine maintenance and repairs shall be scheduled using the Vehicle Maintenance Request form (attachment A-C).

2.1 The Company Captain or his/her designee shall schedule routine work for field units normally used by that station.

2.2 Requests for vehicle repairs shall be initiated by the on duty shift.

2.3 Maintenance and repairs request for Staff vehicles will be handled by the Fleet Maintenance Division.

2.4 The maintenance/repair request shall be forwarded to the repair facility with the vehicle.

2.5 Shop personnel will check off work completed on the unit and return the form with the apparatus.

2.6 The Company Captain or his/her designee shall properly file the completed repair

request.

3 County shop personnel shall be responsible for the maintenance and repair of county-owned vehicles based on the following schedule:

3.1 Group I Vehicles - Cars, Utilities, Brush Units

3.1.1 Every 3,000 miles
- 3.1.1.1 Change oil and filter
- 3.1.1.2 Check transmission fluid level
- 3.1.1.3 Replace the fuel filter
- 3.1.1.4 Align the front end
- 3.1.1.5 Inspection and adjust brakes
- 3.1.1.6 Lubricate the chassis
- 3.1.1.7 Perform all work required by the vehicle manufacture at the various vehicle mileage.

3.1.2 Each April and October
- 3.1.2.1 In April, check air conditioner function, change dryer in system.
- 3.1.2.2 In October, check heater system, check antifreeze levels.

3.2 Group II Vehicles - Ambulances

3.2.1 Every 3,000 Miles
- 3.2.1.1 Change oil and filters
- 3.2.1.2 Change the fuel filter
- 3.2.1.3 Replace air filters
- 3.2.1.4 Inspect belts, replace if necessary
- 3.2.1.5 Check cooling system, hoses, and clamps, replace if necessary
- 3.2.1.6 Inspect the drive shaft
- 3.2.1.7 Check throttle linkage and idle spring
- 3.2.1.8 Inspect fan and fan shroud
- 3.2.1.9 Check coolant strength
- 3.2.1.10 Inspect for fluid leaks
- 3.2.1.11 Lubricate transmission linkage
- 3.2.1.12 Inspect tires, replace if necessary
- 3.2.1.13 Inspect and lube front wheel bearings
- 3.2.1.14 Lubricate front axle spindles
- 3.2.1.15 Inspect rear carrier fluid for leaks and damage
- 3.2.1.16 Inspect brake system, note measurement
- 3.2.1.17 Lubricate caliper slide rails
- 3.2.1.18 Lubricate chassis
- 3.2.1.19 Lubricate doors, hood, hinges, and locks

3.2.1.20 Align front end
3.2.2 Each April
3.2.2.1 Make air conditioning functional
3.2.2.2 Change dryer in system
3.2.3 Each October
3.2.3.1 Make heating system functional
3.2.3.2 Check for leaks
3.2.3.3 Check antifreeze for right strength.
3.2.4 Annually
3.2.4.1 Change transmission fluid and filter
3.2.4.2 Change rear fluid
3.2.4.3 Change batteries
3.2.4.4 Change glow plugs
3.2.4.5 Change coolant
3.2.4.6 Perform power flush
3.2.4.7 Clean Radiator fins
3.2.4.8 Perform DOT inspection.

3.3 Group III Vehicles - Class B vehicles

3.3.1 Service A - **This service is required every 4000 miles, 250 engine hours or annually, whichever occurs first**.
3.3.1.1 Change engine oil
3.3.1.2 Change oil filters
3.3.1.3 Clean or replace air filter
3.3.1.4 Replace fuel filters(primary and secondary) at appropriate interval
3.3.1.5 Inspect belts, replace if necessary
3.3.1.6 Service air dryer
3.3.1.7 Change air compressor filter at appropriate interval
3.3.1.8 Inspect for leaks
3.3.1.9 Change water/fuel separator element at appropriate interval
3.3.1.10 Replace transmission fluid filter
3.3.1.11 Replace transmission fluid at appropriate interval per manufacturer.
3.3.1.12 Inspect transmission for leaks
3.3.1.13 Lubricate drive line and chassis
3.3.1.14 Check lubricant level
3.3.1.15 Clean transfer case breather
3.3.1.16 Change transfer case fluid at appropriate interval per manufacturer.
3.3.1.17 Check rear carrier fluid level
3.3.1.18 Check front wheel bearing lubricant
3.3.1.19 Inspect brake linings, list measurement
3.3.1.20 Check level of cooling system

3.3.1.21 Inspect hoses for wear, replace as necessary
3.3.1.22 Check for leaks around clamps, adjust as necessary
3.3.1.23 Perform DOT inspection

3.3.2 Each April
3.3.2.1 Make air conditioning functional
3.3.2.2 Change dryer in system
3.3.2.3 Change coolant and filter/conditioner
3.3.2.4 Flush radiator
3.3.2.5 Clean radiator fins

3.3.3 Each October
3.3.3.1 Make heating system functional
3.3.3.2 Check for leaks
3.3.3.3 Check antifreeze for the right strength.

3.3.4 Annually
3.3.4.1 Steam clean and lubricate the ladder, turntable, and other related parts (cylinders, locks, etc.).

4 In accordance with recommendations established by NFPA 1500, the following is a list of vehicle defects that are to be utilized in determining an unsafe vehicle operating condition. Any vehicle found to be unsafe shall be placed out of service until the appropriate repairs are completed. It is not the intent of these guidelines to identify every possible unsafe vehicle condition. A vehicle experiencing any of the defects listed below does not necessarily render it unsafe to drive. They are to be used as general guidelines in conjunction with the judgment of the vehicle operator to determine an unsafe vehicle.

4.1 Brakes

4.1.1 Audible or visual air leak at brake chamber (i.e., ruptured diaphragm, loose chamber clamp, etc.).
4.1.2 Air line with audible leak, or bulge / swelling, cracked or broken air line
4.1.3 Loose compressor mounting bolts, or loose or cracked pulley on air compressor.
4.1.4 Inoperable parking brake system, parking brake will not hold vehicle.
4.1.5 Evidence of oil seepage into or out of the brake lining/drum interface area.
4.1.6 Oil running from the drum or bearing seal area (inside of tire area).
4.1.7 Brake drums with evidence of external crack(s).
4.1.8 Low pressure warning device missing, inoperative or does not operate at 55 psi or below.
4.1.9 Air reservoir tanks separated from its attachment points.
4.1.10 Air leak of sufficient nature that air pressure cannot be maintained. between 80-90 psi, at engine idle, with parking brakes applied.

4.1.11 Master cylinder less than 1/4 full.
4.1.12 Any visually observed brake fluid leaks.

4.2 Steering System

4.2.1 Any steering wheel free play that seems excessive (30 degrees before the steering axle tire moves).
4.2.2 Any missing or loose steering support bolts/brackets.
4.2.3 Worn or faulty universal joints.
4.2.4 Steering wheel not properly secured.
4.2.5 Any looseness of the pitman arm on the steering gear.
4.2.6 Any loose power assist cylinder.
4.2.7 Any loose tie rod ends or drag links.
4.2.8 Any condition that interferes with the free movement of any steering component.

4.3 Exhaust System

4.3.1 Any exhaust system leak at a point forward of or directly below the cab that permits entry of exhaust fumes into the cab, jump seat or patient compartment area.
4.3.2 Any exhaust system component so located as to result in burning, charring, or damaging the electrical wiring, the fuel supply, or any combustible part of the vehicle.

4.4 Frame

4.4.1 Any cracked, loose, or broken frame member adversely affecting support of functional components such as steering gear, fifth wheel, engine, transmission, body parts, and suspension.

4.5 Fuel System

4.5.1 Any visible fuel system leak at any point.
4.5.2 The fuel tank not securely attached to the vehicle by reason of loose, broken or missing mounting bolts or brackets. (NOTE: Some fuel tanks use springs or rubber bushings to permit movement.)

4.6 Springs/Suspension System

4.6.1 Any u-bolts or other spring-to-axle clamp bolts cracked, loose or missing.
4.6.2 Any spring hanger cracked, loose or missing.

General Order 530.02: Personal Protective Equipment

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

530.02

Originating From	Issue Date	Revision Date	Attachments
Logistics	**1/10/1985**	**1/5/2009**	**A**

SUBJECT: Personal Protective Equipment
APPLICABILITY: All Personnel

POLICY:
The Howard County Department of Fire and Rescue Services (DFRS) shall provide protective equipment to departmental members as outlined in the following procedure. The DFRS shall also establish guidelines for the standardized wear, use, and quantity of issued items.

1 PERSONAL PROTECTIVE EQUIPMENT

1.1 Personal Protective Equipment (PPE) shall meet NFPA guidelines as well as require DFRS approval. Personal Protective Equipment shall consist of the following:

1.1.1 Helmet with face shield (NFPA approved leather helmets may be worn and are furnished at the employee's expense).
1.1.2 Turnout coat
1.1.3 Turnout pants with suspenders
1.1.4 Short boots (NFPA approved leather "Pro" boots may be worn and are furnished at the employee's expense).
1.1.5 Personal rope
1.1.6 Pair of safety glasses
1.1.7 Protective hood (nomex or PBI)
1.1.8 Pair of firefighting gloves
1.1.9 Set of hearing protection
1.1.10 SCBA Face piece w/bag

1.2 Under no circumstances shall any damaged or defective Personal Protective Equipment be worn during emergency operations or training. It is the employee's responsibility to maintain protective equipment in serviceable condition. In the event that any PPE is damaged or lost, it is the employee's responsibility to immediately report such occurrence to his/her immediate supervisor. In an effort to ensure the highest level of safety and protection, all items shall be inspected by the shift officer on an annual basis and written documentation of said inspections will be included as part of the annual employee evaluation.

1.3 Refer to Attachment A for standard issued quantities of PPE items.

2 PROTECTIVE EQUIPMENT REPLACEMENT AND ALTERATIONS

2.1 Uniform clothing, protective equipment and accessories shall be replaced, one for one, on an as needed basis. Full time, Part time, Temporary and County Volunteer personnel requiring

replacement of issued items may do so by completing a Quartermaster Requisition form. If a replacement is requested on a lost or damaged item, proper documentation such as Loss/Damage Report and Police report, approved by the respective Battalion Chief, must accompany requisition form... The importance of safety and protection cannot be overstated. In the event that an article of personal protective or safety equipment is believed unserviceable, immediate arrangements between the station officer and the Quartermaster should be made for the replacement of such item. Volunteer Corporations in Howard County may requisition items from the Quartermaster for their volunteer personnel. The requisitions for volunteer personnel shall be approved by the Volunteer Chief or other official authorized to approve such expenditures.

2.2 It is the employee's responsibility to maintain PPE items in good condition. Proper care practices as well as the securing of issued PPE items to prevent loss from damage, theft, or otherwise is a shared responsibility of employees and shift officers. The shift officer shall monitor PPE items for appropriate care and initiate appropriate action to replace worn or damaged items.

3 WEAR REQUIREMENTS

3.1 The wearing of department issued clothing and personal protective equipment remains the property of the DFRS and is restricted to "on-duty" activities and department "sponsored" or "sanctioned" activities and training exercises, unless approved by the individual's Section Chief or Volunteer Chief.

3.2 Whenever any part of the department uniform (that an individual has purchased) is worn off-duty, the individual's conduct shall be as if the individual was on-duty.

3.3 The proper protective equipment shall be worn appropriate to the duties at hand.

Approved:

Joseph A. Herr
Fire Chief

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

530.02

Personal Protective Equipment	Attachment A

Attachment A

PPE Item	Full Time Personnel	Part-Time/Contingent County Volunteer	DFRS Trainee
Turn Out Coat	2	1	1
Turn Out Pants	2	1	1
Suspenders (Pair)	2	1	1
Protective Hood	2	1	1
F.F. Gloves (Pair)	2	1	1
F.F. Boots (Pair)	1	1	1
Safety Glasses	1	1	1
Glass Case	1	1	1
Hearing Protection	1	1	1
Personal Rope	1	1	1
Gear Bag	1	1	1
B/A Face Piece	1	1	1
Infection Control Kit	1	1	1
*Prescription Glasses as Necessary			

Special Order 2004-42: Protective Equipment Cleaning

SPECIAL ORDER

Series	Number	Originating Bureau	Effective Date	Expiration Date
2004	42	Support Services	7/06/04	N/A

Subject: **Protective Equipment Cleaning**

1. This Special Order is a temporary order to identify the new procedures for the cleaning/repair/decontamination (decon) of protective equipment with our present cleaning contractor. A General Order will be issued to identify the inspection, cleaning, repair and decon procedures of all protective equipment in the near future.

2. This Special Order is applicable to all career and county volunteer personnel. Corporate volunteer stations may use this special order or develop their own procedures for protective equipment cleaning per NFPA 1851 Selection, Cleaning and Repair of Structural Fire Fighting Ensembles.

3. The Safety Officer will distribute a video tape, through the Training Division, covering the requirements of NFPA 1851 for Selection, Cleaning and Repair of the Structural Fire Fighting Ensembles. All personnel will sign an attached roster (Attachment A) after viewing the video. All rosters shall be forwarded to the Safety & Health Officer **by July 30, 2004.**

4. Every 12 months, at a minimum, departmental issued and approved personally owned protective equipment currently in-service and soiled, shall be sent for cleaning.

5. Turnout coats, turnout pants, structural firefighting gloves, and hoods will be the only items sent out for cleaning at this time. Any other items will need approval from the Deputy Chief of Support Services or designee.

6. The following process shall be used:

   a. Complete a Howard County Department of Fire and Rescue Services (DFRS) purchase request and obtain approval.

   b. **Each** item that is soiled, contaminated or needs repair shall be labeled with the DFRS (Fluorescent Green) Personal Protective Equipment (PPE) Inspection/Cleaning/Repair identification tag (Attachment B). The cleaning contractor must have this tag attached to each item.

   c. Complete the identification tag with the specific reason for the

cleaning/repair/decon and attach it to the item.

i. Secure tag to the top buckle of the turnout coat.
ii. Secure tag to waist buckle on the turnout pants.
iii. Rubber band the gloves and secure the tag to the gloves.
iv. Rubber band the hood and secure the tag to the hood.

d. Place all items in a clear plastic trash bag unless they are contaminated with bloodborne pathogens.

e. **Place items that are contaminated with bloodborne pathogens into a red bio-hazard bag. This is the ONLY method to be used for transporting bio-hazard contaminated protective equipment. These items require special shipping.**

f. Attach the completed DFRS Protective Ensemble Inspection Check List (Appendix C1 & C2) to the outside of the bag with tape after sealing the bag.

g. Place the items (bags) in the designated pickup point for each station/facility.

h. The mail person will pick up the items (bags) and transport the items to the Quartermaster's Office.

i. **No** bag shall be sent to the Quartermaster without the Protective Ensemble Inspection Check List attached to the outside of the bag.

j. The Quartermaster will log and package the items for shipment to the cleaning contractor.

k. Station/Facility officers shall track items sent to the Quartermaster for cleaning on the DFRS Personnel PPE Cleaning Log form (Attachment D).

l. All cleaned/repaired/deconed items will be returned by the mail person from the Quartermaster's Office.

7. All protective equipment should be scheduled for general cleaning during an off-work period (Kelly Day, Vacation, etc.) if possible.

8. All protective equipment shall be marked with the employee/member EID# in the event the inspection tag is removed. The EID# should not cover any identifying information on the label of the item.

9. A new Special Order (Protective Equipment Inventory) will be issued to help verify and compare present inventories of protective equipment.

Joseph A. Herr
Fire Chief

VIDEO ROSTER FOR NFPA 1851 VIDEO

Attachment A

A SHIFT			*B SHIFT*			*C SHIFT*		
EID#	INITIALS	PRINT NAME	EID#	INITIALS	PRINT NAME	EID#	INITIALS	PRINT NAME

Station # _____ or Bureau _____

Safety & Health Officer

1

Attachment B

From:
Howard Cnty. Fire & Rescue
Quartermaster Div.
9250 Bendix Rd.
Columbia, MD 21045
(410) 313-5761

P.O. # _____
Name _____
EID #_____ Sta/Shift _____

(Check all that applies below)

Coat Pants Hood Gloves

Serial # _____

GENERAL Cleaning/Repair _____
Describe known repairs needed:
_____
_____
_____

OR
DECON ___
Bio-hazard ____ or Chemical ____
Blood ___ Petro _____
Other ___ Other _____
Describe: Describe:
_____ _____

_____ _____

Howard Cnty. Fire & Rescue
Quartermaster Div.
9250 Bendix Rd.
Columbia, MD 21045

PPE INSPECTION
CLEANING
REPAIR TAG

1

2

3

Attachment C1

DFRS Inspection / Repair / Decon Check List

Turnout Coat - Pants - Hoods

Protective Ensemble Elements

Name:_____ EID #:_____

Inspector:_____ EID#:_____ Inspection Date:_____

TYPE OF INSPECTION / REPAIR / DECONTAMINATION

Routine	**Annual (Contactor)**	**Specialized (Contractor)**
(In Station)	(Completed w/ Evaluation)	(Contaminated or Special Needs)

(circle one)

Ratings: N - New or new condition, **G** - Good condition, **M** - Maintenance needed, **R** - Replace immediately

"Maintenance Needed" and "Replace Immediately" items are to be REMOVED form service.

Turnout coat and pants Ratings	N	G	M	R
Free from rips, tears, cuts and abrasions				
Free of thermal damage (charring, burn holes, melting, discoloring of any layer)				
Hardware is free of damage, intact and attached, trim maintains reflectivity				
Moisture barrier is free of rips, tears, cuts, abrasions, discoloration & thermal damage				
Ensemble fits and coat overlaps pants				
Seams are unbroken with no missing stitches (All items on coat)				
Wristlets have elasticity with no stretching, runs, cuts, burn holes				
Label is attached and legible				
Hook and loop closures are functional (Velcro is not worn, burned or matted)				
Liner attachment systems are functional				
No painted or added items on coat/pants				
Presence of hazardous materials				
NFPA Label located in/on item.				
Marked with EID# and in-service date				
If greater than 10 years old remove from service				

Hoods Ratings	N	G	M	R
Inspect for cuts, tears, worn areas				
Loose or open seams				
Discoloration or charring				
Hood not altered in any way				
Fits and interfaces with turnout coat with no gaps				
Elasticity around face opening				
Marked with EID# and in-service date				
NFPA Label located in/on item.				
If greater than 5 years old remove from service				

Identified Items needing attention:

1

DFRS Inspection / Repair / Decon Check List
Gloves - Eye Protection

Attachment C2

Name:_____ EID #:_____

Inspector:_____ EID#:_____ Inspection Date:_____

TYPE OF INSPECTION / REPAIR / DECONTAMINATION

Routine	**Annual (Contactor)**	**Specialized (Contractor)**
(In Station)	(Completed w/ Evaluation)	(Contaminated or Special Needs)

Ratings: N - New or new condition, **G** - Good condition, **M** - Maintenance needed, **R** - Replace immediately

"Maintenance Needed" and "Replace Immediately" items are to be REMOVED form service.

Gloves Ratings	N	G	M	R
Free from rips, tears, cuts and abrasions				
Free of thermal damage (charring, burn holes, melting, discoloring of any layer)				
Moisture barrier is free of rips, tears, cuts, abrasions, discoloration & thermal damage				
Seams are unbroken with no missing stitches (All items on coat)				
Wristlets have elasticity with no stretching, runs, cuts, burn holes				
NFPA Label located in/on item.				
Presence of hazardous materials				
Marked with EID# and in-service date				
If greater than 5 years old remove from service				

Eye Protection Ratings	N	G	M	R
ANSI marking "Z.87" on item (Look closely, number is hard to spot on frame)				
No scratches, discoloration of lens (Must have a clear lenses)				
All parts are tight and work (Free range of motion)				
Marked with EID# and in-service date				
If greater than 5 old years remove from service				

Identified Items needing attention:

2

3

Personnel PPE Cleaning Log

Attachment D

Station:_____ Shift:_____

EID#	Employee Name	Date Out of Service for Cleaning	Date Returned to Service	RM # or PDQ (Obtain from HQ)	Items for Cleaning/Repair/Decon
					Hood - Coat - Pants - Gloves

Special Order 2008.052: Field Safety Officer

DEPARTMENT OF FIRE AND RESCUE SERVICES

SPECIAL ORDER

2008.052

Originating From	Issue Date	Expiration Date	Attachments
Health, Wellness & Safety	**7/03/2008**	**N/A**	**N/A**

SUBJECT: Field Safety Officer Implementation
APPLICABILITY: All Personnel

1 The Howard County Department of Fire and Rescue Services (DFRS) in conjunction with the Health, Wellness and Safety Office and Operations will implement a 24 hour Field Safety Officer Program that will be effective on July 7, 2008. There will be three Captain Safety Officers assigned to a 24 hour shift.

1.1 The Unit designation will be Safety 1.

1.2 The Unit will be housed at Fire Station 9.

1.3 The Unit will routinely respond with Battalion 1.

2 **PRIMARY RESPONSIBILITIES:**

2.1 Safety 1 will be dispatched on all box assignments and working rescues. They may also respond to any other calls they feel need an additional safety presence.

2.2 Main responsibilities on emergency incidents will be on-scene safety.

2.3 Complete daily transition with other safety officer and Battalion Chief of Health, Wellness and Safety.

2.4 Handle routing and follow up of injury reports.

2.5 Assist with incident follow-up and post incident analysis.

2.6 Assure OSHA compliance regulations are met within the department.

3 **OTHER RESPONSIBILITIES AND DUTIES AS NECESSARY; TO INCLUDE BUT NOT LIMITED TOO:**

3.1 Complete all pertinent paperwork for incidents and maintenance needs.

3.2 Assist the Training Section with PSTC training activities as a safety officer.

3.3 Provide Safety related training to all DFRS personnel.

3.4 Assign, train and communicate safety needs with station safety representatives and follow up on monthly safety reports.

3.5 Develop and design "Back to the Basics" program to be delivered FY09 along with fitness in service.

3.6 Assist with the delivery of a Heavy Vehicle Operator training program.

3.7 Assist with annual safety inspections of all stations, facilities and apparatus.

3.8 Work with Fleet and Facilities on all safety application needs and purchasing.

3.9 Work with Quartermaster and breathing apparatus technicians on personal protective equipment and breathing apparatus safety needs and purchasing.

3.10 Work with communications liaison/staff to address any communication policy and practice needs related to safety.

3.11 Assist with quarterly departmental career/volunteer safety meetings.

3.12 Assist with scheduling of certification and recertification of ISO/HSO and ACE Personal Trainers.

3.13 Provide personal trainer services to staff and field personnel (volunteer and career).

3.14 Assist with purchasing/maintenance of physical fitness equipment for DFRS.

Approved:

Joseph A. Herr

Joseph A. Herr
Fire Chief

Special Order 2017.36: Pump Testing

Howard Co SPECIal Of()rRaDER cue Services

SPECIAL ORDER 2017.36

Pump Testing

BUREAU OF LOGISTICS

l$$UtOate:	AIII\ISI 3, 2017
Expiration	Se:ptember 30, 2017
D<lte:	All Penonnel
Appllcoblity:	

OVERVIEW

In acco<dance with NfPA 1911, Standard for lnsptttlon Malnlenance TtstlnR and Retlrt""nt of ln-StMct Atttmnotlvc FJrc Ano,rnu,s the Department of J:ire and Rescue Semces (Department) will conduct annual pump testlns ol al 1ppar11us equipped w◆h a fire pump.

DEFINITIONS

None

TOPIC DETAILS

- Testing wil be conducted at fire Station 8 from Monday, Ausust 28, 2017 throush Friday, September 8, 2017. During the testing period, personnel assigned to Fire Station 8 are not to part near the pump testing basin.
- A specific: testing schedule wil not be pubfished this year. lnstead, each morning, Fleet personnel wil provide the on-dUly Sanaion Chiefs with a list of engine companies scheduled lor durins the shift. fleet penonnel will then worlc with the on-duty company olf,cers to testing of cenain apparatus.
- Single *engine* companies with no reserve wil be provided with a reserve engine while testing is completed on the front line apparatus. Engine companies with a reserve engine will have each engine tested inOJYidually. Fleet personnel assume responsibility for transporting all apparatus to and from the testins site when possible; there may be times when companies will be asked to assist. in tral\SJX)rting apparatus to the testing site.
- Field personnel *are* to report any known mechanical and/or pump issues through the fleet Help Desk immediately in order to provide the shop ample time to make minor repairs.

Questions regarding this year's pump testing process can be directed to Battahon Chief Martin P. lePore at fdt686@howardcountymd gov , Ray Wines at fdt518@howardcountymd"gov or FF Michael Hitt at fd2498@howardcountymd gov.

FORMS/ATTACHMENTS/REFERENCES

Approved:

John S. Butler, Fire Chief
Office of the Fire Chief

Author:

Christine Uhlhorn, Assistant Chief
Bureau of Logistics

Special Order 2018.30: Annual Hose Testing

DEPARTMENT OF FIRE AND RESCUE SERVICES

GENERAL ORDER

500.01

Originating From	Issue Date	Revision Date	Attachments
Support Services	**12/10/1995**	**N/A**	**N/A**

SUBJECT: Annual Service Testing and Inspections
APPLICABILITY: All Personnel

POLICY:
Service testing and inspections, as a minimum, shall be conducted annually to insure that all equipment and apparatus in the Howard County Department of Fire and Rescue Services (DFRS) is in a constant state of operational readiness. This annual procedure shall help minimize equipment failure and increase safe and efficient operations during emergency incidents

1 General

1.1 All equipment and apparatus shall be tested and/or inspected annually to ensure proper operational safety. More frequent testing/inspections may be required for certain equipment as stated in this procedure.

1.2 All equipment and apparatus shall be tested and/or inspected after any suspected damage or extensive repairs.

1.3 All equipment and apparatus will be tested in accordance with NFPA standards or manufacturer recommendations.

1.4 Testing and inspections shall be conducted each spring during the months of March, April, and May, unless otherwise stated.

1.5 Apparatus or equipment that fails any portion of the service test will be placed out of service. Repairs, if appropriate, will be accomplished in a timely manner.

1.6 Failed apparatus or equipment shall be retested after repairs have been completed prior to returning to full performance emergency service.

1.7 An annual inventory shall be conducted of all equipment carried, to verify there are no Aunauthorized devices@ present.

1.8 A preventative maintenance program shall be in place for all apparatus and equipment in accordance with manufacturers' recommendations, DOT regulations and/or applicable NFPA standards

2 Equipment Requiring Annual Testing and/or Inspection:

2.1 Fire Service Pumps

2.1.1 Shall be conducted in accordance with NFPA 1911.

2.2 Hose

2.2.1 Shall be conducted in accordance with NFPA 1962, Chapter 5.

2.2.2 All new hose will be tested prior to being placed in service.

2.2.3 All Fire Service Hose that has any suspected damage or has been repaired will be service-tested prior to returning to emergency operations.

2.3 Rope, Life Safety Harnesses and Hardware

2.3.1 There is no approved method to service-test rope without compromising its strength. The DFRS shall use only NEW rope for rescue work.

2.3.2 Rope and accessories shall be inspected and/or removed from service in accordance with NFPA 1983, sec. 3.6 and manufacturer recommendations.

2.3.3 Life Safety Rope shall be downgraded after any use and altered in such a manner to prevent future accidental emergency service.

2.3.4 Training Ropes will be scheduled for replacement at regular intervals. Training Rope shall be destroyed after signs of wear, damage or impact loading.

2.4 Ground Ladders

2.4.1 Shall be tested in accordance with NFPA 1932.

2.4.2 Strength Service-testing and Hardness Testing of ground ladders will be conducted by an independent ladder-testing vendor. Interpretation of non-destructive test results must be performed only by certified personnel.

2.4.3 Testing agencies will provide certification documents stating that their personnel meet the American Society of Non-destructive Testing Requirements.

2.4.4 All Ground Ladders will be identified by: Serial Number, where applicable, and engraved on the beam with the unit radio identification number followed by the number 1, 2 or 3 (example: 21-1 = 35' 3-section ladder).

2.4.5 Heat Sensor Labels will be checked after every use. If a change in the label is noted, the ground ladder shall be removed from service and tested prior to returning to operational use.

2.5 Aerial Ladders and Elevating Platforms

2.5.1 All Aerial Ladders and Aerial Tower Apparatus will be tested in accordance with NFPA Standard 1914.

2.5.2 The inspections and tests will be performed by an independent vendor. Those selected vendors shall comply with the American Society for Testing and Materials Standard E543.

2.6 Breathing Apparatus and Cascade Systems, Pass Devices

2.6.1 SCBA of the open circuit design shall be positive pressure and shall meet the performance requirements of NFPA Standard 1981.

2.6.2 Compressed Breathing Air shall meet the requirements of the Compressed Gas Association G-7.1, Commodity Specification for Air, with a minimum air quality of Grade E, with a Dew Point greater than -55EF.

2.6.3 Sources of Compressed Breathing Air such as air compressors and cascade systems shall be tested every 3 months to assure compliance with Section 2.6.2.

2.6.4 SCBA Cylinders shall be hydrostatically tested according to applicable Federal Standards.

2.6.5 Annual performance testing and inspection of SCBA regulators shall be conducted in accordance with manufacturer specifications.

2.6.6 PASS devices shall be inspected and maintained according to manufacturer recommendations. Batteries shall be changed annually or when needed.

2.7 Air Quality Monitoring Devices/Explosive Meter

2.7.1 Monitoring devices shall be calibrated, inspected, and maintained according to manufacturer recommendations.

2.8 Portable Fire Extinguishers

2.8.1 Shall be inspected annually by a certified private vendor according to NFPA 10. This shall include vehicle mounted and station mounted units.

2.9 All Emergency Vehicles

2.9.1 All DFRS vehicles shall be maintained and inspected in accordance with established DFRS periodic maintenance and inspection procedures and with the Motor Vehicle Administration, Commercial Vehicle Inspections Division.

2.10 Boats

2.10.1 DFRS boats shall be maintained and equipped in compliance with Department of Natural Resources regulations.

2.11 Generators, Gas/Pneumatic/Hydraulic Tools and Miscellaneous Equipment

2.11.1 Shall be inspected annually and maintained according to manufacturer recommendations.

2.12 EMS Equipment

2.12.1 Ambulances, oxygen regulating equipment and related miscellaneous EMS equipment shall be inspected/tested every three years by a representative from MIEMS. The inspection/certification process shall be in accordance with the Maryland Voluntary Ambulance Inspection Program (VAIP).

2.12.2 An annual inventory shall be conducted of all equipment carried, to verify there are no Aunauthorized devices@ present.

2.12.3 Medical Defibrillators shall be inspected/maintained according to manufacturer specifications and MIEMSS.

2.12.4 Mechanical CPR devices shall be inspected/calibrated according to manufacturer specifications.

3 Records

3.1 Appropriate records of tests and maintenance shall be maintained at each station.

3.2 Annual service test results shall be forwarded to the Deputy Chief of Operations in a timely manner.

Approved:

Joseph A. Herr
Fire Chief