Section 1. Purpose:
The purpose of the Structural Firefighting Appendix to the Incident Response Policy is to provide a framework for the initial operational thought processes and actions of fire/rescue personnel at reported structure fires.

SECTION 2. Applicability:
All MCFRS personnel while participating in MCFRS activities and personnel from other organizations while operating in Montgomery County.

SECTION 3. Background:
This Standard Operating Procedure (SOP) describes the MCFRS operational approach for structure fires. It considers research into compartment fire behavior, the behavior of structural components under fire conditions, known changes in the built environment, and lessons learned from firefighting operations in Montgomery County, MD.

Position Statement
Fireground operations are inherently complex and inherently risky undertakings. Successful fireground outcomes require good training, an understanding of the operational environment, careful assessments, decisive action, and exceptional teamwork.

The Structure Fire Appendix (SFA) outlines our initial response to structure fires and is based on the ideas and principles of both the Incident Response Policy and the Operational Doctrine Statement.

Consistent with the Incident Response Policy, all fireground operations must be directed toward clearly defined objectives. The incident objectives are determined by the Incident Commander and those objectives will change over the course of an incident. There are however, five objectives common to the initial actions at structure fires:
a. To provide for the continued survival of people (occupants) who may be trapped;
b. To ensure the immediate care of those on the fireground in need of medical care;
c. To prevent the fire from spreading beyond its current location;
d. To control the movement of smoke, especially in high rise buildings; and
e. To reduce property loss.

The SFA is optimized for residential compartment fires and it considers the welfare of potentially trapped occupants the primary concern. Because the continued survival of people is of primary concern, the concept of survivability is a key factor in the fireground risk assessment.

Survivability is a judgment of how likely a person is to be alive given the conditions of the compartment they are in. Conditions in compartments will vary. Judgements about survivability and the subsequent risk assessment must take that into consideration.

All incidents require personnel to conduct a risk assessment and a risk/benefit analysis. Personnel must ensure the continued survival of potentially trapped occupants, but they can only do so after assessing the scene, assessing risk, and making reasonable judgements about what course of action to take.

While the SFA is optimized for residential compartment fires it can be applied to a large range of structure fires. When faced with non-residential structures, personnel must consider that the dynamics of the fire, the size and configuration of the interior, and the complexity of action will alter the outcome of risk assessments and will often force tactical adjustments.

No two fires are exactly the same, but they all have some basic things in common. Research into compartment fire behavior, the chemistry of interior furnishings, and the behavior of structural components under fire conditions, demonstrate that most of the fires we fight are ventilation limited, meaning the fire has insufficient oxygen to generate as much energy as the burning fuel contains.

Ventilation limited means that the fire has progressed past the incipient stage and has consumed most of the available oxygen in the compartment. In this process the fire generates a tremendous amount of heat and smoke, both of which dramatically diminish survivability for occupants not physically separated from the fire. Once the fire consumes the available oxygen, its ability to generate heat energy diminishes, but there often remains sufficient fuel - especially smoke - and heat to support combustion.

When an opening is created in the structure or compartment and there is a path between the fire and the opening, a flowpath is created. When a flowpath is created:
a. Smoke, heat and other products of combustion leave the compartment along the upper levels of the flowpath.

b. Fresh air enters the structure along the lower levels of the flowpath.

Once the fire has access to a new supply of oxygen, the potential for rapid growth becomes an immediate hazard. How fast the growth occurs and in what directions it moves once it begins to grow is dependent on many factors, including the amount of energy involved, the configuration of the openings and the available flowpaths.

When the fire begins to grow, its rate of growth can be dramatic, causing fast moving convection currents of superheated gases to move out of the structure along flowpaths. It is impossible to predict exactly when rapid fire growth will occur or how rapid the fire growth will be, but firefighters and civilians caught in the flowpath when growth occurs are likely to suffer serious harm.

In order to prevent rapid fire growth, one or more of the legs of the fire triangle: heat, fuel, oxygen, must be removed. During structure fire operations, the removal of the fuel is unlikely, leaving the reduction of heat energy and the removal of oxygen as crucial requirements.

Based on these facts MCFRS uses the fast water, coordinated ventilation approach to improve survivability and reduce property loss. Fast water means using the fastest, most direct method possible to put water on burning surfaces. The emphasis is on surface cooling because surface cooling is typically the least complex and most readily executed form of cooling available. Coordinated ventilation means limiting the creation of flowpaths until water is being applied to the burning surfaces.

By putting water onto burning surfaces and/or by limiting the amount of available oxygen, the heat energy in compartments is reduced, the ability of the fire to grow is reduced and therefore the level of risk for occupants and firefighters is reduced.

The majority of MCFRS fireground operations are in single family dwellings where there is a pressurized water supply available. There are however, two other circumstances that occur with sufficient frequency to deserve special consideration: fires in areas without pressurized water supplies (rural areas) and fires in high rise structures.

A fire in a residential high rise structure is, at its core, no different from other residential compartment fires except the fire is significantly harder to reach and there are more potential occupants in danger. During a high rise fire many more people will potentially be threatened by smoke, high levels of carbon monoxide, other debilitating gases. Given the features of high rise buildings, rapid smoke spread is likely, even in the presence of modern fire protections systems. This smoke travel will most likely occur through the vertical cores of the structure such as elevator hoistways and interior enclosed stairwells.
Fires in high rise structures begin with the same objectives as other structure fires, with the noted exception that effective smoke control becomes a significant issue. The stairwells in high rise structures can be considered a building within a building. They provide an area of refuge for people. Each open stairwell door provides a possible path for smoke and fire travel thereby reducing the safety of occupants and firefighters. For this reason, initial fire operations at residential high rise fires focus on using positive pressure fans to create higher pressures in the stairwells, with the intent of limiting smoke travel. This is consistent with the fast water/coordinated ventilation approach.

It is possible that the use of positive pressure to control smoke can also provide additional oxygen to the fire. However, when pressurization is used in conjunction with limited ventilation, especially in terms of ensuring doors to the stairwell are closed, the amount of oxygen provided to the fire will remain limited.

Compartment fires in rural areas are fundamentally the same as fires in urban areas. The only changes to the initial approach are how the initial water supply is developed, how it is expanded, and what water supply methods and tactics are used to support on-going operations. Those methods and tactics are discussed in the Water Supply Appendix.

The fast water, coordinated ventilation approach is the designed approach for compartment fires regardless of where they occur. Execution of this approach requires the rapid establishment of a continuous water supply, strong situational awareness, effective communications, teamwork and coordination.

Our organizational history demonstrates that the majority of our fires occur in the types of structures for which the SFA is optimized. Further, our history bears witness to the fact that fire operations are most effective when those working on the fireground engage cooperatively to achieve mutually complementary effects.

SECTION 4. Definitions:
See Appendix Q.

SECTION 5. Policy:

a. Standard Response Plan: The response plan for a structure fire (except a shed or detached garage) is five engines, two aerial units, one rescue squad, one EMS unit, and four command officers. At least two command officers must respond on the assignment.

b. High Rise Response Plan: The response plan for a high rise structure is five engines, three aerial units, one rescue squad, one EMS unit, and four Command Officers. At least two Command Officers must respond on the assignment.

c. Rural Response Plan: The response plan for a structure fire in a non-hydranted area is six engines, two aerial units, one rescue squad, three tankers, one EMS unit, and four Command Officers. At least two Command Officers must respond on the assignment.
d. Initial Operations

1. Unit assignments for the structure fire SOP are based on order of dispatch not on “order of arrival.”
2. Structural firefighting operations must begin with the development of situational awareness - (360 degree size up) - unless the size or configuration of the structure prevents the timely completion. The size up must consider the:
   A. Location and status of the occupants;
   B. Construction type of the structure;
   C. Building occupancy type;
   D. Status of exterior exposures;
   E. Location of the fire;
   F. Likely flowpaths;
   G. Paths of entry and egress;
   H. Paths of fire extension;
   I. Impact of the weather, especially the wind; and
   J. Presence of hazards such as inground pools, arcing power lines, security bars etc.

e. The first arriving Primary Unit Officer in both the front and the rear of the structure must provide an Initial On-scene Status Report (IOSR) for that side.

1. Address confirmation (only for first arriving unit);
2. The arrival side of the building;
3. The number of stories;
4. The type of occupancy;
5. Conditions evident; and
6. Any other pertinent information.

f. The first Primary Unit Officer on the scene must provide a Situation Update Report (SUR).

1. The command choice (See Incident Command Appendix);
2. The status of the occupants;
3. The 2-Out (See Standby Team Appendix);
4. The incident action plan;
5. The point of entry (or area of operation);
6. The number of personnel making entry; and
7. Additional resources if needed.

g. The ISOR and SUR are separate reports. The SUR requires occupant status information which is likely not available when the IOSR is provided.

h. The first arriving Primary Unit Officer must announce by radio if they are not able to complete a 360 degree size up.

i. The first arriving Primary Unit Officer must announce the establishment of Command by radio as part of the SUR.

j. Once a “working fire” is confirmed and until a stationary command post is established, incident communications must be limited to critical incident needs such as water supply and occupant status.

k. An engine officer establishing tactical command should consider either passing command or establishing a stationary command at the earliest opportunity.

l. Personnel must use the “fast water, coordinated ventilation” approach to structure fires.

m. The status of the fire, including smoke conditions, and the stability of the structure must be continuously compared against the strategy, incident objectives, and tactics to ensure maximum effectiveness.

n. Additional reports will follow the Location-Conditions-Actions-Needs (LCAN) format.

o. Occupant Status

1. Occupant status is described in one of three ways.

   A. “The occupants are accounted for”: This means that personnel know that the occupant(s) are out of the hazard area, accounted for, and taken care of;

   B. “The occupants are not accounted for”: This means there is no information to suggest that all of the occupant(s) are out of the structure AND there is no information to suggest that there are any occupants in the structure. This includes situations where there are cars in the driveway or toys in the yard but no on-scene witnesses or 911 callers who advise that someone is in the structure; or

   C. “The occupants are known to be trapped”: This means that there are on-scene witnesses or 911 callers who advise that there are occupants inside the structure.

p. Fire suppression

1. Fire suppression should begin on the lowest level of the structure where fire is present.

2. When a fire is primarily concentrated on the outside of a structure, fire suppression should begin on the outside.

3. Interior firefighting must not occur directly above uncontrolled fires in structures unless the occupants are known to be trapped and operating above the fire is required to preserve life.
4. Roof operations should not occur directly above uncontrolled fires.

q. Attack Lines
   1. Once committed to an interior attack position, the primary attack line must be provided a backup line until the fire is controlled, except as necessary to preserve life.
   2. The backup line must be charged, regardless of the status of the supply line. However, the supervisor of the backup line crew should not flow the line until the initial supply line is charged, except as necessary to preserve life.
   3. In general, only two attack lines should be stretched through any one opening.
   4. Personnel must consider the survivability of occupants as part of the ongoing scene evaluation.

r. An engine company arriving before special services must be prepared to force entry into structures.

s. Basement Fires
   1. Whenever a fire is determined to be below the primary entry grade, i.e., a basement fire, the initial attack must be from the exterior basement entrance if there is one and access to it is reasonable.
   2. If there is no exterior basement entrance, the initial attack must use any available exterior opening, e.g., windows to darken the fire prior to any interior operation if access to it is reasonable.
   3. If there are no exterior openings and the risk analysis supports an attack using the interior stair crews must do everything practical to control/remove heat and/or oxygen from the fire before initiating the attack.
   4. Crews descending stairs to attack a basement fire must immediately notify Command and must be prepared to relocate to another position if they encounter:
      A. Flame over along the entry path not immediately suppressed by water flow; or
      B. High heat along the entry path not immediately suppressed by water flow; or
      C. Fire along the entry path not immediately suppressed by water flow.

t. Whenever an interior attack is made on fire below the entry grade, only personnel essential to the fire attack are to be along the entry path.

u. Stairs must remain clear for egress at all times.

v. Interior Searches
   1. Whenever the risk assessment supports an interior fire attack operation a search of the structure must occur as well.
2. The fast water, coordinated ventilation approach does not lower the priority of searching for occupants or the requirement to search.

3. Fast water, coordinated ventilation enhances the continued survival of occupants by providing additional time to search and a lower hazard exposure for both the occupants and firefighters.

4. A report that occupants are accounted for, does not remove the need to conduct a thorough search. It does, however, diminish the level of acceptable risk for search operations.

5. If the occupants are not accounted for, a greater level of risk is supported when making decisions on primary searches.

6. When occupants are known to be trapped AND personnel make a reasonable effort to ensure the occupant status information is credible, the acceptance of a high level of risk may be appropriate.

7. There are four types of searches:
   A. **Primary**: A primary search is the first search conducted. The intent of the search is to locate and remove occupants endangered by the fire. The primary search typically occurs while the fire control is on-going.
   B. **Secondary**: The secondary search is conducted after the fire is knocked down and preferably when it is possible to see in the compartments being searched.
   C. **Directed Search**: A directed search is a search of a specific area based on credible information that there is someone trapped in that area. This search type is often initiated from a position outside the structure.
   D. **High Risk Search**: Any search that occurs directly above an uncontrolled fire, or directly below an uncontrolled attic fire without the protection of a charged hoseline.

8. All primary searches and directed searches must be protected by a charged hoseline whenever possible. This means that a charged hoseline is in close proximity to those searching and immediately available to provide cooling for search crews.

9. Whenever directed searches or high risk searches are indicated:
   A. The Incident Commander and those searching should ensure that the information on which the search is based is sufficient to justify the risk.
   B. The appropriate supervisor must notify Command via radio and be acknowledged before initiating the search.

10. Personnel must not determine occupant survivability in all compartments based on the conditions in a single compartment nor may they make a blanket assumption that all spaces are occupied or survivable.

11. Searches should be prioritized as listed below:
A. Survivable spaces in the immediate fire area;
B. The areas adjacent to the fire area;
C. The floor above the fire; and
D. Other areas (stairwells, elevators, balconies, etc.)

12. Whenever possible, the secondary search of any given area should not be completed by the same crews that conducted the primary search.

13. Searches must not be delayed pending the arrival of the rescue squad.

14. While the rescue squad is tasked with ensuring that a systematic search has been completed, unit officers are not relieved from searching areas as they move through the structure.

w. Units taking positions at reported structure fires must avoid parking in potential collapse zones.

x. Standpipe and Sprinkler Systems:
   1. Standpipes must be charged immediately to the required pressure for the reported fire location.
   2. Sprinkler systems must be charged immediately if they are part of the standpipe system. Otherwise, they must be charged to the required pressure when:
      A. Smoke or fire is visible;
      B. The water flow alarm sounding; or
      C. The officer in charge directs it to be done.

y. Personnel must follow this SOP on adaptive or reduced assignments.

z. Personnel must avoid doing any unnecessary damage to a structure or contents.

SECTION 6. Responsibility:
All personnel.

SECTION 7. Procedure:
*Note: Items in brackets and bold indicate that the item, observation or report is provided by radio.

a. First Due Engine
   1. Positioning
      A. Typically position on Side Alpha of the affected structure
      B. Leave room for aerial apparatus
2. Water Supply
   A. [Provide layout instructions while en route to the scene]
   B. [Announce location of the fill site.]
   C. Initiate a water supply to the scene preferably using a forward lay
   D. [Driver should announce when their supply line has been charged]
   E. [The driver must advise the Incident Commander when the fire protection system(s) have been charged.]

3. Tasks
   A. [Announce the IOSR]
   B. [Announce if unable to complete 360 degree size up.]
   C. [Announce SUR before making entry.]
   D. [If the structure is a high rise announce the attack stairwell.]
   E. Limit the influx of oxygen
   F. Advance an attack line of appropriate length and diameter to locate, confine, and extinguish the fire
   G. [Announce when line is operating on the fire or if the fire’s location cannot be quickly determined.]
   H. [Announce when unexpected hazards e.g., hoarding, holes in floors, etc., are encountered.]

b. Second Due Engine
   1. Positioning
      A. Position as necessary to complete the water supply mission without hindering placement of other apparatus.
      B. For rural assignments, lay into the scene if first due does not.

2. Water Supply
   A. Ensure adequate water supply for the first due engine.
   B. If the first due engine takes their own hydrant be prepared to augment or correct water supply issues for them.
   C. For rural assignments, co-locate with first due engine and attack tanker.

3. Tasks
   A. For rural assignments, pump tank water to the attack tanker.
B. Support the initial attack by ensuring the first line is in place with sufficient length and no kinks.
C. Provide a backup line for the first attack line.
D. Be prepared to move to another assignment once the fire is controlled.

c. Third Due Engine
   1. Positioning
      A. Typically on Side Charlie or the side opposite the first due engine
      B. Leave room for aerial apparatus
   2. Water Supply
      A. [Provide layout instructions while en route to the scene]
      B. Initiate a water supply to the scene preferably using a forward lay
      C. For rural assignments, pump the clappered siamese.
   3. Tasks
      A. Conduct size-up on Side Charlie
      B. [Announce the IOSR for the rear].
      C. Check the lowest level of the structure and report conditions found.
      D. Stretch a hose line to the floor above the fire or to the most threatened exposure.
      E. [Announce location of hose line placement]
      F. Provide updates as appropriate.

d. Fourth Due Engine
   1. Positioning
      A. Position as necessary to complete the water supply mission without hindering placement of other apparatus
   2. Water Supply
      A. Ensure adequate water supply for the third due engine.
      B. If the third due engine takes their own hydrant be prepared to augment or correct water supply issues for them.
      C. For rural assignments, pump the clappered siamese.
   3. Tasks
      A. Support the third due engine as necessary with placing their line in service.
B. Only commit to a position with the direction of the Incident Commander.

e. Fifth Due Engine
   1. Positioning
      A. Position without hindering placement of other apparatus.
   2. Water Supply
      A. Ensure that ALL existing water supply operations are functional.
      B. With permission of Command, correct any water supply issues.
      C. In coordination with Command, consider strategies to augment water supply on escalating incidents that may require master streams.
      D. For rural assignments pump the clappered siamese.
   3. Tasks
      A. Assume duties of the Rapid Intervention Company (RIC).
      B. [Announce when the RIC is in place and their location.]
      C. [When the correction of water supply issues will delay placement of the RIC the unit officer must notify the Incident Commander.]

f. Sixth Due Engine (only on non-hydranted assignments)
   1. Fill tankers and engines at designated fill site.
   2. [Announce when the fill site is operational.]
   3. See Water Supply Appendix for additional information.

 g. First Due Truck
    1. Positioning
       A. Position on Side Alpha or as necessary to make immediate rescues.
    2. Ventilation
       A. Coordinate ventilation with initial interior attack line.
       B. Do not create additional openings until interior attack line officer reports that water is on the fire.
    3. Tasks
       A. Initiate obvious rescues for people in immediate danger and visible from the exterior of a structure.
       B. Assist with forcible entry as needed.
       C. Ensure ladders are placed for egress and/or rescues.
D. Ensure security bars and other impediments to egress are removed.

E. Once exterior duties are completed, support interior operations on the fire floor by:
   i. Conducting interior searches behind the hoseline on fire floor, coordinating with Division/Group Supervisors as appropriate
   ii. Check for and report on extension.
   iii. Confine extension as possible.
   iv. Report location and severity of extension.
   v. Conduct salvage and overhaul operations.

h. Second Due Truck
   1. Positioning
      A. Position opposite the first truck company, typically on Side Charlie.
   2. Ventilation
      A. Coordinate ventilation with initial interior attack line.
      B. Do not create additional openings until initial interior attack line officer reports that water is on the fire.
   3. Tasks
      A. Ensure ladders are placed for egress and/or rescue.
      B. Ensure security bars and other impediments to egress are removed.
      C. Assist the third due engine with forcible entry if needed.
      D. Once exterior duties are completed, support interior operations of the third due engine in their area of operation. Duties include:
         i. Conducting interior searches behind the hoseline, coordinating with Division/Group Supervisors as appropriate.
         ii. Checking for and report on extension.
         iii. Confining extension as possible.
         iv. Reporting location and severity of extension.
         v. Conducting salvage and overhaul operations.
   i. Third Due Truck (only on high rise incidents)
      1. Positioning
         A. Position to provide additional rescue or egress as indicated.
      2. Tasks
A. Pressurize all remaining stairwells.
B. [Announce when all stairwells are pressurized.]
C. Develop a ventilation plan in coordination with other Groups/Divisions and Command.

j. Rescue Squad
   1. Positioning
      A. Position without hindering placement of other apparatus.
   2. Tasks
      A. Ensure systematic completion of searches in unsearched areas in coordination with Division/Group Supervisors.
      B. Once primary searches are complete report to Command for reassignment.
      C. Be prepared to control utilities as directed by their immediate supervisor.

k. EMS Units
   1. Positioning
      A. Park to allow for rapid egress.
      B. Do not impede access to the scene.
   2. Tasks
      A. Immediately locate, assess, and care for occupants.
      B. Be prepared to immediately treat and transport patients.
      C. If used as the standby team, transition to established duties immediately upon the establishment of the RIC.
      D. Locate shelter for occupants and attempt to keep them together.
      E. [Establish aid station near primary entry point and announce location.]

l. First Tanker
   1. Positioning
      A. Co-locate with first due engine.
   2. Tasks
      A. Connect supply line to an intake on the tanker.
      B. Supply the first due engine using a discharge on tanker.
      C. Connect supply line from the second due engine to an intake on the tanker.

m. Second Tanker
1. Supply the incident water via the clapped siamese.

n. Third Tanker
   1. Supply the incident water via the clapped siamese.

o. Tool and Equipment Assignments
   1. All crew members operating inside a structure fire must carry a:
      A. Handlight if one is available.
      B. Radio if one is available.
         i. When a crew member is riding in a position without an assigned radio they must
            remain in voice/touch contact with the unit officer or other radio equipped crew
            member.
   2. The unit officer must carry a thermal imager if one is available.

3. Engines
   A. The primary tool is a handline of sufficient length and flow to complete the assigned
      objective.
   B. Be prepared to force inward opening doors if ladder truck support is not immediately
      available.
   C. Engine crews assigned to check for extension, protect exposures, or check exposures
      must carry tools to breach walls and ceilings.
   D. When operating above the ground level the unit officer should consider bringing along a
      utility rope bag to assist with hoisting hoses and/or tools.

4. Trucks
   A. The officer must ensure that a sufficient number and type of hand tools, based on
      building construction, are brought in.
   B. If assigned to check for extension without an assigned engine should have a hose line
      immediately available should extension be found.

5. Rescue Squad
   A. The crew must bring a sufficient number and type of hand tools to ensure that they are
      capable of performing an effective search.

6. EMS Units
   A. Stretcher, (consider reeves or scoop stretcher)
   B. AED
   C. Oxygen and aid bag
D. ALS and airway bags if an ALS unit
E. At least two clean white sheets

SECTION 8. Cancellation:
This policy cancels and supersedes: Policy and Procedure 24-07AMII: STANDARD OPERATING PROCEDURES FOR SAFE STRUCTURAL FIREFIGHTING OPERATIONS 12/1/05, FCGO 08-19 Communications on Tactical Talk Groups 12/08/2008.

SECTION 9. Attachments:
None.

Approved:

Scott E. Goldstein
Fire Chief

April 14, 2017