

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
600.01

GLOSSARY OF TERMS

REVISION
A

I. Scope

This standard lists and defines common terms used by personnel to manage emergency incidents.

II. Definitions

1. All clear: The primary search has been completed.
2. Incident commander (IC): The person with overall responsibility for a particular incident. The person will use the term “command” and may use a geographical identifier when multiple operations occur. Example “Main Street command.
3. Rural water supply-Terminology:
 - A. Attack pumper: Usually the first pumper on the scene, the attack pumper sets up hoselines to fight the fire.
 - B. Drafting: Using a pump to lift water from a supply source, such as a river, pond, ditch, dump tank, etc.
 - C. Fill site: The location where the tanker trucks go to get loads of water, such as a hydrant, draft site, storage tank, etc.
 - D. Rural fire: Fire located in an area not served by fully functioning fire hydrants.
 - E. Tanker: May also be called a “water tender” or a “tank truck.” A fire truck used to carry water from a “fill site” to the incident location. Tankers usually have greater than 1,000 gallon tank capacities and are set up for quick filling and discharge operations.
 - F. Water shuttle: The process of using several tankers to transport water from water supply to an incident scene.
4. Sector: A geographic location on the incident scene. Examples: Interior, Roof Sector, Rear Sector.
5. Sector officer: A person in charge of a given sector.
6. Staging area: That location where the incident personnel, apparatus, and equipment are assigned in available status.
7. Level I staging: The officers and personnel report to the incident scene and wait for assignment. During response to a structural incident, the first due engine, laying the appropriate supply line if applicable, proceeds to the scene of the incident stopping short or proceeding past the front of the structure. The second due engine will prepare itself to supply the first due engine. Truck 51 shall be positioned at the front of the building unless instructed to do otherwise. Extreme care shall be taken to avoid blocking access and egress to the incident.
8. Level II staging: Second alarm and special called apparatus are staged together at a designated location under the control of the staging officer. Normally, LEVEL II staging will be utilized at large scale incidents, at a site to be determined by the incident commander or the staging officer.

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9. Personnel staging area: A designated location for personnel to wait in before being assigned a task or to a sector. Usually located close to the command post.
10. Initial report: A short radio transmission upon arrival of the first officer or apparatus at an incident scene that provides a description of the conditions at the incident scene.
11. Primary search: A rapid search of all involved and exposed areas affected by an incident that can safely be entered.
12. Secondary search: A complete and thorough search of an area after the incident is under control.
13. All clear: Radio term to indicate to the incident commander that the primary search has been completed, and all victims have been removed from the area or building.

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600.02

INCIDENT MANAGEMENT

REVISION
A

I. Scope:

This standard establishes guidelines for the management of fire and rescue incidents.

II. General:

- A. It shall be the policy of this Department to implement the incident management system for all fires, haz-mat incidents, rescues, and EMS responses that require two or more pieces of emergency apparatus.
- B. The incident management system shall also be used at all incidents in which the scope and complexity of the incident exceeds the capabilities of routine operations.

III. Command

- A. There are three levels or types of command:
 - 1. Forward command
 - 2. Mobile command
 - 3. Fixed command
- B. Forward command: Means to lead from the front and is the exact opposite of a fixed command position. Forward command is task-oriented and should be used:
 - 1. When the incident requires further investigation.
 - 2. When the incident requires an immediate, aggressive, hands-on action and may not be appropriate to pass command.
- C. Mobile command: The commander moves around. This type of command is used only during initial size up.
- D. Fixed command: A command post that is established in a safe, secure environment that allows for efficient, effective operations.
- E. Passing command: Command is passed from one incident commander to another by the following means:
 - 1. The first arriving officer or apparatus may designate another officer or apparatus as Command if it is known that the second will arrive momentarily.
 - 2. Command may be passed at the command post on or arrival of a senior, more experienced command officer at the request of Command or on the senior officer's assessment that it is necessary to assume command.

IV. Response to an incident

- A. No member shall assume that any piece of apparatus is not needed at an incident scene until the incident commander directs otherwise.
- B. All company officers, shall to the best of their ability, respond to fire headquarters and ride the apparatus to the incident. It shall also be the responsibility of the company officer to respond apparatus in the absence of the appropriate members to operate said apparatus.
- C. All chiefs, shall at the time of the alarm, respond directly to the incident scene so as to more rapidly size up the incident, and decide the necessary course of actions.
- D. Firefighters, if at all possible, should respond to fire headquarters and respond to the incident on the apparatus. This will help to alleviate added personal vehicles on the incident scene, as well as to enhance ones knowledge of apparatus operations. If in the event that the firefighter responds directly to the incident scene, the firefighter **SHALL NOT** park in a manner in which blocks the access or egress of apparatus. The firefighter should consider parking as far away from the incident scene as possible.

V. Establishing Command

- A. On initial arrival, the first arriving officer or apparatus shall:
 - 1. Notify dispatch by radio of arrival.
 - 2. Initiate the Incident Management System.
 - 3. Provide a brief size-up of the situation found on arrival.
 - 4. Pass Command if appropriate.
 - 5. Determine the extent of the incident.
 - 6. Determine a plan of action.
 - 7. Request additional assistance if needed.
- B. Subsequent arrival of officers, apparatus, and personnel.
 - 1. Notify the incident commander of arrival and status. Example: “Engine 3 on scene, staged at the hydrant at the corner of Main and North Mason, PAR 4.(PAR 4 – Personnel Accountability Report *number of personnel on the apparatus*”
 - 2. Wait for instructions from the Incident Commander.
 - 3. Personnel shall stand-by at the apparatus unless instructed to do otherwise.
 - 4. **PERSONNEL IN PRIVATE VEHICLES SHALL PARK SO AS NOT TO BLOCK THE ACCESS OR EGRESS OF APPARATUS.**

VI. Sectoring

- A. After "COMMAND" has established a plan to resolve an incident, the incident commander will assign an officer or senior member to be a sector officer. That sector officer will lead a crew to carry out assigned task. The sector officer will be the only individual of the crew to communicate via radio with the incident commander.
- B. The primary responsibility of the entry team, in addition to the assigned task, is to perform a primary search of the area for possible victims. This search is especially important in dealing with structural incidents. The interior sector, or the rescue sector if so assigned, will conduct a primary search of the area or structure for possible victims. This is to be done even if all occupants are reported to be out of the area or building. The signal "ALL CLEAR" will be given by the respected sector officer to the incident

commander when the primary search is complete and no victims have been found, or after the victims have been removed. The incident commander will then in turn notify the Smithfield dispatcher that the area or structure is clear of all occupants by giving the "ALL CLEAR" radio transmission.

VII. Radio communications

The incident commander WILL be the only individual on the fire scene to communicate with the dispatcher. Any communications which needs to be given to the dispatcher will be directed through the incident commander. The purpose is to alleviate the possibility of duplicating a request, giving conflicting information, and helping to reduce the amount of distraction caused to the dispatcher.

II. Termination of Command

- A. The "UNDER CONTROL" signal will be given by the incident commander to the dispatcher when the incident has been controlled and no further damage is expected, and the incident commander is sure of the incident's resolution.
- B. When the incident commander is satisfied that the incident has been resolved to the best ability of the department, the incident commander will terminate command. The incident commander will indicate that command has been terminated by informing the dispatcher in the following manner: "Command to Smithfield, the (type of incident) at (location) is safe, command is terminated."
- C. When possible at the termination of Command, the Incident Commander should indicate to the dispatcher that "all officers and apparatus on scene are available." Therefore, it is not necessary for each officer and apparatus to notify the dispatcher of their status individually and eliminates distraction to the dispatcher. The Incident Commander may also choose to indicate that "all on-scene officers and apparatus with the exception of Truck 1 are available."
- D. Apparatus at the scene is to return to the proper station only after being released by the incident commander. Apparatus shall be considered out of service if the apparatus is out water, or lacks equipment, especially SCBA's. This is a judgement call to be made by the company officer, or the operator of the apparatus in the absence of the company officer.
- E. Chiefs and company officers shall remain at the scene until being released by the incident commander.
- F. Firefighters shall remain at the scene until released by the incident commander. Upon being released by the incident commander, every effort should be made to return to Station 1 to assist with getting the apparatus put back into service.

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**VETERAN OPERATORS ASSUMING APPRATUS OPERATIONS
ON-SCENE**

REVISION
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The purpose of this directive is to utilize the talents and abilities of all members to the advantage of the Department while operating at an incident scene. The intent is to have the younger members available to perform task as requested by the incident commander.

Upon arrival at an incident scene, it shall be the responsibility of the veteran engineer to replace a younger engineer operating apparatus. Upon replacement, the young engineer's role becomes that of a firefighter and is to report to the incident commander for assignment immediately.

It shall be the responsibility of both the veteran and the younger engineer to return their respected apparatus to service as soon as possible after the incident has been controlled.

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600.04

TAKING APPARATUS OUT OF SERVICE

REVISION
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Fire apparatus shall not be taken out of service unless authorized by the Fire Chief or an Assistant Chief. Fire apparatus shall be considered out of service when:

1. Apparatus is carried more than one mile outside of the corporate limits of the Town of Smithfield.
2. Apparatus is carried to a service center for repair, or repair work is done in house and can not be returned to service within 5 minutes from the time of an alarm.
3. Apparatus is being used for training and can not respond within 5 minutes from the time of an alarm.
4. Apparatus is used to perform task and activities that the department does not normally provide.
5. Apparatus is put in a parade outside of the district.

A member may at any time take a piece of apparatus out of service if it is determined to be unsafe or inoperable.

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
600.05

Tactical Guidelines

REVISION
A

I. Scope

This standard shall regulate the management of all emergency incidents to which the Department responds. It is promulgated to:

- A. Establish rules and procedures to manage fire control and rescue activities.
- B. Produce standard and predictable fire control and rescue results.

II. Goals and Objectives

- A. It is the goal of this Department to prevent fires and to save lives and property.
- B. In pursuit of this goal, it shall be the policy of the Department to:
 - 1. Do no harm! Take no action that will cause further injury to a person or intentionally damage property.
 - 2. Be safe! Always obey all safety rules and procedures promulgated by the Department.
 - 3. Be nice! Always treat each other and members of the public with respect.

III. Operational Priorities

Three priorities must be addressed at every incident to which the Department responds. These priorities are discussed below in order of importance.

- A. Life safety/rescue:
 - 1. Primary search: It shall be standard procedure to extend a primary search in all involved and exposed occupancies that can be entered safely. The completion of the primary search process is reported using the standard radio reporting term "*All clear*" if appropriate.
 - 2. Rescue Efforts: Extend rescue efforts in the following order:
 - a. The most severely threatened.
 - b. The largest number of people.
 - c. The remainder of the fire area.
 - d. The exposed areas.
 - 3. Firefighter safety: Due to the hazardous nature of firefighting, the safety of firefighters is of primary importance. Therefore, the following safety rules are to be observed:
 - a. All persons involved in firefighting or other hazardous situations shall wear full protective clothing and SCBA. No one, regardless of rank, shall enter a hazardous atmosphere without SCBA.
 - b. The incident commander and sector officers shall be responsible for persons operating in hazardous locations and shall make sure that all personnel are accounted for.

Section 600.05 Tactical Guidelines continued

4. Victim recovery: The fire Department shall conduct a secondary search after the fire is out and shall assist in the recovery of fire victims. On recovery, the appropriate authorities will be notified, and at no time shall the names of the injured or deceased be mentioned on the radio.
 5. Rehab: A rehab area will be established when deemed necessary by the Incident Commander. The rehab officer will be responsible to:
 - a. Have at least one EMS certified person assigned to monitor the physical condition of members present. The rehab officer shall have the authority to relieve members of their duties for a period of time, if necessary.
 - b. Will be responsible for reporting the status of the members under their supervision to the incident commander.
 6. Safety officer: At least one member will be assigned as a “safety” by the incident commander at a working incident. The “safety” shall have the authority to correct any violations and established safety SOPs.
- B. Fire control:
1. It is the standard procedure to attempt to stabilize fire conditions by extending, wherever possible, an aggressive, well placed, and adequate interior fire attack effort and to support that aggressive attack with whatever resource and action may be required to reduce extension and to bring the fire under control.
 2. Initial attack efforts must be directed toward supporting primary search and rescue operations.
 3. Fire streams are to be operated only on fires, not into smoke.
 4. The following operations are to be initiated at every incident:
 - a. Size-up.
 - b. Rescue/life safety.
 - c. Exposure protection.
 - d. Confinement.
 - e. Extinguishment.
 - f. Property conservation.
 5. Write off property that is lost and protect exposed property based on the most dangerous direction of spread. Always attack structure fires from the unburned side!! Do not continue operations in positions that are essentially lost.
 6. Fire stream management:
 - a. It is the responsibility of each engine company to provide its own uninterrupted, adequate supply of water. “Provide” does not necessarily mean to lay a supply line or to pump the water, but rather get an adequate, reliable supply of water into the pump by whatever means available.
 - b. When in doubt, lay supply hose. The company officer shall make this decision. Remember, it is better to pick up dry line that was not used than to need a line that was not laid out.
 - c. Factors relating to the type of line pulled:
 - (1) Size.
 - (2) Placement.
 - (3) Speed.
 - (4) Mobility.
 - (5) Supply.
 - d. Booster lines shall not be pulled as the first line on working structure or automobile fires. Hoselines of 1½” shall be the minimum size pulled.
 - e. Hoseline placement:

Section 600.05 Tactical Guidelines continued

- (1) Place the first stream between the fire and the persons endangered by the fire.
 - (2) If no life is endangered, place the first stream between the fire and the most severe exposure area.
 - (3) The second line should back up the first line and protect the means of egress.
 - (4) The third line should be a 2½" line to back up the first two hose lines placed in service.
 - (5) Assist rescue.
 - (6) Protect exposures.
 - (7) Support confinement.
- f. Operate heavy streams if necessary, but not when interior attack is taking place. Do not combine interior and exterior attacks.
- g. Shut nozzles down when necessary. Do not operate into ventilation holes!
- C. Property conservation.
1. After rescue and fire control considerations, it shall be standard procedure to commit whatever fireground resources are required to reduce loss to an absolute minimum. All members are expected to perform in a manner that consistently reduces loss during fire operations.
 2. Property conservation activities shall include, but are not limited to:
 - a. Prompt interior and exterior lighting.
 - b. Proper ventilation.
 - c. Salvage.
 - d. Overhaul.
 - e. Proper fire stream management.
 3. If necessary, the incident commander shall call for fresh or additional personnel to complete property conservation activities.

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EMERGENCY VEHICLE PLACEMENT

REVISION
A

I. Scope

This standard regulates the placement and positioning of emergency vehicles at emergency incidents.

II. General rules for Positioning Emergency Vehicles

- A. Apparatus function shall regulate placement. The first arriving companies should position themselves to maximum advantage and go to work. Later arriving apparatus should place themselves in a manner in which builds upon the initial plan and allows for expansion of the operation. However, at no time shall apparatus be positioned in a manner as to place it in an unnecessarily dangerous position.
- B. Apparatus that is not being used should be staged in an uncommitted position that will not congest the incident site and will facilitate performing a maximum number of evolutions. Likewise, privately owned vehicles (POVs) should:
 1. Not block the street. Leave the street open at all times to permit the movement of additional apparatus.
 2. Park at least one block away and never in a cul-de-sac or in front of the buildings(s) involved in the incident.
 3. Do not park in front of fire hydrants, automatic sprinklers, or standpipe connections.
 4. Do not block private driveways.
 5. Do not run over or park on fire hose.
- C. When placing or positioning an emergency vehicle at an incident, consider the following items:
 1. Leave an access lane open down the center of the street.
 2. Do not park in such a manner as to make the emergency vehicle an exposure.
 3. Do not become trapped. Allow adequate room to reposition the vehicle if necessary.
 4. Beware of overhead power lines.
 5. Try to use hoselines and equipment off of apparatus at the immediate scene to maintain better control and not strip all of the apparatus.
 6. Take maximum advantage of key hydrants to avoid excessive lays and to ensure maximum use of the water supply.
 7. Do not park too close to another emergency vehicle. Allow sufficient room to deploy hoselines and to remove stretchers, ladders, and other equipment from the vehicle.
- D. The first arriving engine company at a fire should normally proceed just past the front of the fire, laying a supply line if necessary. Driving past the structure this way will enable the crew to see three sides of the fire building.
- E. Position the engine to use its deck guns, floodlights, and etc. Take care to leave room for the truck company or other support apparatus. If the building has wide

frontage, position the engine at the entrance that provides the best access to the fire.

- F. Unless otherwise directed, the second engine company at a working fire should provide a water supply.
- G. If nothing is showing, the second arriving engine company should stage at the nearest hydrant and await orders if the first in engine company did not lay a line.
- H. Unless otherwise directed, the truck company should initially stage at the front of the fire building.
- I. Additional arriving companies should stage at least one block away and request orders from the incident commander. Upon arrival, the company shall notify the incident commander of their location and the number of personnel (PAR count).

III. Medical incidents/auto accidents

- A. If an engine or truck company arrives before a medic unit, the company should leave clear access for the medic unit and not block the incident site.
- B. Due to the danger of oncoming traffic at motor vehicle accidents, the emergency vehicle shall be placed so as to provide a barrier for personnel.
- C. Traffic cones shall be placed around the emergency vehicle so as to direct traffic around the emergency incident.

IV. Staging

- A. Level I Staging.
 - 1. First two engines and truck on scene.
 - 2. Additional apparatus one block away.
 - 3. Privately owned vehicles (POVs) shall park at least one block away, not blocking the street, driveways, or hydrants.
- B. Level II Staging: Large scale incidents.
 - 1. The incident commander designates the staging area and assigns a member the position of staging officer.
 - 2. All subsequent responding apparatus and personnel report to the designated staging area and await assignment.
 - 3. The staging officer is to maintain a log of personnel and apparatus available in the staging area.

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SECTION
602.02

PERSONEL DEPLOYMENT ON SCENE

REVISION
A

I. Scope

This standard regulates the deployment of personnel at the scene of fire related incidents.

II. General

- A. It shall be the policy of the Department to dispatch a minimum of sixteen (16) personnel to a reported structure fire on the initial alarm.
- B. To assemble the recommended minimum number of personnel at an incident, it will normally be necessary to dispatch at least two engine companies, one truck company, one medic and one chief officer on the initial alarm.

III. Offensive / Interior Operations

- A. Assembling sixteen (16) personnel at a fire related incident will allow for an aggressive interior attack with the maximum flow of 500 gpm, and it will also enable the proper support functions to be performed.
- B. Personnel should be deployed as follows:
 - 1. Incident Commander 1
 - 2. Pump operator 1
 - 3. Search and rescue 2
 - 4. Ventilation, forcible entry. 2
 - 5. Two hoselines. 6
 - 6. Rehab area. 2
 - 7. Rapid intervention team (RIT) 2TOTAL ASSIGNMENT: 16
- C. Individual Company assignments
 - 1. First arriving engine company:
 - a. Proceed past the fire building to size up it's three visible sides and then position appropriately.
 - b. DO NOT BLOCK TRUCK ACCESS TO FIRE BUILDING.**
 - c. Lay a supply line if necessary or notify another engine to bring one in.
 - d. Place the first attack line into service to support containment, rescue, and exposure protection. Always attack from the unburned side.
 - e. At night, place exterior lighting in service and illuminate the front and sides of the building.
 - 2. Second arriving engine company:
 - a. Unless otherwise directed, proceed to water supply source.
 - b. DO NOT BLOCK TRUCK ACCESS TO FIRE BUILDING.**
 - c. Lay a supply line if needed.
 - d. Place a second line in service as a back-up to the first line, but do not oppose the first line.
 - 3. Truck 51
 - a. Position apparatus in the front or a front corner of the fire building.
 - b. Ladder as required by use of the aerial device and ground ladders as appropriate.

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- c. Search and rescue.
 - d. Forcible entry and ventilation.
 - e. Utility control.
4. Rescue 51 - Position apparatus so as not to block truck or engine company operations.

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SECTION
602.03

FIRE STREAMS

REVISION
A

I. Scope:

This standard shall apply to all fire control and rescue incidents where hoselines must be deployed and water is used to mitigate the situation. It was promulgated to:

- A. Establish guidelines for developing effective fire streams.
- B. Establish guidelines for the proper placement of fire streams at a fire control or rescue incident.

II. General:

- A. Tactical success during firefighting operations depends to a large degree on the timely development and placement of adequate fire streams.
- B. For a fire stream to be adequate, sufficient pressures are needed to provide effective reach. Select hoselines and nozzles that provide sufficient volumes to meet fire flow demand.

III. Hoseline selection:

- A. Initial hoselines should be deployed based on the following:
 - 1. Hose of a sufficient size to meet the fire flow demand.
 - 2. The proper safety factor to personnel operating the line.
 - 3. Adequate personnel to deploy the line effectively.
 - 4. Sufficient water supply to meet fire flow demand.
 - 5. The time required and work involved in deploying the stream.
- B. Stream comparisons:
 - 1. Initial hose streams will commonly use pre-connected lines of either 1¾" or 2½".
 - 2. 1¾" lines will normally be equipped with Task Force Tip (TFT) automatic nozzles. Flows of 95 to 200 gpm are available.
 - 3. 2½" lines will normally have solid bore nozzles. At 50 psi, flows of 200 to 330 gpm are available.
 - 4. Master streams are operated at 80 psi and are capable of delivering:
 - 1-1/4" = 415 gpm
 - 1-3/8" = 500 gpm
 - 1-1/2" = 600 gpm
 - 1-3/4" = 814 gpm
 - 2" = 1,000 gpm

IV. Placement

- A. Order of deployment:
 - 1. Place the first line between the fire and the victims to provide an escape route.

2. If there is no life hazard, place the first line between the fire and the most severe exposure.
 3. Place the second line to support the first line or to protect a secondary means of egress.
 4. Use additional lines to support attack positions.
- B. Rules of placement:
1. Always attack the structures from the unburned side.
 2. The safest attack route in wildland fires is from the burned side.
 3. Never combine interior and exterior attacks.
 4. Use the direct attack method in interior operations – i.e., apply water to the base of the fire.

V. **Defensive Fires / Exterior Attack**

- A. Large fires require large volumes of water. Whenever possible, avoid using handlines and opt for the master stream in the bucket of Truck 51. Second, use the master streams mounted on the engines, and third the use of portable monitors.
- B. The best results for fire suppression are normally obtained from smooth bore nozzles. Smooth bore nozzles provide greater reach and penetration. Consider a fog nozzle for use when wetting exposures.
- C. Elevated streams:
1. Use to protect exposures.
 2. Use through windows.
 3. Never use in vent holes.
 4. Directing an elevated stream through a properly made ventilation hole in a roof will negate the beneficial results of the vent. The stream will act as a cover that arrests ventilation, drives fire to other areas, and often forces firefighters out of the building.

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SECTION
602.04

HOSE LOADS

REVISION
A

I. Scope

This standard regulates the loading and transporting of fire hose on apparatus.

II. General

- A. For the purposes of this standard, a hose load may refer to both the total complement of hose carried on an individual apparatus and to the manner in which the hose is carried on the apparatus.
- B. There will be some variation in both the amount of hose carried on an apparatus and the manner in which it is loaded due to number, size, and arrangement of the various hosebeds on the apparatus.

III. Definitions

- A. Attack line: Any hose that is manually deployed and supplies water from an apparatus or standpipe discharge to a nozzle used to control or extinguish fire.
- B. Filler hose: A short section of 2½" or 3" hose carried on the engine and used to fill the booster tank from a hydrant or other water source.
- C. Forward lay: Advancing or deploying a supply line from the water source to the fire or incident scene.
- D. Hard suction: A 10' length of non-collapsible, rubberized hose with a steel core that is used for drafting.
- E. Hosebed: An area or compartment on an apparatus designed to carry or transport hose.
- F. Hi-rise pack: A compact bundle of hose normally used in standpipe operations.
- G. Pre-connect: An attack hose that is connected to a discharge when the hose is loaded so as to reduce deployment time.
- H. Reverse lay: A method of laying hose from a fire or incident scene to a water source.
- I. Supply line: Hose, preferably 5" LDH, from a water source to the intake of an apparatus or 3" where limited water supply conditions exist.

IV. Supply lines

- A. The Department uses large diameter hose (LDH) supply line on all front line engine companies. Each engine should carry a minimum of 1,000 feet of 5" hose coupled in 100' sections. The hose is carried on the apparatus in a flat load. Single sections of 50' and 25' are also carried in rolls to facilitate deployment.
- B. Each engine carries a minimum of 300' of 3" supply line. This hose is used primarily for portable master stream appliances, standpipes, automatic fire sprinkler systems, and rural operations.

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602.05

WATER SUPPLIES

REVISION
A

I. Scope

This standard establishes the requirement that an adequate and reliable water supply be established at each incident.

II. General

- A. For firefighting efforts to be effective, and adequate and reliable supply of water must first be available. The adequacy and reliability of potential sources of water are constantly changing due to weather, system demands, and many other factors beyond the Department's control.
- B. Each member shall be aware of the potential fire flow demands within the fire district

III. Operational procedures

- A. Each engine company shall be responsible for providing its own uninterrupted water supply on the fire ground. The ability to do so will be predicated on:
 - 1. The required fire flow.
 - 2. The available water supply.
 - 3. The number of personnel available.
 - 4. The numbers and types of available apparatus.
- B. Calculations of required fire flow:
 - 1. The following factors influence the required fire flow:
 - a. Construction type.
 - b. Contents.
 - c. Occupancy.
 - d. Exposures.
 - e. The presence or absence of extinguishing systems.
 - 2. For tactical surveys, the calculated analysis of the fire flow shall use the following Insurance Services Office (ISO) formula.
Formula $Q=18C(A)^{.05}$

Q = Needed fire flow in gallons per minute (gpm)
A = Total building area in square feet (ft²)
C = A factor based on the construction as follows:
 - C = 1.5 for wood frame.
 - C = 1.0 for wood-joisted masonry
 - C = .8 for unprotected noncombustable.
 - C = .6 for fire resistive.
 - 3. For a quick reference during fireground operation, use the Nelson-Royer Formula for the required fire flow:

$$\text{Required fire flow (gpm)} = H \times W \times L / 100$$

H = building height
W = building width
L = building length

4. As a general rule of thumb, the following minimum flows are required:

Residential	500 gpm
Light commercial	1,000 gpm
Heavy commercial	1,500 gpm
Industrial	≥ 2,000 gpm
5. The required flow may be reduced by 50 percent if an automatic fire sprinkler system is present.

C. Water supplies may be established by:

1. Booster tank operations: For demands of less than 250 gpm or brief duration. Water may be transferred from other apparatus by 3” lines.
2. Supply lines: A 5” line from a hydrant or static source via drafting. This is the most dependable source and should be used whenever possible. When in doubt, lay a line.
3. Tanker shuttle: The use of water tankers to transport water in areas without hydrants. Tankers are available from the following Departments:
 - a. Carrollton VFD, Station 10 – 5,400 gallons.
 - b. Chuckatuck VFD, Suffolk Station 9 – 3,000 gallons.
 - c. Windsor VFD – 2,000 gallons.
 - d. Rushmere VFD, Station 30 – 2,000 gallons.
4. Dry hydrant locations:
 - a. Benns Church Blvd. at St. Lukes Church Cemetery.
 - b. 12290 Mill Swamp Road (Thacker property)
 - c. Benns Church Blvd. at the Isle of Wight Industrial Park.
 - d. 9555 Central Hill Road at the Isle of Wight Hunt Club.
 - e. 13542 Jones Town Drive at the bridge.
 - f. 18235 Days Point Road at Tormentor Lake.
 - g. 8490 Stallings Creek Drive.

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
602.06

BASIC WATER HYDRAULICS

REVISION
A

1. **Nozzle pressures:**

- a. All fog nozzles: 100 psi
- b. All straight tip handlines: 50 psi
- c. All straight tip master streams: 80 psi

2. **Friction loss in hose per 100':**

(FL = CQ²L)

- a. 1-3/4" hose: (C=15.5)

50 gpm - 4 psi
100 gpm - 16 psi
150 gpm - 35 psi
185 gpm - 53 psi
200 gpm - 62 psi

- b. 2-1/2" hose: (C=2)

100 gpm - 2 psi
150 gpm - 5 psi
200 gpm - 8 psi
250 gpm - 13 psi
300 gpm - 18 psi
350 gpm - 25 psi
400 gpm - 32 psi
450 gpm - 41 psi
500 gpm - 50 psi

- c. 3" hose: (C=.8)

100 gpm - 1 psi
150 gpm - 2 psi
200 gpm - 3 psi
250 gpm - 5 psi
300 gpm - 7 psi
350 gpm - 10 psi
400 gpm - 13 psi
450 gpm - 16 psi
500 gpm - 20 psi

- d. 5" hose: (C=.08)

100 gpm -	1 psi
200 gpm -	1 psi
300 gpm -	1 psi
400 gpm -	1 psi
500 gpm -	2 psi
600 gpm -	3 psi
700 gpm -	4 psi
800 gpm -	5 psi
900 gpm -	6 psi
1000 gpm -	8 psi
1100 gpm -	10 psi
1200 gpm -	12 psi
1300 gpm -	14 psi

- **NOTE:** When pumping two or more supply lines of equal size and length, divide the flow equally between the number of lines and figure the friction loss for one line only.

3. Tip sizes and GPMs:

- a. Hand lines:
- | | |
|------------|---------|
| 1/2" tip | 50 gpm |
| 15/16" tip | 185 gpm |
| 1" tip | 210 gpm |
| 1-1/8" tip | 266 gpm |
| 1-1/4" tip | 328 gpm |
- b. Master streams:
- | | |
|--------------|----------|
| 1-1/4" tip - | 415 gpm |
| 1-3/8" tip - | 500 gpm |
| 1-1/2" tip - | 600 gpm |
| 1-3/4" tip - | 814 gpm |
| 2" tip - | 1063 gpm |

4. Foam operations:

The PDP should be 200 psi. The foam inductor should be no further than 200' from the nozzle.

5. Standpipe operations:

Calculate the friction loss for the hose and elevation and then add 25 psi.

6. Sprinkler systems:

Maintain 150 psi to the system.

7. Bresnan distributor nozzle:

Nozzle flows 300 gpm at 50 psi.

8. Elevation:

- a. Add 5 psi for each floor above the ground floor
- b. Add 5 psi for each 10' when using elevated streams.
- c. Subtract 5 psi for each 10' below grade.

9. Appliances:

- a. Add 10 psi friction loss for wyes and siameses only if they are flowing more than 350 gpm.
- b. Add 25 psi friction loss for deluge guns and ladder pipes.

10. Relay operations:

- a. When using 3" hose, pump the needed GPMs and add 20 psi for the next pumper. Relay pressures should not exceed 200 psi.
- b. When using 5" hose, maintain 80 psi.

11. Minimum residual pressure:

Residual pressure should never be allowed to go below 20 psi.

12. Available water at hydrant:

0-10% drop = 3 times amount
11-15% drop = 2 times amount
16-25% drop = 1 times amount
25% or more = not as much as first flowed.

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
602.07

VENTILATION

REVISION
A

I. Scope

This standard applies to incidents involving structures and confined spaces where the prompt removal of smoke, heat, and other products of combustion is necessary to quickly and safely extinguish the fire.

II. General

- A. Prompt and efficient ventilation is necessary to mitigate the potentially harmful effects of smoke, heat, and other contaminants within structures and confined spaces.
- B. If unchecked, smoke and heat will contribute to property damage and can injure and kill those who become trapped.
- C. Smoke and heat also hinder firefighters in their efforts to perform search and rescue operations as well as suppression.
- D. Therefore, it is the policy of this Department to provide prompt and proper ventilation in all buildings and confined spaces in which smoke, heat, or other products of combustion are present unless otherwise ordered by the incident commander.

III. When to Ventilate

- A. Ventilation shall always be performed whenever:
 - 1. Heat, smoke, and other products of combustion are present.
 - 2. Hose crews cannot effectively make an interior attack due to excessive heat and poor visibility.
 - 3. Heat, smoke, and other products of combustion block escape routes for the occupants of the structure.
- B. When performing ventilation, the following safety precautions should be observed:
 - 1. Read the smoke. Observe conditions that might indicate that the potential for flashover or backdraft is present.
 - 2. NEVER direct charged hose streams into ventilation openings.
 - 3. Always have charge hoselines in place prior to beginning ventilation.
 - 4. Maintain communications.
 - 5. Wear full protective clothing including SCBA.
 - 6. Always consider structural soundness.
 - 7. Exercise caution whenever using power saws, axes, and other sharp instruments.
 - 8. Secure a lifeline to any firefighter who is on an potentially weakened roof.
 - 9. Remember that improper ventilation techniques may contribute to fire spread.

IV. Types of Ventilation

- A. Natural: Accomplished by making use of wind currents. Open the building on the leeward side to allow smoke to escape, then open the windward side to provide fresh air.

- B. Mechanical: Use of electric or gasoline-powered fans or blowers to evacuate smoke from a building or confined space.
 - 1. Negative pressure: Exhaust smoke from the building.
 - 2. Positive pressure: Blow fresh air into the building to force the smoke out.
- C. Horizontal: Generally inflicts less damage to the building than vertical ventilation since it is typically accomplished through available portals such as doors and windows.
- D. Vertical: May also take advantage of natural building features, such as skylights, shafts, and rooftop stairways. Many times, the only option is to cut ventilation openings into the building itself.

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
603.01

SUPPORT OF AUTOMATIC SPRINKLER SYSTEMS

REVISION
A

I. Scope

This standard regulates emergency operations in buildings equipped with automatic fire sprinkler systems. It was promulgated to:

- A. Establish guidelines for emergency operations in buildings equipped with automatic fire sprinkler systems.
- B. Ensure that automatic fire sprinkler systems are properly supported so that they perform as designed.
- C. Ensure that activated automatic fire sprinkler systems are restored to service properly and that the fire has been extinguished.

II. General

- A. It shall be the policy of this Department to support and supplement automatic fire sprinkler systems that have activated during a fire.
- B. It shall be the responsibility of all personnel to know which buildings within the fire district are equipped with automatic fire sprinkler systems and to be familiar with the location of the fire department connections and control valves.

III. Operations

- A. System support:
 - 1. The second due engine company should lay a supply line to the fire department connection (FDC) and then supplement the system by pumping two 2½" or 3" lines. It is best to connect to both inlets of a sprinkler siamese, since doing so decreases friction loss. It also provides safety and redundancy if one of the lines bursts.
 - 2. Pumping pressures:
 - a. Pipe schedule: 150 psi at the fire department connection plus 5 psi per floor in multiple-story buildings.
 - b. Hydraulically calculated systems and 13R or 13D systems: 100 psi at the fire department connection. The goal is to provide 50 psi at the most remote head.
 - c. More water may be required depending on the number of heads operating, building size and height, and etc.
 - 3. Preferably, the engine company supporting system will not be used for handlines or other similar operations.

IV. System Restoration

Section 603.01 – Continued

- A. The system should not be shut off until the fire is extinguished, and only then by order of the incident commander. The member shutting off the system shall remain at the control valve until relieved by the incident commander.
- B. Prior to shutting off the system, the water flow may be stopped by using sprinkler wedges. Each firefighter and company shall be issued sprinkler wedges.
- C. Before leaving the scene, ensure that the system is placed back into service.

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
603.02

STANDPIPE OPERATIONS

REVISION
A

I. Scope

This standard applies to the management of incidents in buildings equipped with standpipe systems.

II. General

- A. It shall be the policy of this Department to use standpipe systems, when provided, to support interior firefighting operations. In buildings equipped with standpipes, the following operations shall be performed:
1. At least one engine company from the initial alarm assignment shall lay a supply line and support the standpipe system by pumping at least two 2½" lines into the standpipe connection. A minimum of 150 psi should be supplied to the standpipe connection for elevations under 100'.
 2. All interior operations shall be conducted using fire department hose. The first line shall be connected below the fire floor. Additional lines shall be added as needed.
 3. A check shall be made to ensure that all water supply valves are open and the fire pump, where provided, is operating properly. A secondary check shall be made to ensure that all hose outlets not in use are closed.
 4. The incident management system shall be used. An interior sector shall be established and sectors shall be assigned by floor numbers or other identifying areas such as the roof or lobby. Communications shall be established among all sectors.
 5. At a minimum, the initial attack crews shall take the following equipment into the building:
 - a. Appropriate protective equipment and SCBAs.
 - b. Hi-rise packs along with the appropriate adapters and spanner wrenches.
 - c. At least one ax, one pike pole, one pry bar, rope, handlights, portable radios, and other equipment that company or incident commander may deem appropriate.
 - d. Equipment assignment.
 - 1). Officer: SCBA, portable radio, handlight, ax.
 - 2). Firefighter: SCBA, rope, pike pole.
 - 3). Firefighter: SCBA, hose pack, pry bar.Other equipment might be taken as the crew size varies or as ordered by the incident commander.
 6. The incident commander shall immediately cause proper ventilation and lighting operations to commence to adequately support interior rescue and firefighting efforts.
 7. As soon as possible, efforts should be made to provide and adequate and continuous supply of air for all SCBAs.

Section 603.02 – Continued

8. All other operations shall be conducted per established SOPs and tactical guidelines.

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
604.01

MOTOR VEHICLE FIRES

REVISION
A

I. Scope

This standard was promulgated to ensure the safety of members involved in the suppressing motor vehicle fires.

II. General

- A. The number and variety of motorized vehicles increases each day. It is impossible to completely identify all of the problems that might be encountered while extinguishing such a fire. Nevertheless, some commonalities do exist, and the general guidelines of this standard should be followed when combating a fire in a motorized vehicle.
- B. The incident commander should always remain cautious and assume the worst until certain that conditions are safe. For example, if a burning vehicle is placarded as transporting a hazardous material, assume that the incident is a haz-mat incident until it can be ascertained that no haz-mats are burning or have been released.
- C. If the fire appears to be the result of an accident, the incident commander should consider the mechanism of the accident in developing a strategy for managing the incident.
- D. The first priority is the safety of the firefighters, rescue workers, and spectators. If spectators are present, remove them to a safe distance. Do not place firefighters and rescue workers in harm's way unnecessarily. Remember, do not risk a lot to save a little. In general, once a vehicle begins to burn, it becomes nothing more than "a dumpster with wheels."
- E. The second priority at the scene of a vehicle fire is rescue. The incident commander must assume that someone is trapped in the burning vehicle until having ascertained that all of the occupants of the vehicle have gotten out.
- F. It is important to control the flow of traffic. The need to minimize the disruption of traffic in heavily congested areas must be balanced by the need to provide for the safety of firefighters and rescue workers. Whenever possible, direct traffic away from the incident.

III. Procedures

- A. Apparatus placement:
 - 1. Position apparatus upwind and uphill from a burning vehicle. This will keep the crew out of the smoke and prevent leaking fuel from running beneath the apparatus.
 - 2. Apparatus should not be parked closer than 100' from the burning vehicle whenever traffic conditions permit. If the burning vehicle is labeled as transporting a hazardous material, increase this distance based on the recommendations of the DOT Emergency Action Guide.
 - 3. The driver should position the apparatus to block at least one lane of the road, but as many lanes as may be required to provide a barrier between firefighters and

oncoming traffic. Ideally, the angle of the apparatus will allow the driver to view the burning vehicle from the pump panel and not expose the driver to oncoming traffic.

4. Secure sufficient room for an ambulance, additional apparatus, or a medevac helicopter in case additional resources are needed.

B. Safety precautions:

1. Members engaged in firefighting and rescue efforts shall wear full protective clothing and SCBA. Protective clothing shall not be removed until the possibility of re-ignition has been removed.
2. The presence of broken glass and other sharp objects mandates that personnel wear gloves and other safety equipment to prevent the possibility of injury even after the fire has been extinguished.
3. Stabilize the burning vehicle as soon as possible to prevent movement. This may be accomplished in a variety of ways, such as using wheel chocks, cribbing, a winch, and etc.
4. If it becomes necessary to open the hood, a hatch, or other opening to make a rescue or extinguish a fire, prop open the hood or hatch to prevent accidental closing due to failure of a spring, rod, or compressed cylinder.
5. De-energize the vehicle as soon as possible by disconnecting the battery. Take care to prevent sparks in the event flammable or combustible vapors or fluids are present.
6. If the operation takes place in darkness, illuminate the scene properly. Operating members should wear turnouts or other clothing with reflective materials to minimize the risk of being struck by other vehicles, including apparatus.
7. Also consider the impact of strobes and other warning lights on visibility. Turn them off when it is safe to do so.
8. Firefighters and rescue workers should also be aware of the hazards associated with air bags, energy absorbing bumpers, downed or overhead power lines, hollow driveshafts, high pressure hoses on power steering and air conditioning systems, air-suspension systems, and the danger of exploding tires equipped with split rims, such as the wheels used on larger vehicles and some pick-up trucks.
9. Establish an adequate water supply. Hose streams should be adequate for the volume of fire. Typically, the minimum sized deployed should be a 1¾” hose. Approach the vehicle from the upwind side whenever possible.
10. Never stick your head inside a vehicle while it is still burning, and never crawl under a vehicle to extinguish a fire.
11. A variety of combustible metals are used for engine blocks, wheels, and other components. These may react adversely with water and may require the use of specialized extinguishing agents.

C. Fuel spills:

1. A fuel tank may be punctured during an accident or may fail during a fire, thereby causing a spill or runoff. Take precautions to contain the spill and prevent environmental damage. If the fuel has not ignited, take steps to minimize the chance of ignition.
2. A variety of fuels are used in motor vehicles. Of particular concern are the LNG and LPG. A leak involving either of these fuels poses special problems, as does

the possibility of a fuel tank rupture due to flame impingement. It is critical that these vessels be cooled during a fire.

3. Do not remove the fuel tank cap until you are absolutely certain that this is no excess pressure in the tank.
4. Do not turn your back on a burning vehicle, and keep charged hoselines available after extinguishment in the event of re-ignition.
5. Prohibit smoking.
6. Prevent sparking from tools, saws, and etc.
7. A fuel leak may be controlled by using lead wool, soap, wood plugs, and etc. or by turning off the fuel valves on a LNG or LPG tank.

Smithfield Volunteer Fire Department

STANDARD OPERATING PROCEDURE

SECTION
605.01

WILDLAND FIRES

REVISION
A

I. Scope

This standard was promulgated to regulate the management of incidents involving ground cover in the wildland / urban interface.

II. Definitions

- A. Backfiring: Intentionally setting fire to fuels inside the control line to reduce fuel and contain a rapidly spreading fire. Used in the indirect method only.
- B. Brands: Pieces of burning debris carried aloft into the convective column. May be carried outside the perimeter of the main fire by wind, causing spot fires.
- C. Brush: Shrubs and stands of short, scrubby trees generally three to twenty feet in height.
- D. Control line: A term used for all constructed or natural fire barriers used to control a fire.
- E. Crown fire: Any fire that advances from the top to top of trees or brush that is more or less independent of the surface fire.
- F. Fire line: The part of a control line that is scrapped or dug down to mineral soil. Normally only used in wooded areas. Generally not used on grass fires.
- G. Fire perimeter: The entire length of the outer edge of the fire.
- H. Head of a fire: The most active part of a wildland fire.
- I. Heavy fuels: Fuels of large diameter, such as logs, snags, and large tree limbs. These ignite slowly and burn slowly, but produce a large amount of heat.
- J. Mop up: After the fire has been controlled, all actions required to make the fire "safe." This includes trenching, falling snags, and checking all control lines.
- K. Rear of fire: The portion of a fire opposite the head. The slowest burning part of a fire.
- L. Wildland / urban interface: Where native vegetation comes in contact with structures and other man made fuels.

III. Operational Procedures

- A. Direct attack: Personnel and resources work close to the fire's edge and put it out there. Best to use on small, slow moving fires with light fuels.
- B. Indirect attack: Uses natural barriers and backfiring.
- C. Parallel attack: Made by hand crews and bulldozers when intense heat or fire spread precludes direct attack.

IV. Safety Precautions

- A. The level of protective clothing to be used during an incident shall be determined by the incident commander. The incident commander may allow the use of durable long pants

and shirts in lieu of structural fire fighting turnout gear. Under no circumstances shall short pants be allowed.

- B. Durable work boots, gloves, eye protection, and helmets shall be worn at all times by members engaged in the suppression of wildland fires.
- C. EMS personnel shall closely monitor all personnel to prevent heat exhaustion, dehydration, and etc. A rehab sector shall be established whenever appropriate.
- D. The incident management system shall be initiated on all wildland fires.
- E. Standard fire orders:
 - 1. Keep informed of weather conditions.
 - 2. Know what your fire is doing at all times.
 - 3. Base your actions on current and expected fire behavior.
 - 4. Plan escape routes for everyone and make them known.
 - 5. Be alert, keep calm, think clearly, and act decisively.
 - 6. Maintain good communications at all times.
 - 7. Give clear instructions and be sure they are understood.
 - 8. Maintain control of your personnel at all times.
 - 9. Fight the fire aggressively, but provide for safety first.
 - 10. On grass fires, fight the fire from the burned area whenever possible.
 - 11. Guard against getting your apparatus stuck in soft terrain. As a general rule, structural engines should not leave the roadway.