Standard Company Operations

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Purpose

The purpose of this guideline is to establish the Albuquerque Fire Department's standard company operations. Standard company operations assign fireground functions and activities to various companies based upon the capability and characteristics of each type of unit to assure safe, effective and efficient accomplishment of fireground objectives including rescue, fire control and loss control activities.

Guideline

Standard company operations reduce the amount and detail of orders required to get companies into action on the fireground, increase the confidence of company members in performing duties and raise awareness of all personnel as to the activities of other companies operating on the fireground.

Operational Guidance

I. Standard company functions

A. Engine company

1. Search, rescue and treatment
2. Initial Rapid Intervention Team (IRIT) duties
3. Stretch hoselines
4. Operate nozzles
5. Pump hoselines
6. Loss control

B. Ladder company functions

1. Search and rescue
2. Ventilation
3. Forcible entry

4. Raise ladders

5. Provide access/check fire extension

6. Utility control

7. Operate aerial master streams

8. Perform overhaul

9. Extrication

10. Loss control

11. Provide lighting

C. Rescue Company functions

1. Transportation of sick and injured to hospitals.

2. Initial Rapid Intervention Team (IRIT) duties (depending on arrival order of units)

3. Search, rescue and treatment - Rescue companies should communicate their commitment and location to Command, and maintain a retrievable status for victim treatment and transportation.

4. Utility control (gas and electric)

5. General firefighting duties as assigned by Command

D. HazMat Squad functions (Squad One and Squad Three)

1. Safety

2. Accountability

3. Rehab

E. Squad Two functions

1. Confined space rescue

2. High-angle rescue

3. Heavy vehicle extrication

4. Structural collapse

5. Trench rescue

6. Swiftwater rescue

7. Mountain rescue

8. Machinery and elevator rescue

9. Squad Two can perform the following functions if their specialty training is not required on scene

    a. Forcible entry (doors,windows,secondary egress, etc)

    b. Utility control

    c. Ventilation

    d. Search and rescue

    e. Roof operations

    f. Rapid Intervention (RIT) team

    g. Squad 2 is a specially-equipped unit that can perform all fireground functions, except fire attack (unless they pull a line from another apparatus).

II. Standard company operations

A. Provide a basic framework for the safe and effective performance of duties on the fireground and should not restrict appropriate actions taken in response to dynamic fireground conditions

B. It is the ongoing responsibility of Command to utilize available on-scene units to complete required tasks and functions (e.g., if a ladder company is

on a delayed response or unavailable, Command should assign ladder functions to an engine company)

C. These guidelines should enhance the decision-making process of all officers by establishing a standard operation framework; they should in no way limit the initiative of any Company Officer, who will determine, based upon conditions, priority functions for their unit

Fireground Safety

Positioning of operating companies can severely affect the safety/survival of such companies. Personnel must use caution when placed in the following positions:

- Above the fire (floors/roof)
- Where fire can move in behind them
- Where sector cannot control position/retreat
- When involved with opposing fire streams
- Combining interior and exterior attack
- With limited access - one way in/out
- Operating under involved roof structures
- In areas containing hazardous materials
- Below ground fires (basements, etc.)
- In areas where a backdraft potential exists
- Above/below ground rescue

The safety of firefighting personnel represents the major reason for an effective and well-timed offensive/defensive decision and the associate write-off by Command. The two strategies are based on a standard Risk Management plan that is to be employed at all structure fires.

Within a Structured Risk Management Plan:

- *We may risk a lot to protect savable lives*
- *We may risk a little to protect savable property*
- *We will risk nothing to save what is already lost*

When operating in a defensive mode, operating positions should be as far from the involved area as possible while still remaining effective. Position and operate from behind barriers if available (fences, walls, etc.).

The intent is for personnel to utilize safe positioning where possible/available, in an effort to safeguard against sudden hazardous developments such as backdraft explosion, structural collapse, etc.

When operating in an offensive mode, be aggressively offensive. An effective, coordinated interior attack operation directed toward knocking down the fire eliminates most eventual safety problems.

Due to the inherent hazards of the immediate fire or incident scene, efforts will be made by Command to limit the number of personnel on the fireground to those assigned to a necessary function. All personnel shall be:

- Positioned in Staging.
- Assigned to a task or operating within a sector.
- Having completed an assignment and no other assignment is available within that sector, crews should be assigned to a Resource, Staging, or Rehabilitation Sector until such time as they can be reassigned to an operating sector or

released to in-service status.
The intent of this procedure is to minimize fireground confusion/congestion and to limit the number of personnel exposed to fireground hazards to only those necessary to successfully control the operation. Individuals or crews shall be restricted from wandering about the fireground or congregating in non-functional groups. If personnel have not been assigned to a sector or do not have a necessary staff function to perform, they shall remain outside the fireground perimeter.
When it is necessary to engage personnel in exceptionally hazardous circumstances (i.e., to perform a rescue), Command will limit the number of personnel exposed to an absolute minimum and assure that all feasible safety measures are taken.
In extremely hazardous situations (flammable liquids, LP gas, hazardous materials, etc.) Command will engage only an *absolute minimum number of personnel* within the hazard zone. Unmanned master streams will be utilized wherever possible.
In situations where crews must operate from opposing or conflicting positions, such as front vs. rear attack streams, roof crews vs. interior crews, etc., utilize radio or facetoface
communications to coordinate your actions with those of the opposing crew in an effort to prevent needless injuries. Command should notify Sector Officers or Company Officers of opposing or conflicting operations. Ground crews must be notified and evacuated from interior positions before ladder pipes go into operation.
Do not operate exterior streams, whether hand lines or master streams into an area where interior crews are operating. This procedure is intended to prevent injuries to personnel due to stream blast and the driving of fire and/or heavy heat and smoke onto interior crews.
When laddering a roof, the ladder selected shall be one which will extend 2’- 3’ above the roof line. This shall be done in an effort to provide personnel operating on the roof with a visible means of egress. If possible, when laddering buildings under fire conditions, place ladders near building corners or fire walls as these areas are generally more stable in the event of structural failure.
When operating either above or below ground level, establish at least two (2) separate escape routes/means where possible, (such as stairways, ladders, exits, etc.), preferably at opposite ends or diagonal corners of the building or separated by considerable distance.

Hazard Zone
The Hazard Zone will be defined as any area that requires an SCBA, charged hoseline, special protective clothing, or in which firefighting personnel are at risk of becoming lost, trapped, or injured by the environment or structure. The following situations would be included inside the Hazard Zone:
• Entering a structure reported to be on fire

• Operating in close proximity to the structure during exterior operations
• Confined Space
• Trench Rescues
• Operating close to crane operations or close to swift water operations
• Building collapse
• Operating close to helicopter operations
• Extrication

All firefighters working in the Hazard Zone shall be in crews of a minimum of two personnel. A portable radio is required for crews working in the Hazard Zone. The Passport accountability system will be in place.

Warm Zone

The Warm Zone will be defined as just outside of the Hazard Zone where the firefighters start their operations on the fireground. This zone is where the fire fighter is not at risk of becoming lost, trapped, or injured by the environment or structure. The following functions could be done in this zone:

• Forward fire apparatus working the incident (i.e.; engines, ladders)
• Laying lines
• Haz-Mat and Heavy Technical Rescue Teams developing tactics and strategies
• Utility trucks
• Special equipment needs
• Accountability Officer
• Fire Investigations

If at any time firefighters in the Warm Zone become threatened, then this would become a Hazard Zone.

Cold Zone

The Cold Zone will be defined as outside of the Warm Zone where no one is at risk because of the incident. The following functions could be done in this area:

• Command
• Level I and Level II staging
• Support and Staff personnel
• Rehab
• Media
• Law Enforcement Liaison
• Interviewing the responsible party

Sectors

The safety of firefighting personnel represents a major reason for fireground sectorization. Sector officers must maintain the capability to communicate with forces

under their command so that they can control both the *position and function* of their companies.
Sector officers and company officers shall be able to account for the whereabouts and welfare of all crews/crew members under their assignment. (See Personnel Accountability System SOG 307).
Company officers shall insure that all crew members are operating within their assigned Sector only. Crews will not leave their respective sectors unless authorized by the Sector Officer.
When crews are operating within a Sector, Company Officers shall keep the Sector Officer informed of changing conditions within the Sector area, and particularly those changing conditions which may affect the safety of personnel.
Hazards that will affect only a specific Sector area should be dealt with within that Sector and need not necessarily affect the entire operation.

Rehabilitation
In an effort to regulate the amount of fatigue suffered by fireground personnel during sustained field operations, sector officers should frequently assess the physical condition of their assigned companies. When crew members exhibit signs of serious physical or mental fatigue, the entire crew should be reassigned to a Rehabilitation Sector if possible. Company officers shall request reassignment to Rehabilitation Sector from their sector officer. The company officer's request shall indicate the crew's position/condition, etc., and shall advise as to the need for a replacement crew.
Individual crews shall not report to the Rehabilitation Sector unless assigned by the Fireground Commander. Crew members should report to and remain intact while assigned to Rehab.
It is the on-going responsibility of Command to summon adequate resource to tactical situations to effectively stabilize that situation, and to maintain adequate resource during extended operations to complete all operational phases.
The rotation of companies will be utilized by Command during extended operations to provide an effective on-going level of personnel and their performance. The Alarm Room will assist in coordinating the rotation of companies during such campaign operations.
It is the intent of this procedure to reduce the fatigue and trauma experienced during difficult operations to a reasonable (and recoverable) level and is in no way intended to lessen the individual and collective efforts expected of all members during field operations.

Safety Sector

The recognition of situations which present inordinate hazards to fireground personnel and the proper response to safeguard personnel from those hazards is of critical importance to all Fire Department operations.

Command has the responsibility to recognize situations involving a high risk to personnel and to initiate appropriate safety measures.

Command shall establish a Safety Sector at incidents involving an inordinate danger to personnel. Command should consider establishing a Safety Sector on any situation where it may be advantageous to the overall safety of operations.

Assigned Squad personnel will respond automatically to multiple alarm incidents to establish a Safety Sector and will report to the Command Post upon arrival. When the need for specialized assistance is noted, Command should confirm the response of the appropriate personnel (Department Safety Officer).

Command may designate any available personnel to establish a Safety Sector when the need is indicated. This should be a high priority assignment.

The establishment of a Safety Sector or the presence of a Safety Officer in no way diminishes the responsibility of all officers for the safety of their assigned personnel. Each and every member shall utilize common (safety) sense and work within the intent of established safety procedures at all times.

Structural Collapse

In recent times, structural collapse has been a leading cause of serious injuries and death to fire fighters. For this reason the possibility of structural collapse should be a major consideration in the development of any tactical plan.

Structural collapse is always a possibility when a building is subject to intense fire. In fact, if fire is allowed to affect a structure long enough, some structural failure is inevitable.

Regardless of the age and exterior appearance of the building, there is always the possibility that a principal structural supporting member is being seriously affected by heat and may collapse suddenly inflicting serious injury to fire fighters.

Example: *A 100' length of unprotected steel expands 9" when heated to 1100° F.*

In the typical fire involved building, the roof is the most likely candidate for failure, however, failure of the roof may very likely trigger a collapse of one or more wall sections. This is especially true if the roof is a peak or dome type which may exert outward pressure against both the bearing and non- bearing walls upon collapse. In multi-story buildings or buildings with basements, the floor section above the fire may collapse if supporting members are directly exposed to heat and flames.

A knowledge of various types of building construction can be invaluable to the Fire Officer from a safety standpoint as certain types of construction can be expected to fail

sooner than others. For example: under fire conditions light weight truss and bar joist roof construction can be expected to fail after minimal fire exposure.
Structures have been known to collapse without warning but usually there are signs which may tip off an alert fire officer. Action might be taken to avert any imminent hazard.
Signs of building collapse may include:
• Cracks in exterior walls.
• Bulges in exterior walls.
• Sounds of structural movement--creaking, groaning, snapping, etc.
• Smoke or water leaking through walls.
• Flexible movement of any floor or roof where firefighters walk.
• Interior or exterior bearing walls or columns--leaning, twisting or flexing.
• Sagging or otherwise distorted roof lines.
• Time of fire involvement.
The following construction features or conditions have been known to fail prematurely or to contribute to early structural failure when affected by fire.
Contributing Factors:
• Parapet walls.
• Large open (unsupported) areas--supermarkets, warehouses, etc.
• Large signs or marquees--which may pull away from weakened walls.
• Cantilevered canopies--which usually depend on the roof for support and may collapse as the roof fails.
• Ornamental or secondary front or sidewalls--which may pull away and collapse.
• Buildings with light weight truss, bar joist, or bow string truss, roofs.
• Buildings supported by unprotected metal-beams, columns, etc.
Buildings containing one or more of the above features must be constantly evaluated for collapse potential. These evaluations should be of major consideration toward determining the tactical mode, i.e. offensive/defensive.
It is a principal Command responsibility to continually evaluate and determine if the fire building is tenable for interior operations. This on-going evaluation of structural/fire conditions requires the input of company officers advising their sectors and of sectors advising Command of the conditions in their area of operation.
Structures of other than fire protected/heavy timber construction are not designed to withstand the effects of fire, and can be expected to fail after approximately twenty minutes of heavy fire involvement. If after 10-15 minutes of interior operations heavy fire conditions still exist, Command should initiate a careful evaluation of structural conditions, and should be fully prepared to withdraw interior crews and resort to a defensive position.
If structural failure of a building or section of a building appears likely, a perimeter must be established a safe distance from the area which may collapse. All personnel must

remain outside this perimeter.

Evacuation

Interior firefighting operations should be abandoned when the extent of the fire prohibits control or the structure becomes unsafe to operate within. When such conditions make the building untenable, evacuate, regroup, account for personnel, communicate, and redeploy.

Our primary concern, when a hazard which may affect the safety of fire personnel becomes apparent, is the welfare of those personnel. In an effort to protect personnel who may suffer the adverse effects of such hazards such as structural collapse, explosion, backdraft, etc., a structured method of area evacuation must be utilized, one which will provide for the rapid/effective notification of those personnel involved, and one which will be able to accurately account for those personnel.

The method of evacuation selected will vary depending on the following circumstances:

• Imminency of the hazard
• Type and extent of hazard
• Perception of the area affected by the hazard

The emergency traffic announcement is designed to provide immediate notification for all fireground personnel of a notable hazard that is either about to occur, or has occurred.

The use of “Emergency Traffic” should be initiated only when the hazard appears to be imminent.

Any member has the authority to utilize the “Emergency Traffic” announcement when it is felt that a notable danger to personnel is apparent; however, considerable discretion should be applied to its use - emergency traffic announcements become ineffective if overused.

When an imminent hazard has been realized, the emergency traffic process should be initiated. Usually either a company or sector officer will be the initiator. The initiator should describe the apparent hazard and order a positive response, usually to evacuate a particular area or section, according to the scope of the hazard.

If possible, the sector officers of those areas to be evacuated should request an acknowledgment of the emergency traffic dispatch from those crews to be evacuated. Upon receipt of the emergency traffic evacuation order, company officers shall assemble their crews and promptly exit to a safe location, where the company officer will again account for all crew members. Shortly after the evacuation order, sector officers shall begin the process of accounting for all evacuated crews. When all affected crews and crew members are accounted for, the evacuation process is complete. At this time a more specific determination as to the reality/extent of the hazard can be made and efforts initiated to redeploy/redirect attack forces.

Building evacuation generally involves a shift from offensive to defensive as an operational strategy. In such cases, Command must develop a corresponding

operational plan and must communicate that plan to all operating elements. This can be a difficult shift to complete as units are committed to positions in an offensive manner. It is extremely important that everyone gets the word that a shift in strategy has been made.
Hazards noted of a less than imminent nature should usually be handled by a consultation of Command, Sector Officers and/or the Safety Officer, company officers or outside agency authorities. These officers or specialists should make a determination as to the nature and possible effect of the suspected hazard, and advise Command so that a more knowledgeable decision as to the proper course of action can be made.
Crews retreating from interior operations often require hoseline protection. The personal protection afforded to fire fighting personnel in such situations represents a major function of back-up lines.

Search and Rescue
Search and rescue should be performed according to an efficient, well planned procedure which includes the safety of search crew personnel.
The object of the search effort is to locate possible victims, not create additional ones by neglecting the safety of the search crew.
Prior to entering the search area, all search team members should be familiar with a specific search plan including the overall objective, a designation of the search area, individual assignments, etc. This may require a brief conference among crew members before entering the search area to develop and communicate the plan. Individual search activities should be conducted by two or more members when possible.
Company officers must maintain an awareness of the location and function of all members within their crew during search operations.
A brief look around the floor below the fire may provide good reference for the search team, as floors in multi-story occupancies usually have a similar layout.
Whenever a search is conducted that exposes search crows to fire conditions (particularly above the fire floor) the search team should be protected as soon as possible with a charged hose line, in order to insure a safe escape route.
If search personnel are operating without a hose line, life lines should be used when encountering conditions of severely limited visibility.

Fireground Factors

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Purpose

This purpose of the guideline is to identify a standardized list of basic factors that are to be considered by an Incident Commander in the evaluation of tactical situations. It identifies the basic issues that Incident Commander should address at all emergency incidents for which AFD maintains management responsibility.

This guideline should provide an Incident Commander with a checklist of the basic issues that are involved in size-up, decision-making, initiating action, review, and revision on the fireground.

Guideline

An effective Command Officer can only deal with a limited number of factors of any kind on the fireground. Within the framework of that limitation, the identification of critical factors is extremely important. Not all factors are critical in any given tactical situation. Command must identify those that are significant for each tactical situation. This guideline offers a framework for that process.

Operational Guidance

I. Fireground factors

A. Operations are often begun before critical fireground factors are adequately considered. Size-up should be a conscious process that involves the rapid, but deliberate, consideration of critical factors. It includes the development of a strategy and rational plan of attack based on existing conditions. A fire attack is an action-oriented process that involves taking the shortest and quickest route directly to the fire.

B. Fireground factors represent an array of items that are dynamic during the entire fireground process. The relative importance of each factor necessarily changes throughout that time frame. Command must continually deal with these changes, and base decisions on factor information that is timely and current. Beware of developing an initial plan of attack and sticking to that same initial plan throughout the fire, even though conditions continue to change. Effective fire operations may require revisions based upon information feedback.

C. In critical fire situations, Command may develop an initial plan and initiate an attack based on an incomplete evaluation of fireground factors. In such cases, efforts must continue throughout the operation to improve the information on which those decisions are based. Command will seldom operate with complete information during initial operations.

D. The effective management of each fireground factor requires Command to apply a somewhat different form of information management (visual, reconnaissance, or preplanning) to each factor. This is particularly true among the major categories of factors. Command must deal with each factor in the most effective manner.

E. Most tactical situations represent a complex problem with regard to how Command deals with fireground factor information. There are factors that can be determined from a command position on the outside of the structure and other factors that can only be determined from other operating positions outside and inside the structure. Fireground intelligence available to Command is developed utilizing an overlapping variety of information management factors and forms. These forms of information management revolve around the three basic information factors:

1. Visual factors are categorized as the type of information that can normally be gained by actually looking at a tactical situation from the outside.

2. Reconnaissance factors include information that is not visually available to Command from a position on the outside of a tactical situation. This generally involves Command making a specific assignment and then receiving an information-oriented report.

3. Preplanning and familiarity factors include the intelligence that is gained from formal pre-fire planning, general informal familiarization activities, and from AFD Dispatch - through the Mobile Data Terminal (MDT). It may include building drawings or the location of hazardous materials. This information would otherwise have to come from a reconnaissance report or might not be available.

F. The following are fireground factors which should be evaluated by Command as they pertain to each tactical situation. They can be obtained by using the above-mentioned information management factors.

1. Building construction.

   a. Size.

   b. Roof type (bowstring, bar joist, etc.), and condition.

   c. Interior arrangement/access (stairs, halls, elevators).

   d. Construction type.

   e. Age.

   f. Structural condition/faults/weaknesses.

   g. Compartmentalization/separation.

2. Building factors

   a. Vertical or horizontal openings, shafts, or channels.

   b. Outside openings--doors and windows/degree of security.

   c. Utility characteristics (hazards/controls).

   d. Characteristics of concealed spaces or attic spaces

   e. Exterior access (wrought iron security bars, etc.).

   f. Effect the fire has had on the structure (to this point).

g. Time projection of continuing fire effect on building.

3. Fire factors

a. Size.

b. Extent of structure involved.

c. Location.

d. Stage (incipient through to flashover).

e. Direction of travel (most dangerous).

f. Time of involvement.

g. Type and amount of material involved.

h. Type and amount of material left to burn.

i. Products of combustion.

4. Occupancy factors

a. Specific occupancy.

b. Type (business, mercantile, public assembly, institutional).

c. Time of day (e.g., occupancy open/closed, occupied/vacant).

d. Occupancy associated characteristics or hazards.

e. Type/value of contents (based on occupancy).

f. Status (abandoned/under construction)

g. Loss Control profile/susceptibility of contents to damage.

5. Life hazard factors

   a. Number of occupants.

   b. Location of occupants (in relation to the fire).

   c. Condition of occupants (by virtue of fire exposure).

   d. Capacity and age of occupants.

   e. Commitment required for search and rescue.

   f. Fire control required for search and rescue.

   g. Needs for EMS.

   h. Time estimate of fire effect on victims.

   i. Exposure of spectators/control of spectators.

   j. Hazards to fire personnel.

   k. Access rescue forces have to victims.

   l. Characteristics of escape routes/avenues of escape (type, safety, fire conditions).

6. Exposure arrangement

   a. Access, arrangement, and distance of external exposure.

   b. Combustibility of exposures.

   c. Capability or limitations on apparatus movement and use.

   d. Severity and urgency of exposures (fire effect).

   e. Value of exposures.

f. Most dangerous direction/avenue of spread.

g. Time estimate of fire effect on exposures (internal and external).

h. Obstructions to operations.

7. Resource factors

a. Personnel and equipment on scene.

b. Personnel and equipment responding.

c. Personnel and equipment available in reserve or in Staging.

d. Estimate of response time for additional resources.

e. Condition of personnel.

f. Capability of personnel.
g. Capability of Command personnel.

h. Availability, location and adequacy of hydrants.

i. Supplemental water resources.

j. Outside agency resource and response time

k. Status of built-in private fire protection systems (sprinkler, standpipe, alarms).

8. Other conditions and factors

a. Time of day or night.

b. Day of week.

c. Season.

d. Special hazards by virtue of holidays and special events.

e. Weather (wind, rain, heat, cold, humid, visibility).

f. Traffic conditions.

g. Social conditions.

Fireground Strategy

Purpose
The following procedure outlines the fireground strategy to be employed at structure fires. Fireground operations will fall in one of two strategies, *Offensive* or *Defensive*. The two strategies are based on a standard Risk Management Plan that is to be employed at *all* structure fires. This is the basis for this procedure.
Within a structured Risk Management Plan:
• We may risk a lot to protect savable lives.
• We may risk a little to protect savable property.
• We will risk nothing to save what is already lost.
Considering the level of risk, the Incident Commander will choose the proper strategy to be used at the fire scene. The strategy can change with conditions or because certain benchmarks (i.e. “All Clear”) are obtained.
The strategic mode will be based on:
• The building (type of construction, condition, age, etc)
• Structural integrity of the building (contents vs. structural involvement)
• The fire load (what type of fuel is burning and what's left to burn)
• The fire and/or smoke conditions (extent, location, etc.)
• The rescue profile (savable occupants/survivability profile)

The Incident Commander is responsible for determining the appropriate fireground strategy. Once the appropriate strategy is initiated, it becomes the Incident Commander’s job to ensure that all personnel are operating within the strategy. By controlling the fireground strategy, the Incident Commander is providing overall incident scene safety. The proper strategy will be based on the following:
Avoiding simultaneous **Offensive** and **Defensive** strategies in the same fire area. This usually happens by first committing personnel to interior positions, then opening up on them from exterior positions with master streams. Once the two strategies have been used in this fashion, there will be no winners in the interior.
Matching the appropriate strategy to the fire conditions of the structure, and minimizing risk to firefighters.

Managing fireground strategy must start with the arrival of the first unit and be constantly monitored and evaluated throughout the entire incident. The initial Incident Commander will *include the fireground strategy in the on-scene report.* As Command is transferred to later arriving officers, these new officers assuming command must evaluate the fireground strategy based on the Risk Management Plan.
Fireground strategy provides a starting point to begin fireground operations. Once the strategy is announced, all the players involved should know what to expect as far as the position and functions of themselves and one another. The fireground strategy cannot

be a mystery to anyone, everyone operating on the fireground should be operating in the same strategic mode, Offensive or Defensive.

Offensive Strategy

Within the framework of the Risk Management Plan, the structure must first be determined to be safe to enter. Once determined safe, an Offensive Fire Attack is centered around rescue. *When safe to do so,* the Albuquerque Fire Department will initiate offensive operations at the scene of structure fires.

The following are guidelines for offensive fire attacks:

• Initial attack efforts must be directed toward supporting a primary search - the first attack line must go between the victims and the fire to protect avenues of rescue and escape (i.e. stairwells).

• Determine fire conditions and extent before starting fire operations (as far as possible). Never operate fire streams into smoke.

• Offensive fires should be fought from the *interior - unburned side* (interior capability is the principal offensive strategy factor).

• Avoid exterior application of water during offensive operation. This is usually the very worst application point.

• Avoid fire attack from the burning side of the building. An attack from the burning side generally will drive the fire, smoke, and heat back into the building and drive the interior fire control forces out of the building.

• Companies must resist the urge to focus only on the fire (this is known as the “candle moth” syndrome or “tunnel vision”). In some cases, the most effective tactical analysis involves an evaluation of what is *not* burning rather than what is actually on fire. The unburned portion represents where the fire is going and should establish the framework for fire control activities and requirements.

Command must consider the most critical direction and avenues of fire extension, plus it's speed, particularly as they affect:

• Level of risk to firefighters
• Rescue activities
• Confinement efforts
• Exposure protection

Command must allocate personnel and resources based upon this fire spread evaluation.

Command must not lose sight of the very simple and basic fireground reality that at some point firefighters must engage and fight the fire. Command must structure whatever operations are required to *put water on the fire.* The rescue/fire controlextension/ exposure problem is solved in the majority of cases by a fast, strong, wellplaced attack. Command must establish an attack plan that overpowers the fire with *actual* water application, either from offensive or defensive positions.

Command must consider the seven sides (or sectors) of the fire: front, rear, both sides,

top, bottom, and interior. Fires cannot be considered under control until all seven sides are addressed. Not doing so may result in fire extension.
Where the fire involves concealed spaces (attics, ceiling areas, construction voids, etc.), it becomes paramount that companies open up and operate fire streams into such areas. Early identification and response to concealed space fires will save the building. Officers who hesitate to open up because they don't want to beat up the building may lose the structure.

Early ventilation (natural or positive pressure) is a major support item that must be addressed during concealed space attacks. This must be initiated early and be well coordinated. Ventilation openings should be made in the fire area. Positive pressure should be injected into the unburned side and exit out of the fire area.
Command must get ahead of the fire. Command must make critical decisions that relate to cutoff points and must develop a pessimistic fire control strategy. It takes a certain amount of time to get water to a location, and the fire continues to burn while the attack is being set up. Command must consider where the fire will be when attack efforts are ready to actually go into operation; if misjudged, the fire may burn past the attack/cutoff position before resources and personnel are in position. Don't play “catch up” with a fire that is burning through a building (the fire will usually win all these races). Project your set-up time, write off property and get ahead of the fire. Set up adequately ahead of the fire, then overpower it.

Write-off property that is already lost and go on to protect exposed property based on the most dangerous direction of fire spread. Do not continue to operate in positions that are essentially lost.The basic variables relating to attack operations involve:
• Location/position of attack
• Size of attack
• Support functions
Command develops an effective attack through the management of these factors. Command must balance and integrate attack size and position with fire conditions, risk and resources.
Many times offensive/defensive conditions are clear cut and Command can quickly determine the appropriate strategy. In other cases, the situation is *marginal* and Command must initiate an offensive interior attack, while setting up defensive positions on the exterior.

The only reason to operate in marginal situations is rescue. The effect of the interior attack must be constantly evaluated, and the attack abandoned if necessary. Strategy changes can develop almost instantly or can take considerable time. Command must match the strategy with the conditions. The Incident Commander controls overall incident scene safety by determining the proper strategy to be used. If the Incident

Commander doesn't change strategies from offensive to defensive until the building is disassembling itself due to structural damage, Command is late in strategy determination and on the receiving end of the building's decision governing the new strategy to be employed. Often times when the building gets to make those decisions, firefighters become traumatized (physically and/or emotionally). *The Incident Commander determines the strategy the building shouldn't.*
Command should abandon marginal attacks when:
• A primary all clear is obtained and the situation is still marginal.
• The roof is unsafe or untenable. Especially working fires in large unsupported, or lightweight trussed attic spaces.
• Interior forces encounter heavy heat and cannot locate the fire or cannot make any progress on the fire.
• Heavy smoke is being forced from the building under pressure and is increasing.
Command needs to constantly evaluate conditions while operating in a marginal strategy. This requires frequent and detailed reports from Sector Officers.
it is imperative that Command assign a Roof Sector as early as possible during marginal operations for rapid evaluation of roof conditions. In certain situations Command should strongly consider not committing crews to the interior of a structure unless he/she receives a report from Roof Sector that the roof of the structure is safe to operate on and under. It is better to go from an offensive to a defensive strategy too soon rather than too late.

Defensive Strategy
The decision to operate in a defensive strategy indicates that the offensive attack strategy, or the potential for one, has been abandoned for reasons of personnel safety, and the involved structure has been conceded as lost (the Incident Commander made a conscious decision to write the structure off).
The announcement of a change to a defensive strategy will be made as “Emergency Traffic” and all personnel will withdraw from the structure *and maintain a safe distance from the building.* Officers will account for their crews and and advise their Sector Officer on the status of their crew. Sector Officers will notify Command of the status of the crews assigned to their sector. A PAR (Personnel Accountability Report) shall be obtained after any switch from offensive to defensive strategy.
Interior lines will be withdrawn and repositioned when changing to a defensive strategy. Crews should retreat with their hose lines if safe to do so. If retreat is being delayed because of hose lines, and it's unsafe to stay in the building, hose lines should be abandoned.
All exposures, both immediate and anticipated, must be identified and protected. The first priority in defensive operations is personnel safety, then to protect exposures. The next priority may be to knock down the main body of fire. This may assist in

protection of exposures but does not replace it as a higher priority.
Master streams are generally the most effective tactic to be employed in defensive operations. For tactical purposes, a standard master stream flow of 750 GPM should be the guideline. Adjustments may be made upward or downward from this figure but it is very significant in the initial deployment of master streams.
When the exposure is severe and water is limited, the most effective tactic is to put water on and, if need be, from the interior of the exposure. Once exposure protection is established, attention may be directed to knocking down the main body of fire and thermal-column cooling. The same principles of large volume procedures should be employed.

Fire under control means the forward progress of the fire has been stopped and the remaining fire can be extinguished with the on-scene resources; it does not mean the fire is completely out. When the fire is brought under control, Command will notify Alarm utilizing the standard radio report of “Fire Under Control”. Alarm will record the time of this report. Command must initiate a PAR report from all on scene Sectors and crews.
If defensive operations are conducted from the onset of the incident, Command will notify Alarm that there will not be a primary search completed for the affected structure

Tactical Priorities

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

Tactical priorities identify the three separate tactical functions that must be completed in order to stabilize any fire situation. This purpose of this guideline is to establish the order in which the basic fireground functions must be performed.

Guideline

All Albuquerque Fire Department Incident Commanders must fulfill the functional objectives of each defined tactical priority in their respective order. The execution of each tactical priority may require different tactical approaches, as they are viewed from command or operational perspectives. Circumstances may require the overlap or combination of tactical actions in order to achieve the desired benchmarks. Such circumstances may include the need to achieve interior tenability (with active/extensive fire control efforts) while conducting a primary search; or the need to initiate loss control operations while active fire control efforts are being extended.

Operational Guidance

I. Command considerations

A. Tactical functions should be regarded as separate, yet interrelated, activities which must be dealt with in order. Command cannot proceed to the next priority until the current functional objective has been completed, or until sufficient resources have been assigned to complete it and it is being accomplished.

B. Basic tactical priorities include rescue, fire control, and loss control.

1. Rescue includes those activities that are required to protect occupants, remove those threatened by the incident, and to treat the injured.

2. Fire control includes those activities required to stop the forward progress of the fire and to bring the fire under control.

3. Loss Control includes those activities required to stop or reduce primary or secondary loss to property, as well as to mitigate the negative psychological and emotional impact of the event on the customers.

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II. Benchmarks

A. The objectives of each tactical priority are reflected at specific bench marks of completion:

1. The rescue benchmark is completion of the primary search.

2. The fire control benchmark is the halt of a fire's forward progress.

3. The loss control benchmark is the halt or reduction of primary or secondary loss to property.

B. The completion of each tactical priority will be identified through specific radio transmissions.

1. Rescue - "All Clear"

2. Fire Control - "Under Control

3. Loss Control - "Loss Stopped"

Apparatus Placement

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

The purpose of this document is to provide a guideline for Albuquerque Fire Department personnel on Apparatus Placement and Positioning at emergency incidents. Apparatus function should regulate placement. Poor apparatus placement may limit the options or functions of a unit.

Guideline

This guideline shall be followed whenever placing apparatus in order to maximize both firefighter and civilian safety.

Operational Guidance

I. Placement decisions

A. The placement of all apparatus should be a reflection of defined standards, including;

1. Tactical objectives and priorities.

2. Staging protocols.

3. A direct order from the Incident Commander.

4. A conscious decision on the part of the company officer, based on existing or predictable conditions.

B. Avoid placing apparatus too close to the fire or other apparatus.

1. Do not drive all fire apparatus directly to the fire. Later arriving companies report to a nearby Level I staging area, and remain uncommitted until assigned by Command.

C. In large, complex, or extended fire operations, additional companies should be staged consistent with Level II staging guidelines.

1. Position apparatus where it will not compromise access: maintain an access lane down the center of streets.

II. Tactical considerations

A. Think of fire apparatus as an expensive exposure.

1. Position apparatus based on potential size of incident rather than current situation. Things to consider:

a. Heat release.

b. Structural Collapse

c. Apparatus should generally be positioned at least 30 feet away from involved buildings, even with nothing showing.

2. Beware of overhead power lines when positioning apparatus. Do not park where lines may fall.

III. Command considerations

A. First arriving pumpers should be placed close enough to deploy handlines while leaving the front of the building open for Aerial Apparatus placement.

1. Pumpers should attempt to view three sides of the structure on approach.

B. Use hydrants close to the fire. Secondary hydrants should be identified.

C. To maintain access, supply lines should be deployed close to the curb on the hydrant side of the street.

D. First arriving Aerial Apparatus should typically place their apparatus on the front of the building, unless conditions dictate otherwise. (i.e., imminent collapse, rescue profile, exposure protection, elevated stream operations, etc.).

E. Command vehicles should be positioned so the IC can see the incident, but not restrict the movement of other apparatus.

F. Rescue units should be positioned to allow for the most effective treatment and transportation of fire victims and firefighting personnel, while not blocking movement of other apparatus.

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G. All other apparatus should position according to Level I staging guidelines, unless otherwise directed.

SCBA

Purpose
This policy is intended to apply to the proper and safe use of SCBA during emergency operations.

Scope
The scope of the SCBA Policy of the Albuquerque Fire Department is to provide all firefighters with the information available to avoid any respiratory contact with products of combustion, superheated gases, toxic products, oxygen deficient atmospheres, or other hazardous contaminants.
It is expected that all personnel responding and functioning in areas of atmospheric contamination, shall be equipped with self contained breathing apparatus (SCBA) and trained in its proper maintenance and use.

Shift Check Guidelines:

Facepiece Seal
Members shall achieve a non-leaking facepiece to skin seal with the mask at the beginning of each shift. Facial hair shall not be allowed at points where the SCBA facepiece is designed to seal with the face. Individual members shall be responsible for operational readiness, care, and cleanliness of this equipment.

Apparatus Check
The driver of each apparatus in the Operations division shall be responsible for the unit's SCBA and shall check the condition of the SCBA at the beginning of the shift, after each use, and at any other time it may be necessary to render the equipment in a ready state of condition.
The driver will also be held responsible for completing and maintaining the appropriate documentation as necessary. Company officers shall assign a specific SCBA to each crew member. Each crew member will be responsible for the proper use and function of that SCBA.

Required SCBA usage
The use of breathing apparatus means that all personnel shall have the facepiece in place, breathing air from the supply provided.
Self contained breathing apparatus shall be used by all personnel operating in the following atmospheres:
• In a contaminated atmosphere
• In a atmosphere which may suddenly become contaminated

• In an atmosphere which is, or suspected of, being oxygen deficient
• In an atmosphere which is suspected of being contaminated
• In an atmosphere that contains any product that has a published Permissible Exposure Limit (PEL)

This includes all personnel operating in the following areas:

• In an active fire area
• Directly above an active fire area (ie. roof)
• In a potential explosion or fire area, including gas leaks and fuel spills
• Where the products of combustion are visible in the atmosphere including vehicle and dumpster fires
• Where invisible contaminants are suspected to be present or may be released without warning, (ie. carbon monoxide during overhaul)
• Where toxic products are present, suspected to be present, or may be released without warning
• In any confined space which has not been tested to establish respiratory safety

PASS Devices

Whenever a SCBA is donned the PASS device shall be activated and remain activated.

Investigative Mode

SCBAs and facepieces will be carried and ready for use when responding in the following investigative modes:

• Nothing showing
• When investigating suspicious odor calls
• When ascending stairs during a high-rise response incident
• When determined necessary by the company officer

In these circumstances only, the SCBA shall be worn with the face piece removed. The wearing of the SCBA in these situations provides that it will be immediately available for use if conditions change or if personnel are to enter an area where the use of SCBA is required.

The active fire area is defined as the inner perimeter of the fire ground, this is any space where the fire situation creates a potential hazard to persons operating at the incident. This area at a minimum is any space within a 50 foot radius of the structure or fire area, however it may be expanded or reduced by the incident commander or safety officer.

Removal of SCBAs

The decision to remove SCBA shall be made by the Incident Commander. In single unit response situations, the decision to remove the SCBA shall be made by the Company Officer, based on an evaluation of the conditions. Premature removal of SCBA shall be avoided at all times. This is particularly significant during overhaul when smoldering

materials may produce increased quantities of carbon monoxide and other toxic products. Prior to removal, fire areas shall be thoroughly ventilated and, where necessary, continuous ventilation shall be provided.
If there is any doubt about respiratory safety, SCBA use shall be maintained until the atmosphere is established to be safe utilizing the following procedures:
• Use the Hazmat Squad's detection equipment to monitor for Carbon Monoxide (CO)
• These monitors have an audible alarm set for 35 ppm (parts per million) of CO, this setting is for CO incidents other than determining what is necessary for safe removal of SCBA's during overhaul operations
• The Immediately Dangerous to Life and Health (IDLH) for CO is 1200 ppm (OSHA)
• The Permissible Exposure Limit (PEL) for CO is 35 ppm (OSHA)
• Safe exposure levels are based on the amount of CO absorbed by the blood over a given time period at a given level of exertion.
• The safe exposure level for AFD personnel for CO is the ppm that would lead to 5% carboxyhemoglobin levels under "heavy work" conditions
• 120 ppm for 20 minutes
• 90 ppm for 30 minutes
• 55 ppm for 60 minutes
• All AFD personnel will continue to utilize SCBAs during overhaul and investigative operations until Haz-Mat personnel have monitored the atmosphere and received a reading of 120 ppm or less of CO.

Replacement of SCBAs
If an SCBA is found to be operating incorrectly or not operating at all, it shall be taken out of service, reported and replaced immediately. Replacement SCBA shall be obtained from Equipment/Supply Section of Support Services.

Fire Investigations
Upon arrival at the fire scene the fire investigators will make contact with the Incident Commander. Fire investigators shall use SCBA while conducting their investigation at the fire scene, when determined necessary by the Incident Commander.

Annual Evaluations
An evaluation of all members of the Operations Division in the use of the SCBA will be conducted annually and as required when the Commander in charge of the Battalion, section or division determines it is necessary. Each member shall be able to demonstrate a high level of proficiency and compatibility with the SCBA under conditions which simulate those expected as a job requirement. Each member shall

also demonstrate an effective facepiece to skin seal of the SCBA during this evaluation.

Individual Facepieces

Proper care and maintenance of individually assigned facepieces will be the responsibility of the member. The Commander in charge of the Battalion will be notified to make final determination for replacement defective or malfunctioning facepieces. Every firefighter will keep the facepiece with their turn out gear for use during floating and acting assignments.

Use of soft contact lenses shall be permitted during SCBA use, provided that the member has previously demonstrated successful long-term soft contact lens use. Successful long-term use is defined as the wearing of soft contact lenses for at least six (6) months without any problems.

The use of hard contact lenses while wearing SCBA is prohibited.

ALBUQUERQUE FIRE DEPARTMENT
STANDARD OPERATING GUIDELINES

Protective Clothing

SOG 1-5-08

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

The following are Albuquerque Fire Department guidelines for the use of protective clothing. By definition, full protective clothing includes – at a minimum -- turnout coat and pants (with liners in), Nomex hood, firefighting boots, firefighting gloves, a helmet with face shield, and goggles.

Guideline

It is the goal of the Albuquerque Fire Department to provide the highest level of personal protection to all members operating on the fireground. It is the responsibility of each company officer to ensure that those under their command are fully equipped in personal protective equipment while operating in potentially hazardous conditions. It is also incumbent upon each member to ensure their own safety by the full and appropriate use of protective equipment that has provided to them.

Operational Guidance

I. Tactical considerations

A. Full protective clothing shall be worn by fire fighting personnel while responding to all structural fire alarms. This may be considered as optional for drivers not assigned to RIT duties, as well as for command and/or command staff. When responding from quarters, all members shall dress accordingly prior to response.

B. It is the intent of this guideline that no member shall cause a delay in any fire fighting operation by not being fully prepared to engage in fire fighting activities in a safe manner.

C. Full protective clothing shall be worn at all times when operating on the fireground, or at other incidents requiring full protective clothing for personal protection, whether an actual or a potential hazard exists.

II. Special operations

A. The face shield and approved goggles shall be utilized at any time the need for eye protection seems apparent such as during overhaul, when operating hand or power tools, and when fighting trash fires, grass fires, and any other fires where the SCBA face piece is not being worn.

B. An appropriate wildland firefighting ensemble should be utilized by all personnel engaged in fighting wildland or urban/wildland interface fires.

C. Gloves shall be worn when engaged in firefighting, overhaul, training with hose and ladders, when using hand or power tools, and any other situation where injuries to the hand are likely to occur.

D. While operating at EMS incidents, all members shall wear protective clothing required to afford complete personal protection per the Exposure Control Plan.

E. Full protective clothing shall be worn when personnel are operating forcible entry equipment and tools,

III. Command responsibility

A. In specific situations for which no guidelines have been provided, the proper protective clothing shall be worn to protect against foreseeable hazards.

B. Crew members should inspect each other's protective ensemble for proper donning (with attention to details such as storm flaps and flash hoods) prior to entering a hazard zone or structure fire.

C. Company officers may use their discretion to regulate the "suit up" criteria in terms of any unusual circumstance, such as extremely long responses, out-of-quarters responses, or when the vehicle is moving at the time they are dispatched. At no time will personnel be permitted to don PPE without being secured by a seat belt while riding in a moving vehicle.

D. The use of turnout coats and Nomex hoods during overhaul operations will be at the discretion of Command and Safety Officer.

Fire Control

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Purpose

This purpose of this document is to establish the Albuquerque Fire Department's guidelines with regard to fire control. It is the AFD standard to attempt the stabilization of fire conditions by extending an aggressive, well-placed, and adequate offensive interior fire attack, wherever possible, and to support that aggressive attack with whatever resources or actions are required to reduce fire extension and to bring the fire under control.

Guideline

The mode of attack at a structure fire must correspond to the scope and complexity of the event. To effectively control a fire, the incident needs to be addressed appropriately. This guideline provides options that the Incident Commander can use in defining either an offensive or defensive mode of attack.

Operational Guidance

I. Command size-up and strategy

A. The determination of a mode of attack will be made by the Incident Commander, and will be based on various criteria.

1. Fire extent.
2. Structural conditions.
3. Entry capability.
4. Ventilation profile.
5. Ability to rescue occupants.
6. Resources.

B. It is the responsibility of the Incident Commander to assign the appropriate strategy to control the fire event.

1. Offensive Strategy.
2. Defensive Strategy.

C. It is important that all units on the fireground are aware of the Attack Strategy.

II. Basic offensive strategy

A. There are a series of strategic steps that can be taken in an interior attack and related support that are directed toward quickly bringing the fire under control.

B. These steps are:

1. Assume Command.

2. Use the first attack line for a fast, aggressive interior attack.

3. Provide support activities (such as ventilation).

4. Perform primary search.

5. Use a second line as a backup to the first line. The backup line should be used to protect a means of egress from the structure.

6. Secure an adequate water supply.

7. Quickly evaluate success and react.

III. Basic defensive strategy

A. There are a series of strategic steps that can be taken in an exterior attack and related support that are directed toward quickly bringing the fire under control.

B. These steps are:

1. Assume Command.

2. Evaluate fire spread and prepare to “write-off” the structure as lost, or as a “no win” property.

3. Identify key tactical positions.

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4. Prioritize fire streams.

5. Provide large volume, well placed streams.

6. Establish adequate water supply to flow master streams.

6. Pump adequate amounts of water.

7. Quickly determine the need for additional resources.

8. “Surround and drown” the fire.

Level I and Level II Staging

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Purpose

This guideline establishes the Albuquerque Fire Department approach to providing a standard system for the initial placement of responding apparatus, personnel, and equipment prior to assignment at incidents. The staging parameters are described as Level I and Level II Staging.

Guideline

Effective staging at complex or large-scale incidents prevents excessive apparatus congestion at the scene and allows time for Command to evaluate conditions prior to assigning later-arriving units. Staging reduces radio traffic during the critical initial stages of the incident and allows Command to formulate and implement a plan without undue confusion and pressure.

Units staged in an uncommitted location - close to the immediate operational scene - become a resource pool from which Command may draw to accomplish tactical objectives. It is the responsibility of all company officers to understand and be able to coordinate effective staging operations. All personnel should maintain an awareness of staging concepts.

Operational Guidance

I. Level I Staging

A. Level I Staging is automatically in effect for all incidents involving three or more responding companies.

1. During any multi-company response, companies should continue responding to the scene until a company reports their arrival on-scene.

2. In situations where the simultaneous arrival of first-due companies is possible, officers shall use radio communications to coordinate their activities and to eliminate confusion.

3. It will be the on-going responsibility of AFD Dispatch to confirm the arrival of the first on-scene unit.

B. Following arrival and assumption of command, the first-in company officer will announce their strategic mode (either offensive or defensive) and begin the assignment of the remainder of the dispatch.

1. Staging during the fast attack mode.

   a. In the event of a fast attack, the first-in company officer will assume command and announce that a fast attack is in progress.

   b. The second-in or next closest unit will assume an operating position on the fireground and assume command.

2. Staging in cases other than a fast attack mode.

   a. Once the first-in unit announces arrival on the scene, Level I Staging is automatically implemented by the balance of the units responding to the incident.

C. Level I Staging for fires and hazmat incidents

1. The first-arriving Engine, Ladder, & Battalion Commander will respond directly to the scene and initiate appropriate actions upon arrival.

2. All other units will stage in their direction of travel, uncommitted, approximately one block from the scene until assigned by Command in positions providing a maximum of possible tactical options with regard to access, direction of travel, or water supply.

D. Level I Staging for multi-company response to major medical emergencies.

1. For multi-company response to medical incidents, the first-arriving company will go directly to the scene and place their apparatus in a location that will provide maximum access for medical or rescue support.

2. The first-arriving rescue will go directly to the scene or where directed and park their vehicle in a manner that will allow quick and unobstructed exit for patient transportation.

3. All other companies will proceed to Level I Staging.

   a. Staged companies or units will announce their arrival and report their company designation and their staged location and direction (such as, “Engine One, South”).

   b. An acknowledgment is not necessary from either the AFD Dispatch or Command.

   c. Staged companies will stay off the air until orders are received from Command.

   d. If it becomes apparent Command has overlooked a company in a staged position, the company officer shall contact Command and advise of their available status.

E. Staging protocols are designed to reduce unnecessary radio traffic but in no way should reduce effective communications or the initiative of officers to communicate.

1. If staged companies observe critical tactical needs, they should advise Command of such critical conditions and their actions.

F. Arrival on-scene of staff Chief Officers, Staff Division Commanders, and Captains can enhance the Command organization and incident management.

1. Unless arriving staff officers have predetermined responsibilities (such as Safety or Arson Investigation), these officers should assume a Level I Staging position.

   a. Staff Officers responding to a Level I Staging area will announce their arrival on the tactical channel.

   b. If Staging Sector operations have been assigned to a fireground frequency, arrival notification should be on the fireground frequency.

c. Vehicle parking at an incident can be limited. Staff officers should leave their vehicles in the Staging area, or park well off the road (such as in parking lots) to avoid restricting on-site access by fire apparatus.

II. Level II Staging

A. Level II Staging is implemented when Command desires to maintain a reserve of resources on-scene and when the need to centralize resources is required.

B. Level II Staging places all reserve resources in a central location and automatically requires the assignment of a Staging Officer.

C. Level II Staging should be implemented in the following scenarios:

1. All second-alarm or greater alarm incidents.

2. First-alarm medical or hazardous materials incidents.

3. Incidents in which Command desires to centralize resources or simply to park apparatus in a central, unobstructed location.

C. Level II Staging parameters.

1. First alarm companies that are already staged, or are en-route to Level I Staging, will stay in Level I unless otherwise directed by Command.

2. All other responding units will proceed to the Level II Staging area.

a. The Company Officer will report in-person to the Staging Officer.

b. The crew will stand by in their unit with crew intact and warning lights turned off until assigned incident site duties, or until released from the scene.

3. When activating Level II Staging, Command will give an approximate location for the Staging Area.

    a. The Staging Area should be some distance away from the Command Post and the emergency scene to reduce site congestion, but close enough for prompt response to the incident site.

    b. The staging area should allow staged companies to access any geographic point of the incident without delay or vehicle congestion.

4. Command should consider Level II Staging when contacting AFD Dispatch for additional resources.

    a. This is functionally more effective than calling for Level II Staging while units are en-route.

    b. The additional units will be dispatched by AFD Dispatch directly to the Staging Area.

5. Command or AFD Dispatch may designate a Staging Officer.

    a. In the absence of such an assignment, the first company officer to arrive at the Staging Area will automatically become the Staging Officer and will notify Command on arrival.

    b. The arrival notification will be made to Command on the assigned tactical channel.

    c. Due to the limited number of ladder companies, a ladder officer will transfer responsibility for Staging to the first-arriving engine company officer.

    d. Staging Officers will assign their company members as needed to assist with Staging operations, or assign them to another company.

6. After being given an assignment on the incident site, companies leaving staging will communicate directly with Command or their assigned sector officer for instructions.

7. Once Level II staging has been implemented, all communications involving staging will be between Staging and Command or Logistics.

   a. Command will request the assignment of an appropriate radio channel for staging operations when possible.

   b. Radio designation will be “Staging Sector”.

D. The staging officer will also be responsible to complete the following:

1. Locate an area of adequate size for all apparatus and advise Command and AFD Dispatch of the location, indicating access and routing as needed.

2. Coordinate with the Albuquerque Police Department to block streets, intersections, or other access required for the Staging Area.

3. Ensure that all apparatus are parked in an appropriate manner for quick exit.

4. Maintain a log of companies available in the Staging Area and inventory all specialized equipment that might be required at the scene.

5. Maintain crews in a ready state with their apparatus.

6. Provide progress reports to Command indicating the number and type of units available.

7. Assume a position that is visible and accessible to incoming and staged companies (by leaving the red lights operating on the Staging Officer’s apparatus).

8. Assign staged companies to incident duty according to Command’s direction.

a. When directed by Command or Logistics, the Staging Officer will verbally assign companies to report to specific sectors, telling them where and to whom to report.

b. Staging will then advise Command or Logistics of the specific units assigned.

c. Command will advise each sector officer of the companies being assigned to their area.

d. The receiving Sector Officer may then communicate directly with the company by radio.

e. When assigned to incident site duties, companies will activate their MDT “on-scene” button.

9. The Staging Sector Officer will provide Command with periodic reports of available companies in Staging.

a. Command should use this information to request additional resources as needed.

10. The Staging Sector Officer should organize staging in a manner that will allow apparatus to effectively move into and out of staging.

a. Adequate space between apparatus is required.

b. Ladder companies should be placed in one area, engines in another, and rescues in yet another area.

c. Where only manpower or specialized equipment is needed at the scene, staging should arrange a “transport” service using a single company to deliver multiple crews or specialized equipment to the scene in order to minimize site congestion.

E. During major incidents where a Logistics Section is implemented, Staging will fall under the direction of the Logistics Officer.

1. Command will also determine, and advise the Staging Sector Officer of the radio channel to be used for communication between Command and Staging.

F. During incidents of very large scale or complexity, Staging will be appropriately included in an expanded ICS organization.

1. The Staging Sector officer reports to the Operations Chief.

2. The Operations Chief may establish, move, or discontinue the use of Staging Areas.

3. All resources within the designated Staging Areas are under the direct control of the Operations Chief and should be immediately available for assignment.

4. Staging will request logistical support (such as food, fuel, rehab, or sanitation) from Logistics.

Staging Sector

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Purpose

This purpose of this guideline is to define a standard system of initial placement for responding apparatus, personnel, and equipment prior to assignment at tactical incidents. This guideline also defines the responsibilities of Albuquerque Fire Department staging sector officers.

Guideline

A staging sector is to be implemented by the Incident Commander and should be used for all greater alarm incidents, or any other incident in which Command desires to either centralize resources or position apparatus in a central, unobstructed location.

Effective utilization of staging sectors will prevent excessive apparatus congestion at the incident scene and allow time for the Incident Commander to evaluate conditions prior to assigning companies. It places apparatus in uncommitted locations, close to the immediate scene, in order to facilitate more effective assignments. It also reduces radio traffic during the critical initial stages of an incident, and allows time for the Incident Commander to formulate and implement a plan, without undue confusion and pressure. Staging additionally provides a resource pool from which units and resources may be assigned.

It is the responsibility of all command and company officers to become familiar with Albuquerque Fire Department staging sector guidelines.

Operational Guidance

I. Level I staging – tactical considerations

A. Level I staging is automatically in effect for all incidents involving three or more companies. During any multi-company response, companies should continue responding to the scene until a unit reports their arrival on-scene.

B. In situations where the simultaneous arrival of first-due companies is possible, the affected officers shall use radio communications to coordinate activities and eliminate confusion. It will be the ongoing responsibility of the Alarm Room to confirm the arrival of the first on-scene unit.

C. Following their arrival and assumption of command, the first-in company officer will announce the appropriate strategic mode (either offensive or defensive), and begin the assignment of the remainder of the dispatch.

D. In the event of a fast attack, the first-in officer should assume command and announce that a fast attack is in progress. In a fast attack mode, the second-in or next closest unit assumes an operating position on the fire ground and assumes command.

E. Once a company announces arrival on-scene, Level I staging will be implemented according to this guideline.

1. Fires and HazMat incidents

a. The first-arriving engine, ladder, and battalion commander will respond directly to the scene and initiate appropriate actions upon arrival.

b. All other units will stage in their direction of travel, uncommitted, approximately one block from the scene until assigned by the Incident Commander.

c. A position providing a maximum of possible tactical options with regard to access, direction of travel, and water supply should be selected.

2. Multi-company response to major medical emergencies

a. The first arriving company will go directly to the scene and place their apparatus in a location that will provide maximum access for medical/rescue support.

b. The first arriving rescue will go directly to the scene or where directed and park their vehicle in a manner that will allow quick and unobstructed exit for patient transportation.

c. All other companies will proceed to Level I staging. Staged companies or units will announce their arrival and report their company designation and their staged location and direction (“Engine-1, south”). An acknowledgment is not

necessary from either the Alarm Room or the Incident Commander.

d. Staged companies will stay off the air until orders are received from the Incident Commander. If it becomes apparent that the Incident Commander has forgotten the company is in a staged position, the affected company officer shall contact the Incident Commander of their staged status.

e. These staging parameters attempt to reduce unnecessary radio traffic, but in no way should reduce effective communications or the initiative of officers to communicate. If staged companies observe critical tactical needs, they will advise the Incident Commander of such critical conditions and their actions.

3. The on-scene arrival of staff and support officers can enhance the Command organization and incident management. Unless arriving staff officers have predetermined responsibilities (such as safety sector, HazMat sector, Public Information, or Arson), these officers should assume a Level I staging posture and announce their arrival on the tactical channel.

a. If staging sector operations have been assigned a fire ground radio frequency, arrival notification should be on the fire ground frequency.

b. Parking at the site can be limited. Staff officers should leave their vehicles in the staging area, or park well off the road, as not to restrict on-site access by fire apparatus.

II. Level II staging - tactical considerations

A. Level II staging is used when the Incident Commander desires to maintain a reserve of resources on-scene, and when the need to centralize resources is required.

B. The staging area should be outside the incident site perimeter, but close enough for quick response to the scene. The staging area should allow staged companies to access any geographic point of the incident without delay or vehicle congestion.

C. Level II staging places all reserve resources in a pre-defined central location and automatically requires the implementation of a staging sector.

D. Level II staging should be implemented for all greater alarm incidents, first-alarm medical or hazardous materials incidents, or other incidents in which the Incident Commander desires to centralize resources or simply to park apparatus in a central, unobstructed location.

E. First-alarm companies which are already staged (at Level I), or are en-route to Level I staging, will stay in Level I unless otherwise directed by Command. All other responding units will proceed to the designated Level II staging area.

F. When activating Level II staging, the Incident Commander will give an approximate location for the staging area.

G. The staging area should be some distance away from the Incident Command post and the emergency scene to reduce site congestion, but close enough for prompt response to the incident site.

1. The staging area should allow staged companies to access any geographic point of the incident without delay or vehicle congestion.

2. The Incident Commander should consider Level II staging when contacting AFD Dispatch for additional resources. This is more functional than calling for Level II staging while units are en-route.

3. Additional units will be dispatched by AFD Dispatch directly to the staging area.

H. Once Level II staging is implemented, all communications involving staging will be between staging and the Incident Commander or Logistics.

1. The Incident Commander will assign an appropriate radio channel for staging operations when possible.

2. The staging sector radio designation will be “staging sector.” The Incident Commander will determine which radio channel will be used for command post to staging sector communications and advise the staging sector officer accordingly.

III. Staging sector officer responsibilities

A. The Incident Commander or AFD Dispatch may designate a staging area and staging sector officer to be responsible for the activities outlined in this guideline.

B. When a staging officer is not designated, the first company to arrive at the designated staging location will automatically become the staging officer and will notify the Incident Commander upon their arrival. The arrival notification will be made on the assigned tactical channel.

C. Due to the limited number of ladder companies, when the first company to staging is a ladder company, staging sector responsibilities should be transferred to an engine company officer upon his/her arrival on the scene.

1. Staging sector officers will assign their company members, as needed, to assist with staging operations, or assign them to another company.

D. Designated staging officers will be assigned specific responsibilities.

1. Locating an area of adequate size for all apparatus, including apparatus that may respond with additional alarms.

2. Transmitting the staging area location to Command and AFD Dispatch, indicating access and routing as needed.

3. Coordinating with the Police Department to block streets, intersections and other access needs determined by staging area requirements.

4. Ensuring that all apparatus is parked in an appropriate manner for quick exit.

5. Maintaining a log of companies available in the staging area, along with an inventory of any specialized equipment that might be required at the scene.

6. Maintaining crews in a ready state with their apparatus.

7. Providing progress reports to Command indicating number and type of units available.

8. Assuming a position that is visible and accessible to incoming and staged companies.

   a. This can be accomplished by leaving the red lights operating on the staging officer's apparatus.

9. Assigning staged companies to incident duty according to the Incident Commander's direction.

E. During major incidents, that require the implementation of a Logistics section, the staging sector will be working under the direction of the Logistics officer.

1. Command will also determine, and advise the staging sector officer what radio channel is to be used for Command-to-staging communication.

IV. Operational considerations

A. All responding companies will stay off the air and respond directly to the designated staging area.

1. The company officer will report in person to the staging officer.

2. The crew will stand by their unit with crew intact and warning lights turned off until assigned incident site duties, or released from the scene.

B. When directed by Command or Logistics, the staging officer will verbally assign companies to report to specific sectors, telling them where and to whom to report.

C. Staging will then advise Command or Logistics of the specific units assigned. Command will advise each sector officer the companies being assigned to the sector.

1. The receiving Sector Officer may then communicate directly with the company by radio.

2. When assigned to incident site duties, companies will activate their mobile dispatch terminal (MDT) “on-scene” button.

D. The staging sector officer will advise Command periodically with reports of available companies in staging. Command will utilize this information to request additional resource as needed.

E. The Staging Sector Officer should organize staging in a manner that will allow apparatus to effectively move into and out of staging. Adequate space between apparatus is required.

1. Ladders companies should be placed in one area, engines in another, and rescues in yet another area.

F. When only staff or specialized equipment is needed at the scene, staging should arrange a “taxi” service using a single company to deliver multiple crews or specialized equipment to the scene. This will minimize site congestion.

G. When assigned to on-site duties, companies leaving staging will communicate directly with the Incident Commander or their assigned sector officer for instructions.

Heat Stress

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

The purpose of this guideline is to define the means by which the effects of heat stress may be minimized for emergency responders, and to identify the signs and symptoms of conditions related to heat stress.

Guideline

These guidelines are to be implemented whenever ambient temperatures are expected to exceed 95 degrees F., or whenever the combination of air temperature and humidity equal a heat index of 95 degrees (humidity has an important impact on human health and well-being since it contributes to the body's ability to cool itself by evaporation of perspiration). It is the responsibility of all personnel to learn and become familiar with this guideline.

Operational Guidance

I. Heat stress overview

A. Simply defined, heat stress is an illness caused by heat.

B. Hot conditions place the human body under considerable stress. High temperatures, along with physical activity, stress the body even more.

1. The loss of fluids, fatigue, and other conditions can lead to a number of heat-related illnesses and injuries. Death is even possible.

C. Heat stress is commonly associated with warm weather. While warm weather increases the number of heat-stress injuries and illnesses, it is not the only cause of heat stress.

1. Heat stress may occur any time the surrounding temperature is elevated.

2. Even if weather is cool, you may work in warm areas, indoors or outdoors.

D. Conditions that could cause heat stress are varied.

1. Temperature.

2. Humidity.

3. Movement of warm air.

4. The radiant temperature of surroundings.

5. Clothing.

6. Physical activity.

II. Personal responsibility

A. Personnel should accept personal responsibility to monitor their own health and well-being, and during warm conditions, should ensure that they observe specific practices.

1. Maintain proper rest and nutrition regimens.

2. Observe appropriate work/rest cycles.

3. Hydrate before, during, and after each shift (minimize coffee, tea, and cola products).

4. Inform supervisor of any ill effects due to heat.

III. Company officer's responsibility

A. During weather or work conditions that may lead to heat-related stress, company officers should be aware of the effect that heat may place on their subordinates, and shall be responsible to monitor and/or manage specific issues.

1. Cardiovascular activity, such as tennis, basketball, or running, should be limited to a maximum of thirty minutes.

2. A minimum of 64 ounces (two quarts) of water should be consumed during the 24-hour shift.

3. Work / rest cycles are to be closely monitored. During fire ground operations, company officers should request replacement of their

crew by a relief company and assignment to rehab after the crew has consumed two bottles of air.

4. Company officers should monitor company activity and request additional resources as necessary.

IV. Command responsibilities

A. At all working fires or extended operations, the Incident Commander will initiate specific protocol.

1. Establish a rehab sector on all working fires.

2. Assign companies to rehab as needed or requested.

3. Allow working companies to remain in rehab for a minimum of twenty minutes.

4. Utilize the practice of first-in, first-out routine.

5. Request additional resources as necessary.

V. Dispatch and deployment responsibilities

A. During periods of high temperatures, AFD Dispatch will follow specific guidelines.

1. Announce the projected high temperature for the day.

2. Consider dispatching an additional RIT company, as a relief RIT company, to all working structure fires.

3. Consider dispatching an additional company, as a relief company, to all working first-alarm assignments.

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Rehabilitation Sector

Purpose

It is the policy of the Albuquerque Fire Department that no member will be permitted to continue emergency operations beyond safe levels of physical or mental endurance. The intent of the Rehabilitation Sector is to lessen the risk of injury that may result from extended field operations under adverse conditions. This procedure is in no way intended to diminish initial fire attack aggressiveness.

Scope

The Rehabilitation Sector, radio designation *REHAB*, will be utilized to evaluate and assist personnel who could be suffering from the effects of sustained physical or mental exertion during emergency operations. Rehab Sector will provide a specific area where personnel will assemble to receive:

- A physical assessment
- Revitalization - rest, hydration and refreshments
- Medical evaluation and treatment of injuries
- Continual monitoring of physical condition
- Transportation for those requiring treatment at medical facilities
- Initial stress support assessment
- Reassignment

A Rehab Team concept will be utilized wherever possible to establish and manage the Rehab Sector. This team will consist of:

- Rescue company
- QIO officer designated as Rehab Sector officer
- Engine Officer with Crew as needed
- Critical incident stress specialist (Psychologist or EAP counselor) as needed

It will continue to be the responsibility of Command to make an early determination of situations requiring the implementation of a Rehab Sector.

At times, due to the incident size or geographic barriers, it may be necessary to establish more than one Rehab Sector. When this is done, each sector will assume a geographic designation consistent with the location at the incident site, i.e., Rehab South.

At incidents involving large life loss, or extended rescue operations (i.e., plane or train wreck, bombing, terrorist attack), the New Mexico State Critical Incident Stress Team should be contacted and be assigned to Rehab Sector.

Should the Bernalillo County Fire Department Rehab vehicle be available there is a mutual aid agreement in place for it’s use. A City bus may also be called to the incident scene to provide cooling and/or heating.

The Rehab Sector should be located adjacent to the Command Post whenever

possible.
The Rehab Sector area boundaries will be defined with tape and will have only one entry point. It will be divided into the following four sections:

Section A: Entry Point
This is the initial entry point and decontamination area. Assigned personnel will collect passports from crews and take a pulse rate on all crew members. Any member who has a pulse rate greater than 120 bpm will report directly to Section C, Medical Treatment and Transport, where they will be treated appropriately. Members that do not require medical attention will then report to Section B, Hydration and Replenishment.

Section B: Hydration and Replenishment
All personnel will be provided supplemental water and/or electrolyte replacement, and the proper amount of nourishment. Initial CISD support will be provided in this section, if needed.

Section C: Medical Treatment and Transport
This section will be staffed by a Rescue crew. Personnel reporting here will receive evaluation and treatment for heat stress and injuries. The Rescue company assigned will advise the Rehab Sector Officer of the necessity of medical transportation and extended medical attention requirements of personnel due to physical condition. Crews released from Section C will be released as intact crews to report to Section D.
The ALS crew in this section will pay close attention to the member's:
• Pulse
• B/P
• Body Temperature
After allowing 20 minutes for a cooling down period the pulse, blood pressure, and temperature will be rechecked. Any person with a pulse rate greater than 100 will be relieved from duty for the remainder of the shift. Anybody who has a temperature greater than 101 or a blood pressure less than 100 systolic will need IV fluids and transportation to an appropriate medical facility.

Section D: Medical Reassignment
This critical section determines a crew's readiness for reassignment. Diligent efforts and face-to-face communication with the Rehab Sector Officer are required. Personnel staffing this section advise the Rehab Sector Officer of all companies' status for reassignment and crews that are running short or without a Company Officer. This information is relayed to Command by the Rehab Sector Officer. Crews without a Company Officer will be assigned to another company or have a member of the crew

upgrade to the officer's position.
The Rehab Sector Officer will collect accountability passports from companies reporting to Section A - Entry Point. The passports will be placed on a status board and all personnel will be logged on Rehabilitation Sector Personnel Log. The log will indicate the assignments as directed by Command. Companies may be reassigned to operating sectors or released from the scene.
The Rehab Sector Officer will update Command throughout the operation with pertinent information including the identities of companies in Rehab, the companies available for reassignment, and the status of injured personnel. All personnel leaving Rehab will retrieve passports from the Rehab Sector Officer.
Company Officers must keeps crews intact and report to the proper sections in Rehab. The Rehab Sector Officer will direct the crew to the proper sections; however, it is the Company Officer's responsibility to make sure crew members receive refreshments, rest and a medical clearance

Responding to Violent Scenes

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

The purpose of this guideline is to establish the Albuquerque Fire Department's approach to safe and effective methods for dealing with violent and potentially violent incidents of any scale. Ensuring a safe environment for firefighters to work is the first priority at any scene.

Guideline

Violent incidents are defined as shootings, stabbings, assaults, unruly crowds, civil disturbances, riots, or any other type of incident in which AFD personnel may be exposed to harm as a result of a violent or threatening act directed at firefighters, other persons, or property. The potential for violence is present on any call.

Operational Guidance

I. Scene considerations

A. There are essentially three types of incidents to which AFD responds.

1. A known or potentially violent scene that has been secured by APD.

   a. AFD units should respond and proceed with caution.

2. A known or potentially violent scene which has not been secured by APD.

   a. AFD units are required to stage in a safe location.

3. An unclassified scene, in which there is no reason to believe the scene is violent or has little potential to become violent, or where acts of violence have gone unreported.

II. Communications considerations

A. If AFD units respond to an incident of an unknown nature and find themselves in a violent situation, they should immediately retreat to a safe location.

B. Any unit requiring immediate assistance from APD will utilize the following AFD Communication model.

1. Transmit “Emergency Traffic.”

2. AFD Dispatch will immediately advise APD Dispatch of the need for a rapid police response.

3. During violent situations where fire crews are at risk of danger or potential injury, or when they need immediate police assistance for any other urgent need, they may radio APD Dispatch directly.

4. Any radio communication to AFD Dispatch or APD Dispatch including the transmission “Emergency Traffic” and/or “34 is needed ASAP” will not be required to provide any further explanation to have APD or BCSO units dispatched Code 3.

a. If possible, the company in danger will give the reason to the dispatcher.

b. It is the responsibility of the Company Officer to use discretion in removing crewmembers from a scene if the threat of violence against firefighters appears imminent.

III. Scene size-up

A. All crewmembers must be alert to indications of possible violence and must be aware that any scene is a potentially violent scene. Crews must use common sense, awareness, and make good use of information from AFD Dispatch.

B. Use a scene size-up and frequently reassess to avoid the danger of violent scenes.

1. Common sense and awareness.

a. Pay attention to any information provided by AFD Dispatch and if possible, have one portable radio tuned to APD Dispatch.

b. Do not get lulled into a false sense of complacency (“we’ve been here ten times before”)

2. Do not ignore any gut feeling or instinct.

a. If it doesn’t feel right, it probably isn't.

3. Present a confident attitude (commanding presence) on scene, but do not be confrontational or abusive with any individual or group.

4. Do not be an easy target.

a. Call for backup early and be prepared to leave the area if the need arises.

B. Red flags for violence or potential violence.

1. Shootings, stabbings, fights (domestic or public), man down, attempted suicides, and overdoses all have potential for further violence.

a. Remember that a significant percentage of public safety personnel that are critically injured or killed, are injured or killed at domestic abuse responses.

2. Considerations for scene safety.

a. Is APD on scene?

b. What is the nature of the call?

c. Type of injuries and reported cause of injuries.

d. Does the patient display an altered level of consciousness, or are drugs or alcohol a factor?

e. Is a fight still in progress and if a person caused injuries, are they still on scene?

f. How many people are involved?

i. Parties should be a red flag for dispatching APD.

ii. Make contact with the ranking police officer and describe what security is needed.

C. Maintaining awareness of surroundings and potential danger.

1. Ask APD to search the individual prior to your assessment.

a. Have APD Clear the scene of any potentially dangerous materials or objects.

2. If APD is not on scene, due to MPDS coding or unclassified scene, consider doing an informal pat down to check for potential weapons.

a. As you begin to check the patient, check those areas where a weapon may be hidden.

3. Weapons can be guns or knives designed to kill, or makeshift weapons, such as anything that wasn't designed to be a weapon, but can be used as one.

4. Always look for the informal or designated leader of a potentially violent group and attempt to visually monitor and, if possible, make a personal contact to ease tensions.

5. Do not ignore the potential for violence on any scene, including travel to and from the call and trips back and forth to the apparatus while on-scene.

6. Be aware that uniforms can be threatening to certain people and that public perception of the fire department is not always positive.

a. Some individuals may fear detection of criminal activity.

b. An individual who has caused the patient's injury in a domestic or gang-related confrontation may not want the patient to receive emergency care and may be antagonistic or uncooperative.

IV. Tactics for maintaining crew safety on all calls

A. Take specific precautions whenever entering any building on a call.

1. Introduce yourself as AFD.

2. Ask that any loose dogs be secured (in a yard or other room).

3. Have the person who answered the door lead you to the patient.

   a. If they ask you to come in, ask them to open the door.

   b. Never stand directly in front of the door. Always stand to either side, particularly the door knob side.

      i. This forces the person at the door to open the door fully to see you, and allows you to fully see them.

      ii. You are also afforded the protection of the exterior wall.

   c. If they insist, ask them why they can't come to the door.

4. There are risks involved when looking into windows at calls where callers or other individuals are delayed in answering the door.

5. Scan the room for weapons, alcohol, drugs, signs of violence, or makeshift weapons.

   a. Look for signs of weapons, including bulges in clothing.

6. Watch for potentially violent temperament of individuals on-scene.

   a. Watch their hands.

b. Remember to keep the individual at arms length. This allows you the time and space to react if the person turns violent.

7. Keep your crew in sight at all times. Never leave a crew member alone.

8. If a scene involves more than one disputant, make sure that APD separates the individuals and that a police officer remains with each individual to ensure crew safety.

V. Tactics for responses to unclassified scenes

A. Take specific actions on calls where there is very little potential for the scene to become violent or violence has not been reported.

B. AFD response is dictated by the MPDS system.

1. Maintain vigilance when approaching the building.

a. Do not slam the door of the apparatus or vehicle.

b. Keep the volume low on the radio.

c. Gain information before entering the house.

d. Look and listen before entering the house.

2. If the scene becomes violent or has the potential to become violent, immediately retreat to a safe location and call for APD.

VI. Tactics for approaching a violent scene that has been secured by APD

A. Take specific actions when spotting the apparatus at a residence.

1. Turn off siren several blocks away, if possible.

2. Proceed with caution.

3. Consider turning off all lights just prior to arrival on scene.

a. Scan the scene prior to departing the apparatus. Does the scene look secure?

4. Spot the vehicle approximately 100 feet before the residence.

a. This will allow an approach to the scene from a safe position or direction.

C. String fire line tape to provide an established barrier between firefighters and a crowd.

1. Fire line tape provides a control line for APD to enforce. The tape is generally well-received by citizens as needed by emergency personnel to provide control of an incident.

2. Fire line tape can be used to divide large crowds to assist APD in maintaining order.

D. Use APD to secure traffic and crowds.

1. This is the primary responsibility of police at the scene of a fire department emergency.

2. A fire department member should establish liaison with the on-scene ranking police officer.

3. Explain to them what is needed to control the scene. More officers should be called if necessary.

E. Provide scene lighting to assist crew operations or to prevent the potential or further violence**.**

1. More serious violence occurs after daylight hours. Spotlights take away the cover of night.

2. All emergency responders will be able to see more of the scene when good lighting is provided.

VII. Tiered responses

A. Known or potentially violent scenes will be designated as Tier One, Tier Two, or Tier Three Responses. They will be dispatched as such by AFD Dispatch.

B. Tier One response conditions.

1. AFD Dispatch will direct units to "stand by for APD to secure the scene" before entering when known violence (such as, shootings, stabbings, or fights) have been identified by AFD Dispatch as confirmed or suspected violent calls.

2. If the suspected Incident is within one mile of the responding Fire Station, the responding unit should stage inside their respective station and monitor the radio (Level 2 staging).

   a. In all instances, stage at least ½ mile from the Incident.

   b. Stand-by is defined as locating a safe distance from the event location.

   c. The responding unit should stage out of sight of the scene, with at least two means of egress.

      i. Backing is not considered a means of egress.

3. Responding to a Tier One event.

   a. The first-in unit will stage at a minimum of ½ mile from the incident, at the discretion of the Company Officer, until APD has secured the scene and this is reported by AFD Dispatch.

   b. The first-in unit will take Command and advise both AFD Dispatch and other responding units regarding their staging location

      i. Example: "Engine 1 has command, Engine 1 is staged at Central and 4th street; standing by for APD to secure scene."

c. All additionally responding units will report to the staging area, and will be under the command of the first-in company officer.

d. AFD Dispatch will collect and provide as much scene information as possible and will rapidly communicate that information to responding companies by radio.

e. In all cases, and without exception, AFD personnel will adhere to defined staging protocols.

4. AFD units will not proceed beyond staging until advised that the scene is confirmed secure, either by AFD Dispatch or by APD.

a. If and when APD advises that scene is secure, that information will be communicated to all on-scene and to AFD Dispatch via radio

5. General staging parameters and considerations.

a. Staging can take many forms, including Level 2 staging in which the company officer of the first-staged unit advises incoming units of a central staging location.

b. Level 1 staging, as defined by AFD (one block away, in the direction of travel), may not provide a sufficiently safe distance when violence is involved.

c. Personnel should consider the hazards at-hand and stage far enough away to avoid becoming a part of the incident.

i. At least ½ mile away, out of line-of-sight and out of the line-of-fire for gunshots. You should have at least two means of egress.

d. Personnel should remember that any crowd can be a hazard and stage units accordingly at a safe distance.

e. Units should turn off warning and interior cab lights off while staged.

f. Emergency lights should be turned on when completing the response to the scene.

g. Turning off warning emergency lights while on-scene may reduce crowd attention or attraction to the incident.

B. Responding to a Tier Two event.

1. A Tier Two response will be initiated when an actual act of violence towards firefighters has occurred at a specific location of the city.

a. Example: A random gunshot fired at a fire apparatus, but resulting in no injuries, and there are no indications that the situation involved any other related acts.

b. A perimeter should be identified that is a minimum of a 1/2 mile in each direction from which the act occurred.

2. Effective initiation of a Tier Two response requires immediate communication between, and coordination of, the companies experiencing acts of violence.

a. AFD Dispatch will notify the appropriate Battalion Commander and the Deputy Chief of Operations in the event of a Tier Two incident.

3. For at least the remainder of that work shift, fire department units will not respond into, or be dispatched into, that area without a police escort**.**

a. Units will stand by for APD to secure the scene on every call.

4. No Code 3 responses will occur into or through the area.

a. Responding units should stay clear of the area when returning from other calls.

b. All surrounding fire department units should return to and remain in their stations, except to respond to and return directly from calls.

5. Any fire stations located inside the established perimeter should have all their resources reassigned to a station outside the perimeter, or to a Level II staging area.

a. All support apparatus, such as brush trucks, will also be relocated.

6. Fire stations located adjacent to the perimeter area will remain in their stations, but shall go into a “lockdown” mode for security reasons.

a. All doors will be closed and locked.

b. Members will remain indoors at all times.

7. Additional operative parameters for Tier Two response.

a. All fire department personnel will respond to and from all emergencies in full protective clothing (helmet and full turnout gear), and will remain in full gear until returned to staging or to their assigned fire station.

b. Apparatus placement must be in a manner that will allow for a rapid and unobstructed retreat from the area.

c. Apparatus must also be parked in a manner that best protects the crew, two means of egress, without backing.

d. All tools and equipment located on the exterior of apparatus must be removed and placed within interior compartments.

C. Responding to a Tier Three event.

1. A Tier Three response will be initiated when civil disturbances occur over a large area, meaning when a series of actual acts of

violence have occurred in a specific area of the city (such as, unrelated and intentionally-set fires, a series of assaults, or looting).

2. The effective initiation of a Tier Three response requires immediate communication between and coordination of the companies experiencing acts of violence.

3. AFD Dispatch will notify the appropriate Battalion Commander and the Deputy Chief of Operations in the event of a Tier Three event.

    a. Any company experiencing an act of violence against them must immediately report the incident to AFD Dispatch.

4. It is the responsibility of the AFD Dispatch Supervisor, Company Officers, and Battalion Commanders to be alert to potential or actual hazards due to a civil disturbance.

5. There are times when such potential is high and well-known throughout the city; however, at other times, a single act or incident can spontaneously escalate into a significant disturbance.

6. AFD Dispatch accountabilities include specific issues.

    a. It is essential that the AFD Dispatch Supervisor remain alert at all times to the potential of a civil disturbance.

    b. The AFD Dispatch supervisor should also attempt to identify specific patterns.

        i. What may appear to be a few unrelated incidents in a particular part of the City can be the only warning of a significant disturbance in its early stages.

        ii. Incidents can also occur in more than one area of the city simultaneously.

        iii. A delay in recognizing geographically diverse, but related, incidents of violence may result in significant risk to responding units and may negatively affect the development of the Incident Command System

D. If the severity of the situation dictates that a Tier Three response is in order, AFD Dispatch will take specific actions.

1. Notify all on the following list.

a. AFD Fire Chief.

b. City of Albuquerque Emergency Manager.

c. Police Liaison Officer.

d. AFD PIO.

e. APD Communications.

i. Inform them of the situation and request notification of the Area Command (of the involved area), and the relevant Shift Commander.

f. All AFD stations.

i. After an Incident Action Plan has been developed, AFD Dispatch will notify all AFD stations and brief all personnel on the incident or situation, detailing location or boundaries and expected duration of the event.

2. Any Tier Three situation will be reported to oncoming shifts at roll call and announced to all stations and units over the air by AFD Dispatch.

3. The Deputy Chief of Operations and the Battalion Commander of the affected area will periodically review the Tier Response Plan and initiate communication (to the department) of any changes and the current status of the situation.

E. Tier Three operative parameters.

1. When a Tier Three response has been designated, a perimeter encompassing one or more square miles will be established around the area.

2. A Command Post will be established well outside that perimeter.

    a. Whenever possible, a joint Command Post should be established with APD.

        i. If this is not possible, a ranking Police Officer should be requested to report to the fire department Command Post.

    b. Consider Dispatching the AFD mobile command vehicle for greater coordination.

3. Command shall establish Level II Staging near the Command Post and request appropriate resources from AFD Dispatch (such as the mobile command vehicle).

    a. At all times we shall adhere to the Incident Command Model.

4. Close communications are to be maintained between AFD Dispatch (via a Dispatch Liaison located at the Command Post), and the Police Liaison.

5. The Command Post will direct all responses into the Hazard Zone

    a. AFD Dispatch will provide Command all requests for emergency service in the identified area.

    b. Dispatch will also advise Command of all emergency requests to perimeter areas

    c. Command will determine the appropriate response to the incident, the radio channel, obtain a police escort, and actually direct the companies to respond.

    d. All resources responding into the perimeter will be grouped (no single company responses) and will respond only with police escorts.

i. Responding units will communicate only with Command.

ii. Requests for additional assistance by a company or unit should be directed to Command, using the emergency traffic procedure, if necessary.

e. Upon completion of the call, the companies are to return to the Command Post, be accounted for, and return to Level II Staging.

f. Both Command and AFD Dispatch must monitor all radio traffic.

5. Command should consider rotating units from throughout the City into the Level II Staging area for response.

a. This can help to reduce tension and to maintain alertness among the crews.

6. If disturbances are occurring in more than one area of the City, this system may be duplicated in other locations.

a. When operating in a Tier Three situation, emphasis must be placed on stabilizing the incident as rapidly as possible, if safe to do so, and then pulling out.

7. Companies responding to situations that involve civil disturbances should observe specific precautions.

a. No single company responses will be permitted into Tier Three situations.

b. Police escorts will be required into such situations.

c. All AFD personnel will respond to and from all emergencies in full protective clothing (helmet and full turnout gear), and will remain in full gear until returned to staging or their assigned fire station.

d. The use of sirens and air horns within the perimeter should be avoided, although emergency lights may be used.

e. Apparatus placement must be in a manner that will allow for rapid and unobstructed retreat from the area.

i. Apparatus must also be parked in a manner that best protects the crew.

ii. Remember that you must have two means of egress.

f. All tools and equipment located on the exterior of apparatus must be removed and placed within interior compartments.

g. Crews should be careful about what is said over the radio.

i. Outside speakers on apparatus broadcast all messages to the public.

ii. Cellular phones should be used as much as possible for sensitive communications.

h. AFD members must control their behavior and back off from confrontation in potentially violent situations so as not to incite a significant event.

i. Patients may be more effectively treated, in a potentially violent situation, if the patient is rapidly removed from the scene to an exterior treatment area (scoop and run).

8. On fire scenes, if no lives are at stake, emphasis will be on protecting savable property.

a. Property such as buildings or vehicles that are fully involved, with no exposure problem, may be left to burn.

b. Emphasis will be on fast attack methods, with engine mounted master streams deployed to rapidly control and extinguish any fire, allowing responding crews to evacuate the area.

i. The use of hand lines should be limited.

c. Routine salvage, ventilation, and overhaul practices may be discontinued.

d. All fire units will enter the perimeter as intact groups, travel in groups, operate in groups, and return in groups.

9. Firefighters should be aware that any civil disturbance has the potential to quickly escalate into a major situation and any escalation must trigger the involvement of officers higher up the chain-of-command.

10. Apparatus located at fire stations, such as brush trucks or utility trucks, can be staffed to substantially increase the number of units available to respond to emergencies in groups.

11. The call back of off-duty personnel and staffing of reserve apparatus may be necessary.

12. An appropriately located fire station, other city facility, or school can make an excellent Command Post and staging area, and can be easily secured.

a. Schools, in particular, may offer more space and resources for command functions.

Aircraft Emergencies

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

This guideline establishes how the Albuquerque Fire Department will respond to aircraft emergencies.

Guideline

The Albuquerque Fire Department maintains mutual or automatic aid agreements with various agencies and neighboring jurisdictions. Since an aircraft crash can occur anywhere in the metropolitan area, it is likely that AFD personnel and equipment will be required to respond accordingly. Responding personnel need to be familiar with basic tactical information and guidelines for responding to events involving an aircraft crash.

Operational Guidance

The scope of the aircraft emergency will dictate the response, along with the number and type of resources necessary to manage the incident. A large commercial airliner with hundreds of passengers crashing into a building would require a dramatically different response than a single engine aircraft making an emergency landing on a roadway.

As with any incident, life safety is the priority. Initial actions should revolve around evacuation of survivors and assisting the injured, incident stabilization and property conservation.

I. Strategic considerations

A. Request that the AFD Dispatch Center make notifications of the event to all pertinent agencies.

1. The City of Albuquerque Emergency Operations Center may need to be activated.

2. The National Transportation Safety Board (NTSB) should be notified by contacting the FAA Air Traffic Control Tower at Albuquerque Sunport.

B. Additional notifications should include: The Salvation Army, The American Red Cross, Critical Incident Support Debrief (CISD) teams, Albuquerque Sunport communications center.

C. Consider requesting AARF response units from the Kirtland Air Force Base (KAFB) Fire Department, if they have not already been dispatched.

D. An airline representative should be requested to report to the Command Post, along with representatives from the Albuquerque Police Department, Aviation Police, CABQ Aviation Department, and any other agency that can assist with the incident.

E. The first-arriving company officer should assume command and direct additional incoming resources. The initial radio report should relay the general scope of the incident, i.e., the approximate number of patients, size of aircraft, and anticipated resources needed, etc. The initial IC should focus on strategic considerations rather than task level needs.

II. Tactical considerations

A. The first arriving crew may need to assist passengers in escaping from the aircraft. They may also need to provide an escape route for passengers, by using foam to cut a path through any burning flammable liquid -- from the escape area or exit door to a safe area outside the burn area.

1. If foam is not available, use large volumes of water.

2. Avoid walking in front or behind jet engines.

a. When approaching the aircraft, keep at least 30 feet away from the engine intakes. Exhaust hazards on larger aircraft can be up to 200 feet.

b. Attack the fire from a 45-degree angle (relative to the forward direction of the aircraft). Figure 1 illustrates a 30’ – 200’ approach at a 45°

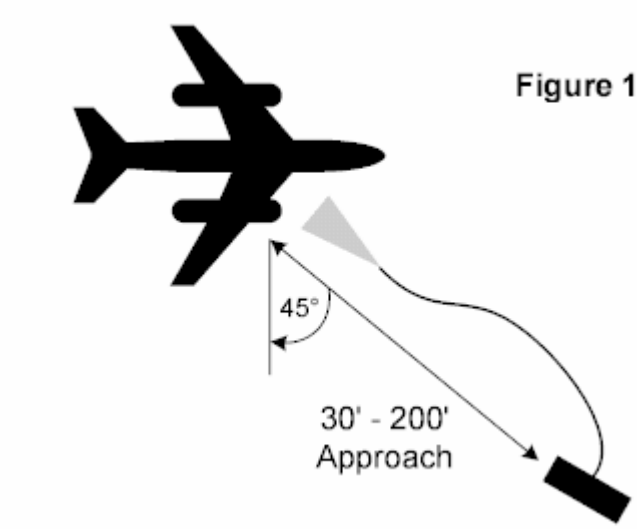


Figure 1

3. Protect the aircraft fuselage from direct flame impingement, since fire can burn through a fuselage within 60 seconds.

    a. Use a handline to keep heat from spreading between the engine and fuselage.

4. When possible, lay a supply line. Use deck guns to provide quick water and large volume to extinguish fires and to protect exposures.

5. Fuel is carried in the wings; do not block vent holes or tubes.

6. If landing gear was deployed, avoid walking under aircraft; approach landing gear at a 45-degree angle. See figure 1.

C. Interior attacks on large frame aircraft.

1. Advance interior attack line(s) inside the aircraft as soon as possible without interfering with the escape of the passengers.

2. Provide ventilation as quickly as possible inside the aircraft. Most victims who die inside survivable aircraft crashes do so because of smoke inhalation.

    a. Use PPV fans or fog streams to ventilate.

b. Pressurize from the unburned area and provide a ventilation exit in fire area. Ventilation should be started at the same time as the attack lines are put into operation, if possible.

3. Large aircraft have common attic spaces, large open cargo areas (in the belly), and sidewalls that can hide running fires in these confined spaces.

D. Accidents involving small or propeller-driven aircraft.

1. Do not walk within ten feet of propellers due to the possibility of accidental or sudden rotation. Do not manually move or bump propellers.

E. When an emergency landing occurs on a highway or other roadway, and there has been little or no damage, ensure that the battery is disconnected, and verify with the pilot that emergency shutdown procedures have been initiated.

1. If possible, and if safety considerations require it, assist in moving the aircraft from traffic areas and secure the scene.

F. Engine fires

1. Initiate an attack using large volumes of water or foam through the engine air intake. In addition to extinguishing the fire, this will shut down the engine.

2. Always maintain a safe distance from rotors and propellers.

3. Use ladders on the aircraft at the wing or other accessible points. Jumbo aircraft may require aerial ladders to reach access points.

4. Obtain primary and secondary “all clears.”

5. Provide for interior lighting.

6. Request that the Police Department secure the scene and assist in the control of ambulatory passengers. Have the police provide a holding area for them until sectors or groups can be assigned to address those issues.

7. Initiate both fire and medical groups as soon as possible. Establish divisions for both sides of the aircraft to protect the escape routes and to manage the evacuated passengers.

8. Establish groups to address scene lighting, extrication, treatment, transportation, and site safety.

9. Consider establishing a branch level command system to address fire and medical operations separately.

10. Large amounts of flammable liquids on fire will require large amounts of foam extinguishing agents.

    a. Keep all flammable liquids covered with a foam blanket.

    b. This will prevent ignition.

11. Be aware that large aircraft have enough electrical power running through the aircraft electrical lines to kill a person and/or ignite flammable liquids.

12. Jagged metal parts of the aircraft can cut through protective clothing and hose lines.

13. To cut into the fuselage of an aircraft, the wing area may be used as an area from which to work; however a platform ladder truck may be necessary.

    a. The best place to cut is around windows, doors, and the roof area.

    b. Hurst tools and pry bars do not work well on aircraft metals because there are no solid supports to work against.

    c. If saws are used for extrication or ventilation, arcing and sparking will need to be suppressed with water or foam from

handlines. A good blanket of foam must be maintained on the flammable liquids area.

d. Be aware that aircraft have numerous high pressure hydraulic lines that can cause serious injury if they are cut or broken.

14. Always have a safety back-up crew with charged and staffed hose lines in place to protect all personnel who will be working inside the spilled flammable liquid areas.

    a. All personnel working in these areas shall be fully turned out in protective gear.

    b. SCBA face pieces must be worn.

15. Have police secure a route into, and out of, the incident site to permit easy movement of emergency equipment -- particularly for ambulances going to hospitals.

16. Do not allow any overhaul operations to take place until all investigative agencies are through, unless needed to suppress fire.

17. Be aware that large aircraft have oxygen cylinders on board that can explode, become missiles, and/or accelerate the spread of fire.

18. Never assume that there are no survivors of the aircraft crash. Obtain primary and secondary “all clears.”

19. Consider adopting a defensive mode of operation to protect personnel and exposures.

Highrise Firefighting

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

Highrise firefighting operations are uniquely complex. A working fire in a highrise building may be the most demanding fire incident our department will face. Because they occur so infrequently, fires in these buildings present a high potential for life and property loss. This high risk/low frequency event poses a very challenging threat to firefighters and building occupants. A thorough understanding of Command and Control, tactical objectives, building systems and communications is required for a successful outcome at a highrise fire operation.

Guideline

Recognizing the large number of highrise buildings located throughout the City of Albuquerque, AFD has developed this guideline to inform operations at highrise firefighting incidents and emergencies.

Operational Guidance

I. Basic operational plan

A. Highrise operations need to be carried out in a specific manner in order to gain and maintain control of the occupants, building systems and firefighters. The basic operational plan consists of the following elements:

1. Determine the fire floor.

2. Verify the fire floor.

3. Control building occupants, including firefighters.

4. Control building systems.

5. Confine and extinguish the fire.

B. Operational factors may include fire floor access, search/rescue and evacuation, fire attack, ventilation, reflex time, building systems, equipment staging, apparatus staging and communications. Each of these elements is discussed in further detail within this guideline.

C. Organization.

1. Response to highrise incidents will be based on the information received by the dispatch center.

2. Highrise emergency response will be categorized as one of the following:

   a. Fire alarm activation.

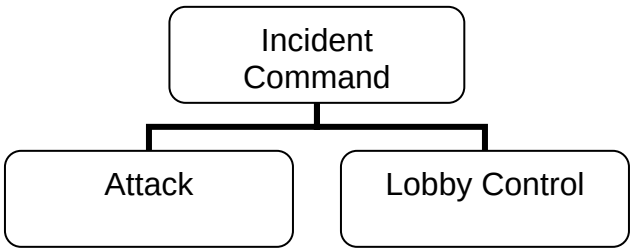
   b. Report of smoke and/or fire.

   c. Determination of a working fire and/or sprinkler system activation by initial responding units.

II. Highrise fire alarm activation

A. The dispatch will consist of an Engine, Ladder and Commander. The basic organizational structure is shown in figure 1.

Figure 1.



B. The engine company should assume initial command and begin the investigation into the fire alarm activation.

C. The ladder company should assume the Lobby Control Division.

D. Once on scene, the Commander should assume Command from inside the structure and assign the engine as the Attack Group.

E. The Attack Group objectives are to determine and verify the alarm floor of origin, investigate, clear stairwells of occupants and begin attack operations.

F. The Lobby Control Division must analyze building systems status and support the Attack Group with building information and equipment as needed.

G. Full personal protective equipment and necessary firefighting equipment must be taken with the Attack Group as it conducts an investigation.

H. Unless cancelled enroute by dispatch, no units should be cancelled until fire department apparatus arrives and the investigation is completed/determines the origin of the alarm.

III. Report of smoke or fire

A. The dispatch will consist of four Engines, three Ladders, three Rescues, two Squads (Squad 1 or 3 and Squad 2), Unit 78, and three Commanders. The basic organizational structure is identified in Appendix A.

B. Immediate responsibilities of the first alarm companies include:

1. Establish Incident Command.

2. Establish Lobby Control Division.

3. Determine and verify fire floor.

4. Make an announcement regarding the situation and our operations via the public address system.

5. Stairwell designations and determination of an “ALL CLEAR” status in stairwells.

6. Initiation of fire attack operations.

7. Water supply.

8. RIT.

C. Once a working fire and/or sprinkler activation is determined, multiple alarms should be dispatched. An incident of this magnitude will require a very large number of resources and a completely expanded Incident

Command Structure. The basic organizational structure is illustrated in Appendix A.

D. Each branch, division and group within the organization has specific functions.

1. Table 1 illustrates a highrise response to a report of smoke or fire.

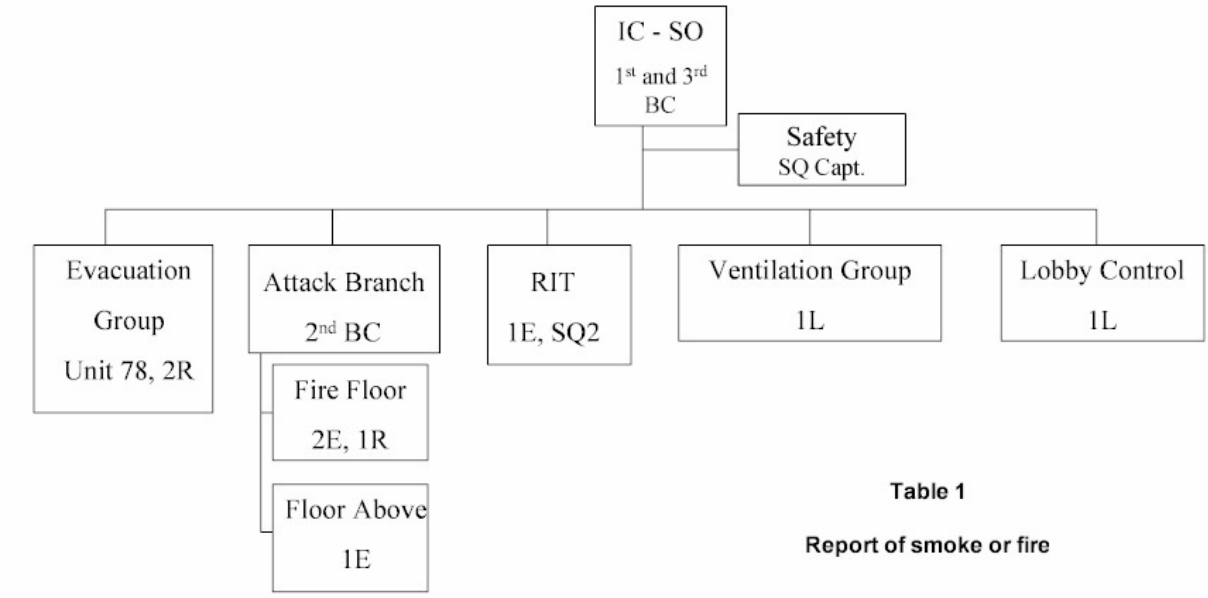


Table 1

Report of smoke or fire

IV. Command and control at a working fire or sprinkler activation

A. The first-arriving Commander should assume and establish command in the lobby.

B. The second-arriving Commander should take a position in the designated attack stairwell and assume the role of Fire Attack Branch Director.

C. The third-arriving Commander should join the first-arriving Commander/Initial IC in the lobby and assume the role of Support Officer. The primary function of the Support Officer will be incident accountability.

D. The fourth-arriving Commander will establish a Command Post outside of the structure and assume command of the incident.

E. The first-arriving Commander should then be reassigned as the Systems Branch Director and the Support Officer will assume the role of Accountability Branch Manager.

F. The placement of first three arriving Commanders in the building is critical to an early and strong organizational structure being established.

1. The decisions regarding control of building systems, stairwell designations, evacuation plans and fire attack operations, along with firefighter accountability are best made at the Command Level.

2. The information needed to make these crucial decisions can be gathered more effectively with Command presence in the building.

3. The early establishment of these positions also creates an effective radio communications structure.

G. Table 2 illustrates a highrise response to a working fire or sprinkler activation.

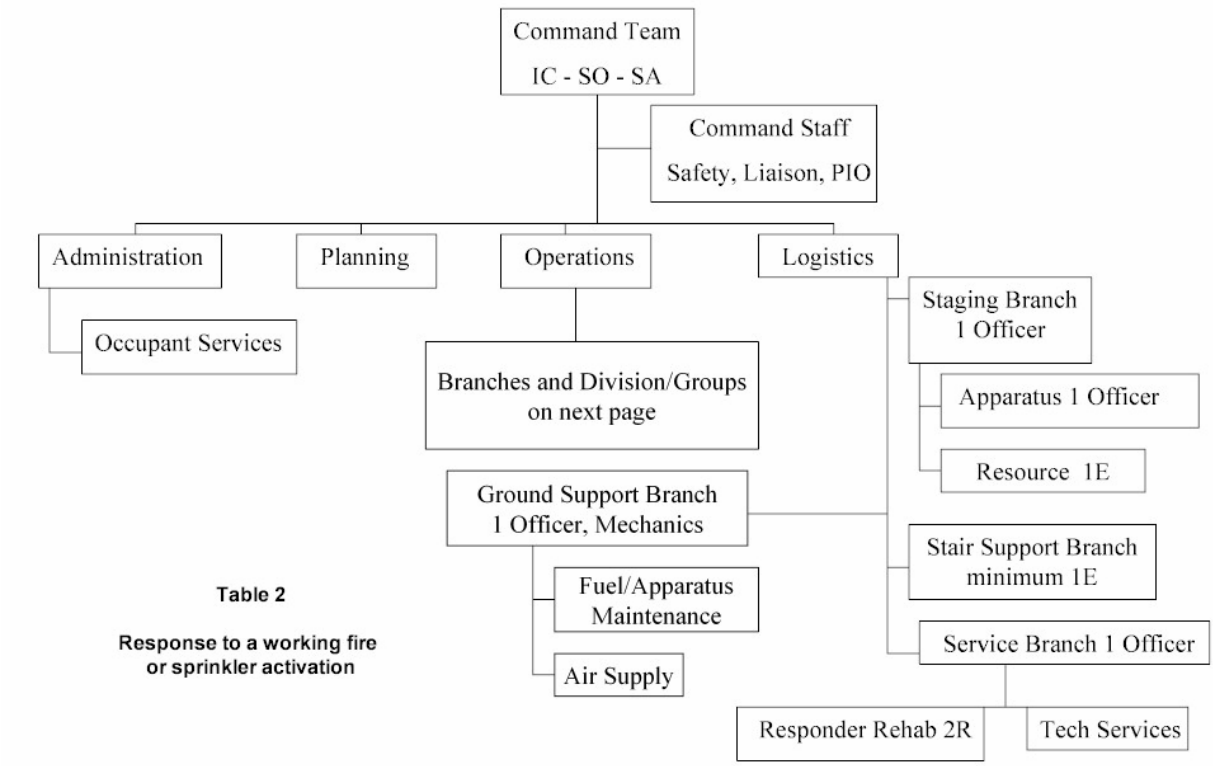


Table 2

Response to a working fire or sprinkler activation

H. Table 3 illustrates the Branches and Sectors within Operations at a working fire or sprinkler activation.

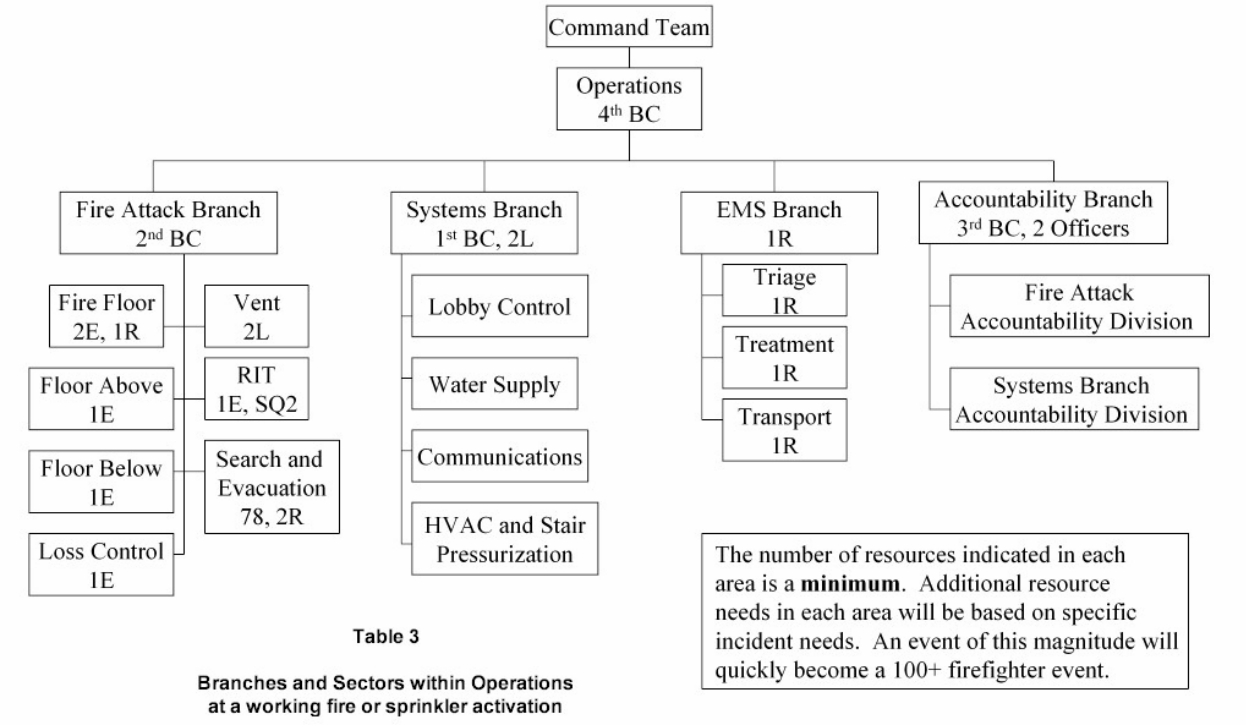


Table 3

Branches and Sectors within Operations at a working fire or sprinkler activation

V. Systems Branch

A. This Branch should be under the direction of a Commander and staffed with one Ladder company minimum.

B. Stairwell designations, control of building systems, and occupant information gathering are major functions of the Systems Branch.

C. Building systems control involves gaining control of and monitoring those building systems that can affect firefighting operations. The following is a list of building systems control and information the Systems Branch must secure.

1. Elevators - If not automatically recalled, elevator control must be accomplished by initiating Phase I operations. If Phase II operations are deemed safe, a firefighter from the Lobby Control Division should be assigned as an elevator operator.

2. Stairwell designations - Stairwell locations, roof access, and the presence of standpipe systems are all stairwell features that need to be known. If three stairwells are present, an attack, ventilation and evacuation stairwell should be designated.

    a. The attack stairwell would ideally have roof access. The ventilation stair should also have roof access. The ability to pressurize any of the designated stairwells should also be considered.

    b. A door that opens at ground level should also be present. If three stairwells are not present, attack and ventilation operations may have to be delayed until the designated stairwells are clear of occupants.

3. Elevator control and stairwell designations must be accomplished rapidly. Occupants in the process of self-evacuation may be in any elevator or stairwell.

    a. Once the elevators return to their designated floor, they must be quickly searched for occupants.

    b. Once units are assigned a stairwell, that stairwell must be ascended rapidly and an “ALL CLEAR” established.

    c. Life safety being the primary tactical objective, the stairwells must rapidly be searched and determined to be clear of occupants prior to the initiation of fire attack operations.

4. HVAC -If the system is having a negative effect on the incident, the HVAC system must be shut down. If determined later in the incident that the HVAC system can assist with ventilation operations, the building engineer should initiate this operation under our direction.

5. Fire pump - A firefighter from the Lobby Control Division should be sent to the fire pump room to determine if the fire pump(s) are operating. The fire pump may be manual, electric or diesel/electric combination.

    a. The pump’s operation is very important to achieving water pressure in the standpipe system, so confirmation of its operational status must be accomplished.

6. Public address system (PA) - Building occupants must be informed of fire department presence and operations. Detailed instructions of the evacuation plan (protect-in-place, floor-by-floor evacuation, etc.) must be announced so that the Search and Evacuation Group can maintain control of the evacuation process.

7. Stairwell pressurization - This system provides a positive pressure to the stairwell in an effort to keep it smoke-free. If not present, the use of electric PPV fans within the lobby may be considered.

8. Other information, equipment, and functions that the Systems Branch is responsible for may include:

   a. Master keys and/or swipe cards for floor access.

   b. Elevator keys.

   c. Fire phones.

   d. Building/floor plans.

   e. Status of alarm annunciator panel (are remote detectors activating?)

   f. Status of building's emergency back-up power.

   g. Occupant list – may identify those in need of evacuation assistance and/or hazardous contents or operations within the building.

VI. Accountability Branch

A. The third-arriving Commander should enter the structure and implement the firefighter accountability system. Once the exterior Command Post is established and the incident organization begins to expand, the Accountability Branch will be managed by this Commander.

1. All units assigned to the interior of the structure will check-in with the Accountability Branch Director before proceeding to their

tactical assignment. The Accountability Branch will essentially act as entry control.

B. A Fire Attack Accountability Division will be established in the attack stairwell also. Acting as an aide to the Fire Attack Branch Director, the Fire Attack Accountability Division will account for personnel assigned to the Fire Attack Branch.

1. The Resource Division located two floors below the fire floor will be location where Fire Attack Branch accountability is maintained.

C. Accountability for units that arrive from multiple alarms will be conducted as follows.

1. Units arrive in the Apparatus Staging Division of the Logistics Section.

2. Once given a tactical assignment inside the structure, units will report to the Accountability Branch Director in the lobby.

3 Units will continue to a tactical location.

4. Once arrived, the Accountability Division Supervisor for that location will add this new resource to its Division Accountability list.

VII. Fire Attack Branch

A. The Fire Attack Branch will consist of the following divisions/groups:

1. Fire Floor (Division title based on the floor number).

2. Floor Above (Division title determined similarly).

3. Ventilation Group, Search and Evacuation Group, and RIT.

4. A Floor Below Division may also need to be established.

5. An Accountability Division will also be assigned.

VIII. Fire Floor Division

A. The Fire Floor Division should consist of two Engines and a Rescue.

1. The three Officers, Rescue Driver and 4 firefighters should proceed to the fire floor.

2. The two Engine Drivers should establish 5" water supplies to the standpipe and sprinkler system fire department connections.

B. Equipment that needs to be taken to the fire floor includes:

1. Standpipe kit – contents include 60^{o} elbows, in-line pressure gauge, 1-1/8" solid tip nozzle, 18" pipe wrench, door chocks, latch straps, chalk, spanner wrenches,150' of 2 ½" hose, assembled as three staircase carries.

2. Forcible entry tools to include rabbit tool.

3. Pike pole.

4. Thermal imaging camera.

5. 100' of search rope.

6. Spare SCBA bottles.

C. When elevator use is determined to be unsafe, equipment and manpower must travel via the designated attack stairwell to the fire floor. Based on the travel distance, equipment needs and firefighter physical fitness, the fatigue factor must be considered.

1. With eight firefighters, the workload can be shared. Also, crews may consider leaving bunker coats unsnapped and hoods and helmets off while inside a protected stairwell. The need to keep body temperature as cool as possible is important.

2. The goal is to minimize reflex time – the amount of time from arrival to the first application of water on the fire.

D. Once at the floor below the fire, several things need to be accomplished.

1. The firefighters may begin deploying the hose in the stairwell.

2. The Officers should take a quick tour of the floor below in an effort to get an idea of floor layout.

3. The fire floor conditions should be communicated to the Fire Attack Branch Director.

E. When the fire attack is ready to begin, personnel should be assigned as follows:

1. An Engine Officer and three firefighters advance the attack line for confinement and extinguishment.

2. The Rescue Officer and Driver begin primary search.

3. Another Engine Officer and firefighter remain in stairwell and act as Initial Rapid Intervention Team (IRIT).

4. Officer positions at the standpipe outlet and regulates attack line pressure by reading in-line gauge and opening/closing discharge outlet.

5. A Firefighter must track progress of attack and search personnel and maintain communications with both.

IX. Floor Above Division

A. This division should initially consist of one Engine. The function of this division is an evaluation of conditions on the floor above, the presence of fire extension, and search/rescue needs. If conditions warrant a need for more resources/equipment, the Fire Attack Branch Director must be notified.

X. Ventilation Group

A. This group should initially consist of one Ladder company.

B. Ventilation efforts must be coordinated with the Systems Branch and Fire Attack Branch for stairwell pressurization, HVAC control, roof door opening, etc.

C. Ventilation considerations

1. PPV can pride stairwell pressurization if on-site building fans are not present.The effect of wind and the stack effect must be considered.

2. Horizontal ventilation tactics can be dependent on occupancy type. Residential occupancies may allow window opening; commercial occupancies usually do not.

3. Breaking of windows is not recommended. Before any such action is taken, the IC must be notified so that all branches are made aware that tactical choice.

XI. Search and Evacuation Group

A. This group should be designated if two or more occupied floors exist above the fire floor.

B. This group is responsible for controlling the evacuation process by providing direction to occupants and maintaining stairwell integrity.

C. Human behavior tends to be the weak link in highrise operations.

D. No more than three floors at a time should be evacuated, to keep control of the evacuation process and allow for an occupant accountability to be kept.

E. If a documented list of evacuated occupants and suite/apartment/room numbers cannot be maintained, a door marking system will be utilized. An “X” under the doorknob will indicate that evacuation of the room, etc. is complete.

XII. RIT

A. In addition to the IRIT on the fire floor, a four-person RIT shall be assigned two floors below the fire floor

B. As fire attack operations expand, multiple RIT should be considered.

XIII. EMS Branch

A. This branch should be established three floors below the fire floor.

B. This location can act as both the initial occupant evacuation site and the medical assessment site.

C. By designating this branch three floors below the fire floor, occupant congestion is minimized in the building lobby.

D. Triage and treatment groups may be established at this location.

E. Patient transport may consist of both patient removals from the building and transport to a hospital.

F. The Transport Group may need both interior and exterior components.

XIV. Logistics Section

A. The Logistics Section acts as the support mechanism for the organization. It consists of four branches:

1. Ground Support.

2. Services.

3. Staging.

4. Stairwell Support.

B. The Ground Support Branch is responsible for ground support items such as fuel and mobile air supply/cascade unit and firefighting equipment needs.

C. The Service Branch should consist of a Technical Group and Responder Rehab Group.

1. The Technical Group provides communications assistance (radios and batteries) and any equipment/expertise needed by the IC.

2. The Responder Rehab Group may be located on the same floor as the EMS Branch, three floors below the fire. Food, drink and medical assessment should be provided.

D. The Staging Branch has two Groups.

1. An Apparatus Staging Group should be established no less than 200' from the structure and be supervised by the first arriving Engine Officer.

a. Once the Incident Command Structure is expanded and Support Personnel have arrived on scene, Staging supervision should be transferred to Support Division Personnel.

b. The Engine Officer and crew should then be given a tactical assignment. The minimum of a first alarm assignment should be in Staging.

2. A Resource Group should be located two floors below the fire floor. At least three engines and a ladder for relief purposes and additional equipment shall be staged here.

a. If the elevators are deemed unsafe, equipment will need to be carried to the Resource location.

b. In this case, a Stairwell Support Branch should be established. Under the direction of an Officer, firefighters are located every two floors and act as an equipment shuttle. Obviously, if the fire floor is located several floors above ground, several firefighters may need to be assigned to this operation.

XV. Understanding building systems

A. The correct use of building systems is vital to safe and successful highrise firefighting operations. The following sections list and describe these building systems.

1. Elevators.

2. Standpipe Systems.

3. Smoke Control Systems and Ventilation.

4. Sprinkler Systems.

5. Building Communication Systems.

XVI. Elevators

A. Elevator use under highrise fire conditions is very hazardous. The decision to use elevators during highrise fire operations must be made carefully. Under non-fire conditions, elevators can be a great asset in moving firefighters, equipment, and evacuees.

B. Elevators do, however, have a tendency to malfunction when exposed to heat, smoke, and/or water.

1. Given the fact that elevators can malfunction when exposed to the products of combustion, firefighters will not utilize any elevator that serves the fire floor or floor of fire alarm activation.

2. Only elevators that do not serve the floor(s) involved in the emergency will be used for civilian, firefighter and equipment transport.

C. The decision to use elevators must be made by the Systems Branch Director and only elevators with Phase I and Phase II firefighter controls will be used.

D. If it is deemed safe to use the elevator, several safety considerations must be observed.

1. Do not overload the car. No more than six firefighters and an elevator operator should be in the car at one time. The elevator load limit should be posted inside the car.

2. Equipment to be taken into the elevator should include: PPE/SCBA, forcible entry tools, hose and standpipe kit, flashlights, radio, and fire phone. In case of elevator stoppage/malfunction, firefighters

must be capable of forcible exit. An attic ladder should be kept in the elevator.

3. Before entering the elevator car, it is imperative that crews identify the location of the nearest stairwell. If a hasty escape from the elevator car is needed, knowledge of the nearest stairwell location is crucial to quickly reaching a safe area.

4. After entering the elevator car, press the “Call Cancel” button to ensure the car has no memory of a previous floor selection.

5. Once traveling, stop the car every fifth floor. This is performed for two reasons. First, make sure the elevator car functions are still responding correctly. Second, the hoistway should be checked to make sure it is smoke and water-free.

6. The elevator car shall be stopped and all firefighters shall exit a minimum of two floors below the fire floor.

7. If other units will be using the same elevator, place the Phase II control back into the “OFF” position so the car will return to the lobby/designated floor.

E. Firefighter Elevator Service.

1. Elevator systems provide two phases of operation for use under emergency conditions

   a. Phase I operations are required in buildings under 75’ tall.

   b. Phase II operations are required in buildings 75’ and taller.

2. Phase I operations recall all elevator cars to a designated floor, usually the lobby floor.

   a. Phase I operations can be activated several ways.

i. Smoke detector activation in the hoistway or elevator lobby may activate Phase I.

ii. The general building fire alarm may also activate it.

b. No two buildings are alike; alarm and detector activation cannot consistently be counted on to recall the elevators.

3. If the incident dictates fire department control of the elevators and the alarm/detector system has not initiated Phase I operations, a key can be used.

a. The key switch should be located in the Fire Control Room or elevator lobby, possibly both.

b. A three-position switch will be present. The positions are:

i. “OFF” = normal elevator operation. Key can be removed from this position.

ii. “ON” = Phase I activation and recall of the elevator car to the designated floor. Key can be removed from this position.

iii. “BYPASS” = overrides alarm/detector system and allows normal elevator use.

4. Once the elevator car is recalled, the doors will open and remain open.

a. Firefighters must check all cars for their proper return and the presence of occupants.

b. Hoistways should be checked for the presence of smoke and water.

5. If deemed safe, firefighters may enter the car and begin Phase II operations from within the elevator car (where there is another

three position key switch in the elevator car with the “OFF”, “ON” and “HOLD” positions).

a. Take the key from the Phase I keyway outside of the car and place the key in the Phase II keyway inside the car and turn to the “ON” position.

b. The elevator car is now under the complete control of the car occupants.

c. Press the “Call Cancel” button and then select the desired floor.

d. Press and hold the “Door Close” button until the door completely closes.

e. Stop the car every fifth floor to check elevator is responding correctly.

f. Once the car has reached its destination, press and hold the “Door Open” button until it completely opens.

g. If conditions are poor upon the doors opening, simply release the “Door Open” button while the doors are still opening and the doors will automatically close.

h. If crews are going to stay on the selected floor and no other crews will need the car, place the key in the “HOLD” position. The elevator car cannot be moved when in this position.

i. If other crews will need the elevator car, place the key in the “OFF” position and the car will return to the designated floor (it is back in Phase I operations).

6. Elevator use should be driven by necessity, not convenience.

a. A study in the 1990’s showed that elevators malfunctioned 30% of the time under emergency conditions.

b. Elevator use assists with occupant evacuation and firefighter access to upper floors, but cannot be used if conditions are suspect.

c. It cannot be overstated that prior to any elevator use, firefighters must know the location of the nearest stairwell. With elevator malfunction, the stairwell will be the best safe haven and means for traveling within the building.

XVII. Standpipe systems

A. The effective delivery of water to upper floors is critical to the success of highrise firefighting operations. Water is supplied to upper floors via standpipe system.

B. Several types of standpipes exist in Albuquerque.

1. Automatic wet systems are most common.

a. These systems have water in them at all times.

b. Water is provided from the municipal water supply and system static pressure is maintained via a jockey pump.

c. The jockey pump will operate when any small drop in water pressure occurs in the system.

d. If a discharge outlet is opened, the fire pump(s) should operate and supply both a volume and pressure of water to the discharge outlet.

2. Either automatic or manual dry standpipes may be present.

a. An automatic dry system has air in the standpipe riser above the deluge valve and water below the deluge valve.

i. An air compressor maintains enough air pressure to keep the valve closed.

ii. Once a discharge outlet is opened, air pressure drops below the incoming water pressure.

iii. The water pressure pushes the deluge valve open and the standpipe system fills with water.

iv. Fire pump(s) will then provide water volume and pressure.

b. A manual dry standpipe system is simply a series of piping. Apparatus must supply all the needed water pressure and volume to these systems.

C. All stations with any standpipe equipped buildings, not just highrises, must familiarize themselves with system type and class prior to an incident occurring. Four classes of standpipes exist:

1. Class I standpipes are designed for firefighter use. Outlets are 2 ½" and the primary standpipe is supplied with a 500 GPM capacity.

a. All other standpipes will provide 250 GPM.

2. Class II standpipes are designed for occupant use. Outlets are 1 ½" and only rated for 100 GPM.

a. Firefighters should not use this class of standpipe due to inadequate flow capacity

3. Class III standpipes provide both 2 ½" and 1 ½" outlets. The system requirements are the same as Class I.

4. Due to addition of sprinkler systems in existing buildings, a fourth class of standpipe has evolved. The riser in this class of standpipe system is used to supply both the standpipe and sprinkler systems. Class IV standpipes are often referred to as combination systems.

D. Fire pumps are usually located on the building's lowest floor. These pumps are designed to provide both volume and pressure to the water in the system.

1. Exactly how much volume and pressure the pumps will provide is based on the NFPA requirements in place at the time of installation.

a. For systems built prior to 1993, the minimum pressure required at the most remote discharge was 65 psi flow pressure, with a maximum of 100 psi flow pressure.

i. If the pressure is between 100-175 psi, a flow-restricting device is required.

ii. Table 1 details the specifics.

Table 1			
NFPA Requirements Prior to 1993			
Outlet Size	Allowable Flow Pressure	Flow Restricting Device Required if:	Pressure Reducing Valve Required if:
2 ½"	65 psi minimum 100 psi maximum	Residual pressure between 100 psi and 175 psi	Static pressure greater than 175 psi

b. For systems built after 1993, 100 psi flow pressure is the minimum and 175 psi is the maximum.

i. A maximum static pressure of 175 psi is maintained by pressure reducing valves.

ii. Flow restricting devices are optional as long as the static pressure is less than 175 psi. If the static pressure exceeds 175 psi, a pressure reducing valve is required. Table 2 details the specifics.

Table 2			
NFPA Requirements 1993 and After			
Outlet size	Allowable Flow Pressure	Flow Restricting Device Required if:	Pressure Reducing Valve Required if:
2 ½"	100 psi minimum 175 psi maximum	Optional as long as static pressure is less than 175 psi	Static pressure greater the 175 psi

F. The differences between pressure restricting devices and pressure reducing valves must be understood.

1. Pressure restricting devices control discharge pressure under flow conditions.

a. The device acts to limit the pressure that can be supplied to attack lines.

b. The types of pressure-restricting devices include a removable disc, a removable reducer, and a removable pin or link on the handwheel.

c. Firefighters should remove these devices when found on the standpipe discharge outlet.

d. Once the pressure-restricting device is removed, outlet discharge pressure is controlled by operating the outlet valve handwheel until the proper discharge pressure is indicated on the in-line gauge.

2. Pressure reducing valves control outlet pressure under both flow and no-flow/static conditions.

a. The purpose of pressure reducing valves is the prevention of excessive and dangerous discharge pressure at lower floor outlets in very tall buildings.

b. These valves are either factory set or set during installation.

c. Firefighters do not have the ability to alter the pressure reducing valve setting.

d. This makes the in-line gauge extra important so as to indicate flow pressure once the outlet is opened.

XVIII. Standpipe operations

A. Once an attack stairwell is designated and determined to be clear of occupants, firefighters must reach the floor below the fire in order to make the standpipe connection.

B. The fire attack team should have with them a complete compliment of equipment.

C. Once at the floor below the fire, the standpipe should be flushed to remove debris and to check for the presence of adequate water.

D. A 60^{o} elbow and in-line gauge should be connected to the discharge outlet.

E. The hose is then connected and placed near the outside wall of the stairwell.

F. Hose should continue up the stairs to the landing above the fire floor so that the charged line can be pulled down the stairs when advancing.

G. While the hose is being stretched in the stairwell, officers should view the layout of the floor below the fire so as to get an idea of the needed amount of hose, floor configuration, etc.

1. Standpipes are required to be separated by no more than 130'. This figure is based on 100' of working hose and a 30' fire stream.

2. If the fire's location is beyond this distance, an alternate standpipe from another stairwell should be considered.

XIX. Charging standpipe systems

A. The Fire Code requires fire hydrants to be located within 40-100 feet of the standpipe fire department connectionThe close proximity of fire hydrants and fire department connections will assist in lessening the water supply friction loss.

B. Drivers should connect their engines to all possible standpipe inlets

C. It is good practice to have multiple engines supply the standpipe so that if a pump/apparatus malfunctions, water supply operations will not cease.

D. With the presence of pressure reducing valves, pump operators will not have the capability to augment pressures needed on the fire floor.

1. The pressure-reducing valve is set to provide a fixed discharge pressure, regardless of pressure provided by either the building fire pump or fire apparatus pump.

2. In this case, the engine should provide maximum volume to the standpipe system.

E. When supplying wet standpipes with removable pressure-restricting devices or manual dry systems, the engine can deliver both pressure and volume to the discharge.

F. In all cases, pump discharge pressure will be determined by adding 100 psi + 5 psi per floor above the first floor.

1. This pump discharge pressure enables the engine to supply adequate volume and pressure to the standpipe system.

2. The actual discharge pressure at the standpipe outlet will be adjusted and monitored by the officer stationed at the outlet.

G. If the exterior fire department connection is damaged, drivers should use the first floor outlet on the standpipe system to supply the riser. To achieve supply via the first floor outlet, a few steps must be taken.

1. First, any pressure-restricting device must be removed.

2. A double-female and 2 ½" x 2 ½" siamese is then connected to the discharge threads.

3. Supply lines can then be pumped into the standpipe.

4. If a pressure reducing valve is present or the pressure restricting device cannot be removed, Command must be notified of the inability to establish a continuous water supply to the standpipe system.

H. Due to elevation loss, friction loss in piping and hoselines, and nozzle pressure, the pressure demands of standpipe operations can be quite high.

1. In order to provide safe operating pressures while maintaining adequate pressures for effective fire streams, the standpipe system possesses pressure control devices.

2. Based on the date of system installation, there may be as little as 65 psi flow pressure available on the fire floor.

3. With only 65 psi available, standpipe operations require hose and appliances that minimize friction loss and nozzle pressure.

   a. The hoseline and nozzle combination of 150' of 2 ½" hose with a solid tip size of 1 1/8" at 45 psi nozzle pressure will provide 250 gpm on the fire floor, requires 64 psi and only produces 99 pounds of nozzle reaction.

   b. The use of 1 ¾" hose and fog nozzles will create 125 pounds of nozzle reaction and pressure needs in excess of 200 psi, which is impossible to achieve beyond a pressure reducing valve and dangerously high for the standpipe assembly.

   c. Standpipe discharges are designed to be high-volume/low-pressure outlets. Based on these facts, 2 ½" hose and 1 1/8" solid tip nozzles are the required hose and nozzle combination to ensure adequate fire streams for fire attack.

XX. Smoke control systems and ventilation

A. Controlling smoke movement in a highrise fire is very important. Smoke control systems can basically be divided into two categories:

   1. Shaft protection.

   2. Floor protection.

B. Shaft protection is accomplished via stairwell pressurization.

   1. Stairwell pressurization systems provide a tenable environment for escaping occupants and a staging area for firefighters.

2. The basic function is to maintain an air pressure in the stairwell that prevents smoke from entering while doors are opened.

3. Stairwell pressurization may be performed by either a single or series of fans.

4. Different buildings will have different systems.

5. If the details of the pressurization operations are not well understood and the building engineer is not present, the system may be shut down and stairwell pressurization should be accomplished with electric PPV fans positioned in the lobby at the stairwell entrance.

C. Floor protection from smoke can be provided with a zoned smoke control system.

1. Zoned smoke control systems are designed to limit smoke spread via cracks in floors and partitions and other shafts not protected by stairwell pressurization.

2. Zoned smoke control systems can be either dedicated or non-dedicated.

a. In a dedicated system all of the air movement equipment is installed for the sole purpose of providing smoke control.

b. Non-dedicated systems share components of the air movement system with some other system, like HVAC (Heating, Ventilation and Cooling).

D. The goals of HVAC smoke management are:

1. To limit fire and smoke spread.

2. To prevent the system from intensifying and spreading fire.

3. To provide fresh air to occupants and firefighters.

E. HVAC, also known as central air conditioning, is designed to provide a fresh air supply to occupants.

1. Rather than attempt to exchange inside and outside air in large structures, this system recirculates air from within the building. This system of air recirculation has 3 main subsystems.

   a. Processing system.

   b. Supply system.

   c. Return system.

2. The processing system is usually located in the mechanical equipment room. Its purpose is to mix air from occupied areas with some outside air, filter the air, cool or heat it, humidify it, and return it to occupied areas. This is accomplished via a network of airshafts, fans, and treatment equipment.

3. The supply system distributes the processed air to the occupied areas while the return air system brings the air back to the processing system.

4. While the supply system delivers air completely through enclosed shafts and ducts, the return air system may use either ducts or the overhead plenum space to return air to the return airshaft.

   a. All three subsystems utilize detectors and dampers to recognize and control smoke movement.

F. HVAC systems in highrise buildings are often divided into horizontal zones. A zone may consist of a single floor or multiple floors.

1. A fifteen-story building might have the following four HVAC zones:

   a. Zone 1 $\rightarrow$ 1st floor/lobby.

   b. Zone 2 $\rightarrow$ floors 2-5.

   c. Zone 3 $\rightarrow$ floors 6-10.

d. Zone 4 → floors 11-15.

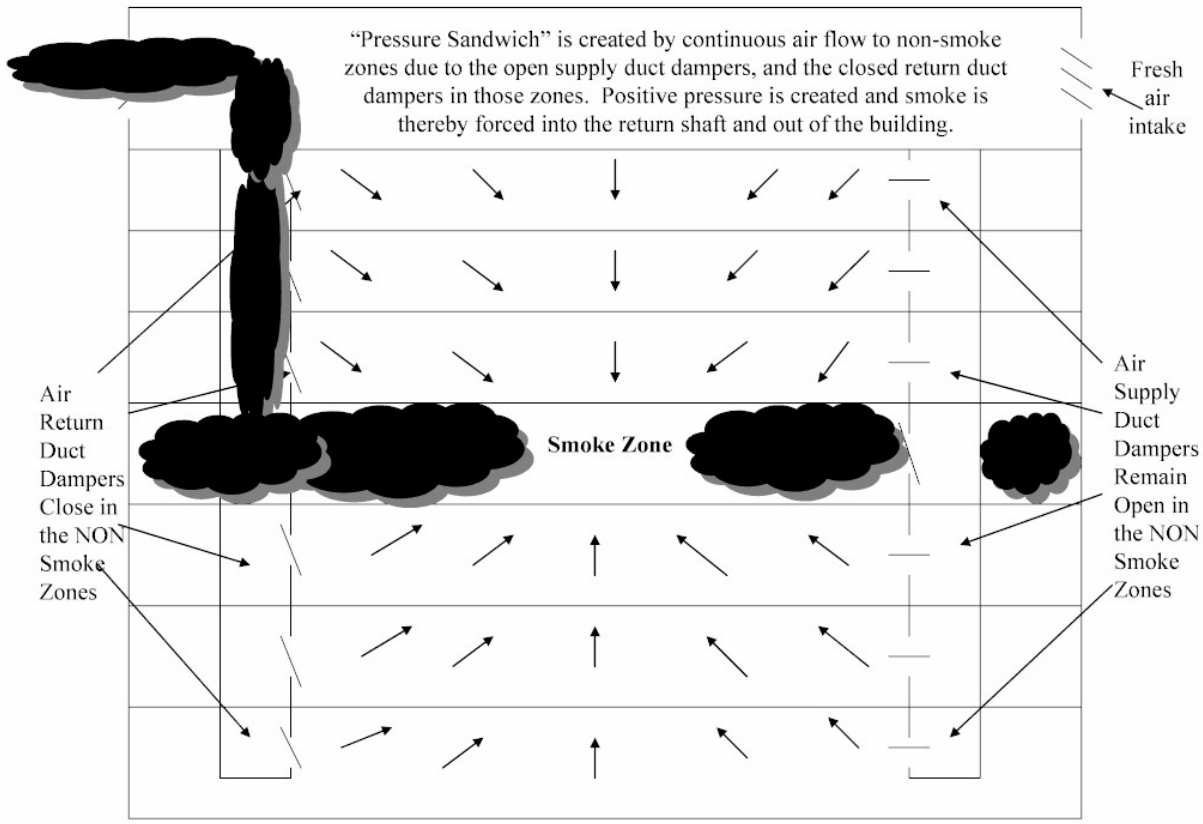
2. When smoke production occurs, the smoke control systems differentiate between the smoke zone/fire floor and the non-smoke zones.

3. The system should close the air supply dampers to the smoke zone and close the return dampers to the non-smoke zones, creating two effects.

   a. The first effect is the continued delivery of fresh air to the occupants that are being protected-in-place/evacuation delayed.

   b. The second is the creation of a “pressure sandwich,” as illustrated in Table 4.

Table 4



i. In the smoke zone/fire floor, air supply dampers are closed so as not to deliver a fresh air supply to that zone.

ii. The return dampers remain open to vent the products of combustion. In the non-smoke zones, the air supply dampers remain open and deliver fresh air to those designated areas.

iii. The return dampers are closed. Since the air being delivered to the non-smoke zones cannot enter the return air shaft due to the return dampers being closed, a positive pressure is created in the non-smoke zones.

iv. This positive pressure forces the smoke from the smoke-zone through the open return dampers, into the return air shaft and out of the building.

4. It is imperative that the initial attack teams communicate with the Systems Branch as to the current smoke conditions and movement. Zoned smoke control systems are mechanically complex.

   a. If HVAC is making conditions worse, the Systems Branch should shut the system down. Both the supply and return air fans should be shut down.

   b. Smoke detectors may shut down the supply fans only, so it is important that the HVAC Group confirm that all supply and return fans are shut down.

   c. The system will remain shut down until the building engineer can take control of the system and make its use advantageous to firefighting operations.

G. A highrise fire requires a size-up of the HVAC system. Size-up elements include the following:

   1. The location of the mechanical equipment room.

   2. The number of zones.

   3. The presence of any special systems.

   4. The location of HVAC operational controls.

   5. The number of return shafts, including:

      a. Shaft locations and number of floors served.

      b. How the dampers are controlled.

H. The HVAC system is appropriate for ventilation under small fire or cold smoke conditions; a large working fire may overwhelm the HVAC system and should, therefore, not be used under those conditions.

I. Ventilation operation possibilities may include:

1. Use of the HVAC system.

2. Stairwell pressurization.

3. Vertical ventilation.

4. Horizontal ventilation.

J. Occupancy type will have an effect on ventilation considerations.

1. Many residential occupancies allow horizontal ventilation through open windows while most commercial occupancies will not provide windows that can be opened

2. Vertical ventilation can be accomplished through a designated stairwell. Factors in selecting a ventilation stairwell include:

a. An opening at the roof level.

b. Doors that open on the ground floor.

c. The presence of an exhaust fan at the top of the stairwell.

K. Ventilation operations must always be coordinated with fire attack operations.

1. Ideally, separate stairwells can be designated:

a. One attack stairwell.

b. One ventilation stairwell.

c. One evacuation stairwell.

2. If separate stairwells cannot be designated, the coordination of these operations becomes even more important.

L. Two factors greatly affect ventilation operations.

1. Wind.

2. Stack effect.

M. Winds at ground level are not a reliable indicator of either wind speed or direction at upper floors. Conditions close to the fire floor must be known.

1. Horizontal ventilation on the windward side of the building must be avoided. Windward side ventilation operations could create a wind-driven, blast furnace effect.

N. Stack effect accounts for most of the natural air movement in buildings under normal everyday conditions.

1. During fire conditions, stack effect can widely distribute smoke and toxic gases.

2. The intensity of the stack effect is based largely on both the building's height and the difference between the inside temperature and outside temperature.

a. Basically, the taller the building and the larger the temperature difference, the greater the stack effect.

3. The stack effect can be viewed in terms of winter and summer effects.

a. During the winter months, the inside air temperature is much higher than the outside air temperature.The inside air being warmer, less dense and more buoyant, will rise.

i. The air in the building moves upward toward the top and out of the building, while outside air is drawn in from the bottom.

b. During the summer months the opposite occurs. At a point about 1/3 – ½ the building's height, a neutral pressure plane will exist.

i. At this point air is neutral and neither rises nor sinks.

4. Understanding stack effect is important to both smoke control system use and ventilation operations.

a. Cold smoke could be drawn down to lower floors by the HVAC system.

b. If during the winter months a fire below the neutral pressure plane occurs, using windows on lower floors for ventilation may actually worsen the conditions as air is drawn into the building on the lower floors during winter stack effect.

XXI. Sprinkler system support and operations

A. With the exception of very few buildings, all human-occupied areas of highrise buildings in Albuquerque are completely protected by a wet sprinkler system.

B. The purpose of sprinkler protection is the rapid application of a sufficient volume of water to a fire while the fire is still in the incipient stage.

1. Most wet sprinkler systems are designed to control fire growth, not to completely extinguish fire (although they might).

C. Sprinkler system design is based on several factors including occupancy type, fire load, and the square footage of the area to be protected.

1. The municipal water supply should be all that is necessary to provide sufficient pressure and volume.

2. On a sprinkler activation response, precautionary actions may be needed to provide supplemental pressure and water volume to the system.

a. An engine should be positioned near the fire department connection.

b. Supply lines should be stretched to the fire department connection, but not charged immediately.

c. If the system is performing as designed, immediate charging of the sprinkler system may create excessive water damage

d. If it is determined by the Fire Attack Branch that the pressure and volume from the municipal water supply are not adequate for fire control, supply lines should be charged and a pump discharge pressure of 150 psi should be established.

i. The discharge pressure should be sufficient to provide maximum volume capacity to the apparatus fire pump, an not overpressurize the sprinkler system.

D. While controlling fire growth, sprinkler water flow will create special tactical considerations.

1. Sprinkler activation will disrupt the thermal balance in the fire area.

2. The steam created will push smoke down toward the floor, reducing visibility and making natural ventilation operations difficult.

3. PPV should be initiated once the fire's location, spread and control are known.

4. The HVAC system may also be considered as an option when ventilating this cold smoke.

E. Sprinkler activations may contribute to the potential for water damage as the flow of water continues following fire knockdown. Two operations will aid in minimizing the damage.

1. A Loss Control Group should be established both on the Fire Floor and Floor Below.

2. A radio-equipped member from the Systems Branch should be sent to the sprinkler system riser.

a. Once the Fire Attack Branch determines the fire is under control and sprinkler flow is no longer necessary, the system can be promptly shut down and drained.

F. It must be understood that premature shutting down of the sprinkler system is not acceptable.

1. The presence and activation of a sprinkler system does not alter the Fire Attack Branch operations.

a. All resources and equipment must proceed to the fire floor regardless of sprinkler system status.

2. Fire attack and search/rescue operations will still be required.

3. Only after a confirmation of fire “Under Control” status from the Fire Attack Branch will the sprinkler system be shut down.

a. With a combination sprinkler/standpipe riser, a sprinkler zone shut-off may be found on the branch line leading from the riser to the fire floor.

b. If so equipped, the system may be shut down from this location as well.

G. Additional sprinkler systems, other than automatic wet, may be present.

1. A dry chemical system may protect a kitchen cooking area.

2. A Halon system may protect a computer room.

3. The presence of these systems needs to be identified in pre-fire plans and information of their activation communicated to the Incident Commander.

XXII. Building communication systems

A. On-scene communications will play a very important role in incident outcome at highrise operations.

1. The Incident Command structure not only creates and maintains incident organization and span of control, but establishes a radio communication network.

2. All on-scene personnel must maintain a clear understanding of the command structure

3. Radio communications should be made using the AFD communications model.

4. As a highrise incident escalates, each Branch should be designated a separate tactical channel.

B. Two highrise building features can enhance firefighter ability to communicate within the building.

1. Fire phones.

2. Public address systems.

C. Fire phones are required in all highrise occupancies.

1. Fire phones can be either permanently affixed in the structure or portable.

2. If the building provides portable phone capability, phones need to be distributed by the Systems Branch to each Group/Division Supervisor/Branch Director.

3. Phone jacks/outlets may be located throughout the building and are commonly found in or near manual fire alarm pull stations, exit ways, elevator cars, elevator lobbies, the fire pump room, and the mechanical equipment room.

4. With the potential for radio malfunction in highrise structures, the fire phone system provides a back-up communications system between the fire control room and tactical locations throughout the structure.

D. A public address (PA) system allows the Systems Branch to make announcements to any location in the building.

1. Many systems provide the ability to address the entire building at once or allow communications to selected floors or zones.

2. It is crucial that the Systems Branch make a statement on the PA system to all building occupants upon arrival.

a. Occupants need to be made aware of current fire conditions and fire department operations.

b. Evacuation measures must also be announced in an effort to gain control of the evacuation process.

c. Protection-in-place, stairwell designation, and floor order of evacuation, all must be made known to occupants.

d. Frequent announcements, with accurate and updated information transmitted to building occupants - using the PA system - may reduce occupant confusion and activity that could be detrimental to fire control or evacuation operations.

e. PA system announcements are important in appropriately counteracting the predictable behavior patterns on the part of many highrise building occupants, depending on incident conditions and objective/tactics. Some of these behaviors include:

i. Many individuals have a “false alarm effect” that drives the decision to continue with their current activity and not evacuate.

ii. Many people will wait for a verbal confirmation of the presence of a fire or verbal orders from the fire department before evacuating.

iii. Many people may now begin immediate and uncontrolled evacuation of the building for fear of imminent building collapse.

iv. People will use the means of egress most familiar to them, oftentimes the elevators. With the recall of the elevators, stairwells will be the only means of egress.

v. Without proper instruction as to which stairwell to use for evacuation, occupants may enter the designated fire attack and/or ventilation stairwell.

- Until occupants are removed from the fire attack and ventilation stairwells and redirected toward the evacuation stairwell, fire attack and ventilation operations must be delayed.

vi. Announcements over the PA system gan give instruction to “convergence clusters” which sometimes occur when large groups of people are found gathered together in a place of refuge within the fire building (e.g., elevator lobbies or areas with balcony access).

XXIII. Building construction

A. The specifics of each highrise building’s construction need to be determined during pre-fire planning while the building is being built.

B. Two features of the building, however, may provide some important information regarding building construction.

1. Occupancy.

2. Approximate date of construction.

C. The occupancy of the building is defined as how the building is used. Highrise occupancies usually can be classified into two types.

1. Residential.

2. Commercial.

D. Residential highrises may include:

1. Apartments.

2. Hotels.

3. Hospitals.

E. The floors in residential highrises are often compartmentalized.

1. Walls that extend to the ceiling level divide each living space.

2. The living space empties into an enclosed corridor designed specifically for exit.

F. Commercial highrise occupancies may include:

1. Businesses

2. Restaurants and retail shopping structures.

3. Government offices.

G. Commercial occupancy floor layout can be quite different from residential occupancies.

1. A commercial occupancy may have an open floor plan in which work areas are separated by partitions (with the exception of corner offices).

a. Partitions do not extend to the ceiling level, thus creating a non-compartmentalized floor plan that may be thousands of feet in area.

2. If a particular tenant has offices or work areas occupying more than one floor of the building, access stairs may be present.

a. Access stairs are non-enclosed stairs that allow workers to travel floor-to-floor without using the exit stairwells or the elevator. While convenient for the occupant, the presence of access stairs creates very serious fire and smoke spread potential that firefighters must combat.

XXIV. Occupant services

A. Under the direction of the Administration Section Chief, an Occupant Services Branch may be designated to fulfill several functions.

1. Information from the Transportation Group of the EMS Branch regarding patient destinations must be gathered.

2. As family members request information about occupant/victim locations, this branch will provide the needed information.

3. The Occupant Services Branch will also oversee the relocation of displaced occupants and address their shelter, health and safety needs.

a. This branch will often be required to coordinate their efforts with outside agencies, such as the American Red Cross.

HIGHRISE INCIDENT COMMAND CHECKLIST

OPERATIONS SECTION

Obtain briefing from Interior

- ☐ Determine Incident Strategy/Incident Action Plan.
- ☐ Determine need for and call for additional resources.
- ☐ Establish an exterior Command Post
- ☐ Begin expanding the Incident Command Structure as needed.
    1. Establish Fire Attack Branch.
    2. Establish Systems Branch/Lobby Control Division.
    3. As incident escalates – Command and General Staff assembled.
- ☐ Designate an Apparatus Staging Group and location.

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

HIGHRISE INCIDENT COMMAND CHECKLIST

OPERATIONS SECTION

- Report directly to IC.
- Manage all fire attack, building systems, and EMS operations.
- Branches include Fire Attack, Systems, EMS.

1. Fire Attack Branch.
    - A. Fire Floor Division.
    - B. Floor Above Division.
    - C. Ventilation Group.
    - D. Search and Evacuation Group.
    - E. RIT.
    - F. Floor Below Division.
    - G. Loss Control Group.
2. Systems Branch.
    - A. Lobby Control.
    - B. Water Supply.
    - C. Building Communications.
    - D. HVAC and Stairwell Pressurization.

3. EMS Branch.

   A. Triage Group.

   B. Treatment Group.

   C. Transport Group.

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

HIGHRISE INCIDENT COMMAND CHECKLIST

LOGISTICS SECTION

- Report directly to IC.
- Manage present and future needs of Operations Section.
- Branches include Staging, Ground Support, Service, Stairwell Support.

1. Staging Branch.
   - A. Apparatus Staging Group.
   - B. Resource Staging Group.
   - C. Accountability Location.
2. Ground Support Branch.
   - A. Fuel.
   - B. Air Supply.
3. Service Branch.
   - A. Technical Services.
   - B. Responder Rehabilitation.
   - C. Stairwell Support.

HIGHRISE INCIDENT COMMAND CHECKLIST

SAFETY OFFICER

- ☐ Report directly to IC.
- ☐ Risk vs. Benefit Analysis.
- ☐ Confirm Establishment of RIT.
- ☐ Confirm Accountability System in use.
- ☐ Assessment of Building Construction Features and Concerns.
- ☐ Confirm Establishment of Responder Rehab.

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

HIGHRISE INCIDENT COMMAND CHECKLIST

SYSTEMS BRANCH DIRECTOR

- ☐ Reports directly to Operations Section.
- ☐ Initial Accountability Location.
  - Entry Control once Accountability is relocated to Resource Group.
- ☐ Acquire Occupant List and begin Occupant Accountability.
- ☐ Recall Elevators.
- ☐ Designate Stairwells.
  - Attack, Ventilation, Evacuation.
- ☐ Assess Annunciator Panel.
- ☐ Locate PA system and prepare to make a building-wide statement.
- ☐ Contact Building Engineer.
- ☐ Evaluate status of HVAC.
- ☐ Evaluate status of stairwell pressurization.
- ☐ Evaluate status of fire pumps.
- ☐ Acquire building and floor plans.
- ☐ Acquire keys and access cards.
- ☐ Acquire and distribute fire phones.
- ☐ Determine emergency/back-up power status.

Appendix A - List of Company Functions

I. Alarm activation

A. Engine functions.

1. Determine fire floor.
2. Assume Attack Group and proceed to designated stairwell.
3. Verify fire floor.
4. Determine “All Clear” in attack stairwell.
5. Initiate fire attack operations.

B. Ladder functions.

1. Assume Lobby Control Division.
2. Designate stairwells.
3. If investigation dictates, make announcement over PA system:
   a. Attention all building occupants. This is the Albuquerque Fire Department. There is smoke/fire on the ____ floor. AFD is investigating/fighting the fire. All occupants of the _____ floors (fire floor and two floors above) should evacuate in the _____ stairwell. All other occupants should remain in their rooms/offices until advised by fire department personnel to evacuate.
   b. Repeat the message.
4. Building systems evaluation.

C. Commander functions.

1. Assume Command in the Lobby/Fire Control Room.

II. Report of fire and/or smoke.

A. First Engine.

1. Determine and verify the fire floor.

2. Assume Fire Floor Division.

3. Determine “All Clear” in attack stairwell.

4. Initiate fire attack operations.

B. First Ladder.

1. Assume Lobby Control Division.

2. Designate stairwells.

3. Make announcement over PA system:

a. Attention all building occupants. This is the Albuquerque Fire Department. There is smoke/fire on the ____ floor. AFD is investigating/fighting the fire. All occupants of the _____ floors (fire floor and 2 floors above) should evacuate in the _____ stairwell. All other occupants should remain in their rooms/offices until advised by fire department personnel to evacuate.

b. Repeat the message.

4. Building systems evaluation.

C. First Commander.

1. Incident Commander in the Lobby/Fire Control Room.

D. Second Engine.

1. Join Fire Floor Division.

E. First Rescue.

1. Join Fire Floor Division.

F. Second Ladder.

1. Ventilation Group.

G. Third Engine.

1. Floor Above Division.

H. Fourth Engine and Squad 2.

1. RIT.

I. Unit 78, second and third Rescue.

1. Evacuation Group.

J. Second Commander.

1. Fire Attack Branch Director.

K. Third Ladder.

1. Join Lobby Control Division.

L. Third Commander.

1. Support Officer and establish Accountability Branch.

M. Squad 1 or 3.

1. Safety Group.

III. Working fire or sprinkler activation

A. First Commander.

1. Transfers Command to fourth-arriving Commander and assumes Systems Branch Director.

2. Two Ladders assigned.

B. Second Commander.

1. Fire Attack Branch Director.

2. Continues supervising division/group operations in attack, ventilation and evacuation stairwells.

   a. Minimum 6 Engines, 2 Ladders, 3 Rescues, 1 Squad, Unit 78 assigned.

3. Has Fire Attack Accountability Division Officer as an aide.

C. Third Commander.

1. Accountability Branch Director in lobby.

2. Fire Attack Accountability and Systems Branch Accountability Divisions assigned.

3. EMS Branch established.

4. Reports to Operations Section.

5. Four Rescues minimum.

D. Fourth Commander.

1. Assumes Command of the incident and begins ICS expansion.

Water Supply and Fire Stream Management

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

This document provides guidance to Company and Command Officers in determining water supply needs and selecting the most effective hose line size.

Guideline

Adequate water supply during fire attack operations has a critical impact on fire control outcomes. A good water supply and adequate Gallons Per Minute (GPM) flows from attack lines result in good outcomes. Delayed or limited water supply and inadequate GPM flow lead to delayed fire control, increased risk to firefighters and victims, and greater fire loss. The use of excessive amounts of water and leaking couplings or nozzles may increase loss inside the structure.

Operational Guidance

I. Hydrant water supply

A. First-in engine companies approaching the scene with any evidence of a working fire in a structure should lay their own 5” supply line. This supply line allows a number different options. The 5” supply may also be dropped at the hydrant and secured with the hydrant strap while the engine proceeds to the scene.

B. Exceptions include: obvious critical rescue requiring a full crew, unclear where actual fire location is in multi-unit building complex, etc.

C. When choosing a water supply, choose the best method to supply enough water to effectively utilize apparatus (consider combination of primary and secondary attack lines, or a master stream) and extinguish the fire. A well-laid 5-inch supply line offers a vast array of options.

II. Firestream options

A. Engine mounted master streams

1. Characteristics include: very large GPM flows (500 to 1,000 GPM), quick operation, improved reach and penetration.

2. A solid bore tip offers greater reach and penetration with a more intact stream than a fog nozzle that is set on straight stream.

3. Should be considered for structures that are well involved, beyond rapid reach of attack lines, for exposure protection and in situations that pose an unusual safety risk to firefighters.

4. Engine mounted master streams may be detached and used as a portable monitor. This may provide better reach and placement. These have 2 ½ and 5" supply inlets.

B. Attack hoselines

1. Choose an attack hoseline adequate to provide enough GPM flow to overcome the volume of fire being produced, or adequate flow to effectively cool and protect exposures.

   a. 1 3/4" attack line can be used for most small fires (i.e., one or two rooms in a residential fire.

   b. 1 ¾" attack line can be used when maneuvering in tight quarters is required. The 1 ¾ " preconnect has it's limitations. Namely it's decreasing effectiveness beyond 250ft of hoseline.

   c. 2 1/2" attack lines are appropriate for a larger volume of fire. You may use the ADULTS acronym. A- advanced fire, D- defensive, U- unknown location, L- Large undivided area, T- tons of water, S- sprinkler or standpipe. The 2 ½ " line should be reserved for attack or backup operations.

   d. The Blitz attack, 150ft of 2 ½ ' hoseline with a vindicator tip offers 300- 350 GPMS. This may also be used in situations where the ADULTS acronym may be applied (this line is present on all frontline engines within AFD).

2. Attack lines must be ready and in place before forcible entry is initiated to fully protect the safety of attack crews.

III. Basic attack hoseline placement

A. Offensive attack mode

1. Attack hoselines capable of adequate volume should be advanced inside the fire building in order to put water on the fire and to control access to halls, stairways, or other vertical and horizontal channels through which people and fire may travel.

2. The first stream should be placed between the fire and persons endangered by it

3. When no life is endangered, the first stream should be placed between the fire and the most severe exposure or unburned areas so as to confine the fire to the smallest possible area.

4. A backup hoseline should protect interior crews and provide a way out of the structure (always bear in mind the presence of crews operating in opposing positions) The backup line should be equal to or greater than the size of the initial attack line. This may be an adequate use of the Blitz attack line, 2 ½".

5. Additional hoselines should cover other critical areas or back up in place hoselines.

6. Whenever possible, crews should position hoselines in a manner and direction that supports rescue activities, begins confinement, protects exposures, and controls loss.

B. Offensive operations to defensive operations

1. Pull handlines out of the fire building only if safe to do so.

2. Do not delay exit from the building for the sake of salvaging a few feet of hose and a nozzle if conditions are deteriorating rapidly unless the line is needed for crew protection during exit operations.

3. Once offensive operations shift to a defensive mode, Command must prioritize handline operations and choose which handlines will be shut down to provide adequate water supply for master streams.

IV. Firestream characteristics and considerations

A. Choose the most effective nozzle and stream for the task:

1. Solid/straight streams - Greater penetration, reach and striking power with less steam conversion.

2. Fog - Increased heat absorption/expansion with shorter reach. Most effective in confined spaces (indirect attacks).

B. Choose the proper sized attack hoseline/master stream:

1. 1 3/4" hoselines - Fast, mobile, volume @ 175 GPM.

2. 2 1/2" hoselines - Slow/difficult to move, volume @ 250 GPM.

3. Engine mounted master streams - Fast, great reach and penetration, large volume @ 500 to 1000 GPM (Portable monitors).

4. Elevated master stream - Mostly stationary, slower to set up, maximum water, 500 to 1000 GPM. Note: L13 is able to supply a total of 2000 GPM.

V. Fire attack effectiveness

A. Offensive attack activities must be highly mobile to be most effective. As mobility is reduced, attack activities become more defensive in nature.

B. An offensive attack mode should achieve an effect on the fire quickly. Contingency plans should be developed quickly in the event it does not.

C. If water is applied to the fire in an offensive attack position and the fire does not go out, react and consider:

1. Backing it up or redeploying hoseline to another position (consider more water and /or more ventilation or change tactics).

2. Focusing on what direction the fire is likely taking and puting crews in position ahead of the fire.

D. Beware of hoselines that have been operated in the same place for lengthy periods of time.

1. Fire conditions change during the course of fire operations (most things will only burn for a limited time) Always be aware of potential collapse and rapid change in interior conditions.

2. The effectiveness of any hoseline must be continually evaluated.

3. If the operation of such lines becomes ineffective, move, adjust, or redeploy them.

E. Beware of the limitations of operating nozzles through holes such as breached walls, floors, etc. The mobility of such streams is limited and it is generally difficult to evaluate their effectiveness.

F. Basement fires

1. When utilizing crews with handlines to enter basement fires, crews should not open nozzles until they can see and/or are near the fire

2. Straight streams should be used in basement fires. Consider using 2 ½ " handlines for below grade fires. The volume and intensity will most likely necessitate this.

3. Fog streams should never be used when operating in basement fires as steam production will be extensive and the risk of steam burns is significant.

G. Interior attacks

1. Extreme caution should be taken with interior and exterior attacks in the same building

a. Command must closely coordinate exterior streams (particularly aerial master streams and engine mounted master streams) if attack crews are committed to inside operations

b. Command will pull crews out of the building before an exterior master stream knockdown is initiated

H. Aerial master streams

1. Aerial master streams are particularly effective on large open-type fires or when operated from underneath the roofline (example: taxpayer fire). Aerial master streams are versatile, and maneuverable.

2. Typically deploying an aerial master stream indicates the overall strategy has shifted from offensive to defensive operations and the structure (or a portion of the structure) has been written off

3. Aerial master streams may be used offensively. The stream may be brought to the ground level when the volume of fire exceeds the capability of handlines. The stream may be directed at the ceiling level to halt further fire spread. Interior crews must be pulled before operation of Master streams.

4. Ground crews should be warned that aerial master streams are to be imminently deployed before the streams go into operation.

5. Consider establishing collapse zones and defensive positions when the potential for master stream operation exist. When master streams go up, the tendency is that buildings come down.

6. Applying water to the outside of a roof is not an effective method of fire extinguishment.

   a. Applying water to the outside of a roof may offer effective exposure protection

   b. An intact roof will shed water and prevent water from reaching the seat of the fire

   c. An aerial master stream should be operated above the roof when the threat of extension to exposures higher than the fire building exist.

7. Never direct aerial master streams down ventilation holes during offensive operations as ventilation efforts may be compromised and interior attack crews may be seriously endangered.

8. Continuing operation of large volume master streams can prevent entry and complete extinguishment of the fire. Consider shutting down nozzles periodically to reassess fire conditions.

9. Operating fire streams into smoke is not effective. Fire location must be determined for effective application of firestreams.

VI. Command considerations

A. Company Officers and Division/Group Officers must maintain active responsibility for the effectiveness of firestreams being deployed.

B. Officers must be aware of where firestreams are being directed and whether they are effective.

C. Company officers must continually be aware of current operations and of any potential adjustments or improvements which might increase firestream effectiveness (e.g., nozzle diameter adjustment or nozzle tip reduction).

D. Company Officers must keep Division/Group Officers or Command informed of firestream effectiveness.

Fireground Hydraulics

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

The purpose of this document is to provide a guideline for personnel on fireground hydraulics and applications as endorsed by the Albuquerque Fire Department. It also provides hydraulic calculations as practiced by the Albuquerque Fire Department.

Guideline

Apparatus drivers must possess a clear understanding of Engine Company operations and possess knowledge of firestreams, nozzles, fire pump theory, pump operations and hydraulics. Familiarity with the capabilities and limitations of the apparatus and its components makes a professional and effective Driver.

Without a thorough knowledge of how and why the pump and its components work, a Driver may not be capable of effectively troubleshooting when problems arise. All Drivers must be capable of safely and quickly supplying adequate firestreams and sustaining a dependable water supply on the fireground.

Operational Guidance

I. Fire streams

A. A fire stream is a stream of water or other extinguishing agent after it leaves a fire hose and nozzle until it reaches the desired point.

1. As a fire stream passes through space, it is influenced by specific factors.

a. Velocity.

b. Gravity.

c. Wind .

d. Friction with air.

2. The condition of the stream as it leaves the nozzle is influenced by specific factors.

a. Operating pressure.

b. Nozzle design.

c. Nozzle adjustment .

d. Condition of the nozzle orifice.

3. Choice of nozzle determines the type of fire stream.

a. Drivers must be familiar with the different types of nozzles carried on their apparatus.

b. Each type of nozzle has its own required flow rate and discharge pressure which effect values utilized in hydraulic calculations.

c. A Driver must understand the capabilities of each nozzle in order to choose the correct nozzle for a particular evolution.

II. Fire hose nozzles and flow rates

A. The fire service utilizes three basic types of fire streams.

1. Solid.

2. Fog.

3. Broken.

B. Nozzles have been developed for each type of stream. It is important to emphasize that no nozzle is capable of delivering any other stream than the one for which it was designed.

1. Solid stream nozzles.

a. A solid stream is a fire stream produced from a fixed orifice, smooth bore nozzle. The solid stream nozzle is designed to produce a stream as compact as possible with little shower or spray. A solid stream has greater penetration and as a result may be able to reach areas that other streams might not be able to reach.

b. Solid streams may be used on handlines, deck guns, portable monitors or aerial master streams.

c. The velocity of the stream (nozzle pressure) and the size of the discharge opening determine the flow from a solid stream nozzle.

d. Solid stream nozzle pressures.

   i. Handlines - 50 psi (flowing up to 350 GPM).

   ii. Master streams - 80 psi (flowing 350 GPM or more).

e. Solid stream nozzle discharges are calculated using the following formula and values.

   i. $GPM = 29.7 \times D^2 \times \sqrt{NP}$.

   ii. GPM = discharge in gallons per minute.
   29.7 = a constant.
   D^2 = diameter of the orifice in inches, squared.
   $\sqrt{NP}$ = square root of the nozzle pressure.

   iii. Using this formula, it is possible to determine water flow from any solid stream nozzle when the nozzle pressure and tip diameter are known.

f. Handline solid tip nozzles should be supplied with a maximum of 50 psi nozzle pressure (exceeding 50 psi compromises safety).

g. The following table lists the solid stream tip sizes used on AFD handlines and their discharge rates (GPM) at 50 psi nozzle pressure. These discharge rates can be rounded to simplify hydraulic calculations. See Table 1.

Table 1		
Handlines		
Solid tip orifice size	Discharge rate at 50 psi nozzle pressure	Value used for fireground calculations

1”	209 GPM	200
1 1/8”	265 GPM	250
1 ¼”	326 GPM	325

h. Solid stream nozzles for master stream appliances should be supplied with 80 PSI nozzle pressure. Using 80 PSI nozzle pressure for all master stream appliances with solid stream nozzles will greatly simplify pump operations and will not be a detriment to fire stream performance.

i. The following table indicates master stream solid tip sizes that are found on AFD master stream appliances and their discharge rates (in GPM) at 80 PSI nozzle pressure. These discharge rates can be rounded to simplify hydraulic calculations. See Table 2.

Table 2		
Solid Stream Master Streams		
Solid tip orifice size	Discharge rate at 90 PSI nozzle pressure	Value used for fireground calculations
1 3/8”	502 GPM	500
1 ½”	598 GPM	600
1 ¾”	814 GPM	800
2”	1,063 GPM	1,000

2. Fog nozzles.

a. Fog nozzles should be supplied with 100 PSI nozzle pressure.

i. While automatic nozzles can usually provide adequate stream patterns with less nozzle pressure, flows are dramatically reduced and crew safety may be compromised. For this reason, AFD fog nozzles will be supplied with 100 PSI nozzle pressure (unless otherwise noted by the manufacturer of the nozzle).

ii. Some nozzles will have labels that indicate pressures required for specific flows. Most of the fog nozzles carried by AFD are constant pressure, variable gallonage (automatic) nozzles.

b. The fog nozzles shown on Table 3 are some of the ones used at AFD.

Table 3		
Selected Fog Nozzles Used at AFD		
Fog Nozzle	GPM Range	Standard Use
SM20F	60-200	1 ¾" preconnects
SM20FG	60-200	1 ¾" preconnect
SM30F	75-325	2 ½" handlines
SM30FG	75-325	2 ½" handlines
Akromatic 2000	500-2,000	aerial platform and ladder master streams

3. Broken stream nozzles are not required by NFPA 1901 to be on engine companies

a. Various broken stream nozzles are found on AFD units.

i. Cellar nozzle.

ii. Piercing nozzle.

iii. Chimney nozzle.

b. Due to the variety of broken stream nozzles in use in the department, Drivers must refer to the manufacturer's

operating nozzle pressures for that specific nozzle. Nozzle pressures may range from but not limited to 100-150 psi.

4. Vindicator nozzles.

   a. Vindicator nozzle characteristics.

      i. The Vindicator satisfies the requirements of both a high rate of application and a broken stream for high heat absorption.

      ii. The Vindicator offers higher flow rates than found with either a spray nozzle or a solid stream nozzle, while doing so at less nozzle pressure, with increased mobility and safety, and with less steam generation.

      iii. Because it is an aspirated water stream it has the advantage of being able to remove heat from the combustion zone to slow the reactions. This is an advantage not found in either the solid stream or the combination nozzle.

      iv. The Vindicator has a higher surface-area-to-volume ratio due to the coupling of high application rate (GPM) and its effective aspiration. Therefore, it has better heat-transfer characteristics than solid stream nozzles and, consequently, is more effective in absorbing heat.

   b. Because the application rate is coupled with a high surface-area type stream, it is unnecessary to break up the stream by deflecting it off hard surfaces such as bulkheads and overheads as required with a solid nozzle.

   c. A dependable water supply must be established when using the Vindicator nozzle as it flows a significant amount of GPM at relatively low pressures.

d. Table 4 is a list of Vindicator nozzles that may be found on AFD units (flow indicator is stamped inside tip).

Table 4			
Vindicator Nozzles Used at AFD			
Vindicator Nozzle	GPM Range	Standard Use	Capable Of
Heavy Attack	175-250	1 ¾" pre-connects	250 GPM at 50 psi NP through 1 ¾" hose
Blitz Attack	250-500	2 ½" rear pre-connect	325 GPM at 50 psi NP through 2 ½" hose
Master Attack	675-1000	master streams	1000 GPM at 85 psi NP for monitors

III. Nozzle pressure and reaction

A. The psi needed to produce adequate flow through the nozzle is known as NOZZLE PRESSURE (NP). Nozzles used at AFD require one of five nozzle pressures (fog nozzle manufacturers may indicate a specific nozzle pressure). Table 5 shows nozzle pressure for AFD nozzles.

Table 5	
Nozzle Pressures for AFD Nozzles	
Nozzle	Nozzle Pressure
Solid tip handline	50 psi
Solid tip master stream	80 psiI
Vindicator handline	50 psiI
Vindicator master stream	85 psi
All fogs	100 psi

B. As water is discharged from a nozzle at a given pressure, a force pushes back on the firefighters handling the hoseline. This counter force is known as Nozzle Reaction (NR)

1. Nozzle reaction clearly illustrates Newton's Third Law of Motion, which states that for every action there is an equal and opposite reaction.

   a. The greater the nozzle discharge pressure and GPM, the greater the resulting nozzle reaction.

   b. It is the resulting nozzle reaction to a given pressure that forces us to limit the amount of nozzle pressure that can be supplied to an attack line.

2. Firefighters can be seriously injured and fire attacks greatly hampered by nozzles violently whipping around from excess nozzle reaction.

3. Determining the nozzle reaction from a given hose layout is certainly not necessary on every fire scene.

4. Calculating nozzle reaction is useful when specifying hose and nozzle configurations for preconnected attack lines on an apparatus. The following equations help determine whether it is realistic for the given number of crew members to handle the hose lay that is being proposed.

   a. Calculating nozzle reaction for solid stream nozzles.

      i. $NR = 1.57 \times D^2 \times NP$.

      ii. 1.57 = A constant.

      D^2 = Nozzle diameter in inches – squared.

      NP = Nozzle pressure in psi.

      iii. Example: Find nozzle reaction on a hoseline equipped with a 1 ¼" solid tip operating at a nozzle pressure of 50 psi

      $NR = (1.57)(d^2)(NP)$.

NR = (1.57)(1.25)^2(NP).

NR = (1.57)(1.56)(50).

NR = 122.5 pounds.

b. Calculating nozzle reaction for fog nozzles.

i. NR = 0.0505 x Q x √NP.

ii. 0.0505 = A constant.

Q = Total flow through the nozzle in GPM.

√NP = Square root of the nozzle pressure.

iii. Example: Find the nozzle reaction on a hoseline with a fog nozzle flowing 200 GPM at 100 psi

NR = (0.0505)(Q)(√NP).

NR = (0.0505)(200)(√100).

NR = (0.0505)(200)(10).

NR = 101 pounds.

IV. Theoretical pressure calculations

A. A Driver's prime objective is to provide fire suppression crews with the water flow and pressure needed to achieve efficient fire control and/or extinguishment. Drivers rarely, if ever, perform the calculations contained in this section while on the fireground.

B n the fireground Drivers are more likely to use the methods described in the next section, "Fireground Calculations." Drivers should be able to complete theoretical calculations for the following reasons

1. To better understand the basis for "Fire Ground Calculations"

2. To calculate accurate pump discharge pressures for preconnected hose lines and common hose lays used on their apparatus (prior to ever being dispatched to a fire)

3. To use the knowledge as a tool when pre-planning incidents at structures requiring unusual hose lays

C. Pump Discharge Pressure (PDP) is the actual velocity pressure (measured in psi) of the water as it leaves the pump and enters the hoseline.

1. To produce effective fire streams and to accurately calculate Pump Discharge Pressure, it is necessary to know the amount of friction loss in the fire hose and any pressure loss or gain due to appliances and elevation.

2. To calculate the PDP, add the nozzle pressure of the nozzle in use, the friction loss in the hose, the pressure loss in the appliance (if applicable) and the elevation pressure loss or gain (if applicable).

a. PDP = NP + FL + AP +/- EL.

C. Friction Loss (FL) is the loss of pressure created by the turbulence of water moving against the interior walls of the hose or pipe.

1. The four Principles of Friction Loss.

a. All conditions being the same, friction loss is more if the hose is longer.

b. If the hose is the same size and velocity is increased, friction loss increases much more quickly.

c. The bigger the inside diameter of the hose, the less friction loss.

d. The bigger the hose, the less velocity it takes to flow (feet per second).

2. To accurately calculate Friction Loss you must determine the size and length of the hose as well as the amount of water flowing through it. The primary determinant when calculating friction loss remains the volume of water flowing per minute.

3. There is a formula to find friction loss in fire hose of any size.

   a. $FL=CQ^2L$.

   b. FL = Friction loss in psi.

      C = Friction loss coefficient (different for each size hose).

      Q = Flow rate in hundreds of GPM (flow/100).

      L = Hose length in hundreds of feet (length/100).

   c. Coefficients used to calculate hose line friction loss are shown in Table 6.

Table 6	
Coefficients used to calculate hose line friction loss	
1 ¾" hose (100')	15.5
2 ½" hose (100')	2
5" hose (100')	.08

4. AFD Drivers must know the following information about various hoselines

   a. 1 ¾" hose

      i. The coefficient used to calculate friction loss for 1 ¾" hose with 1 ½" couplings is 15.5 (per 100' section).

      ii. Friction loss for 1 ¾" hose (at various GPM flows) is shown in Table 7.

Table 7	
1 ¾" hose friction loss per 100'	
100 GPM	15.5 psi

150 GPM	35 psi
200 GPM	62 psi
250 GPM	97 psi

iii. Max operating pressure for 1 ¾" hose is 300 psi.

iv. A dry 50' section of 1 ¾" hose weighs 18 lbs and a charged 50' section of 1 ¾" hose weighs 68 lbs and contains approximately 6 gallons of water.

v. 1 ¾" preconnects rarely require fireground hydraulic calculations because the length of hose is constant, and the nozzle selection is constant. If GPM was predetermined, the pump discharge pressure could be determined before we leave the station.

Example for calculating friction loss for 1 ¾" hose.

125 GPM flowing through a 100' section of 1 ¾" hose would have how much friction loss?

$FL=CQ^2L$

C = 15.5 (coefficient for 1 ¾" hose).

Q = 1.25

$Q^2 = Q \times Q = 1.25 \times 1.25 = 1.5625$

$CQ^2 = 15.5 \times 1.5625 = 24.21875$

FL=24

125 GPM flowing through a 100' section of 1 ¾" hose would have 24 psi of friction loss.

b. 2 ½" hose.

i. The coefficient used to calculate friction loss for 2 ½" hose with 2 ½" couplings is 2 (per 100' section).

ii. Friction loss for 2 1/2" hose (at various GPM flows) is shown in Table 8.

Table 8	
2 ½" hose friction loss per 100'	
150 GPM	5 psi
200 GPM	8 psi
250 GPM	13 psi
300 GPM	18 psi
325 GPM	21 psi

iii. Max operating pressure for 2 ½" hose is 300 psi.

iv. A dry 50' section of 2 ½" hose weighs 25 lbs and a charged 50' section of 2 ½" hose weighs 125 lbs and contains approximately 12 gallons of water.

v. Calculations for 2 ½" preconnects should be predetermined.

vi. When supplying a 2 ½" handline that is not the rear preconnect, keep an accurate count of how many sections of hose is being pulled off the hosebed (as well as what nozzle/tip size is being used).

Example for calculating friction loss for 2 ½" hose.

300 GPM flowing through a 100' section of 2 ½" hose would have how much friction loss?

$FL=CQ^2L$

C = 2 (coefficient for 2 ½" hose)

Q = 3

$Q^2 = Q \times Q = 3 \times 3 = 9$

$CQ^2 = 2 \times 9 = 18$

FL=18

300 GPM flowing through a 100' section of 2 ½" hose would have 18 psi of friction loss.

c. 5" hose.

i. The coefficient used to calculate friction loss for 5" hose is .08 (per 100' section).

ii. Friction loss for 5" hose (at various GPM flows is shown in Table 9).

Table 9	
5" hose friction loss per 100'	
750 GPM	5 psi
1,000 GPM	8 psi
1,250 GPM	13 psi
2,000 GPM	32 psi

iii. Max operating pressure for 5” hose is 185 psi.

iv. A dry 100’ section of 5” hose weighs 105 lbs and a charged 100’ section of 5” hose weighs 900 lbs and contains approximately 95 gallons of water

v. Example for calculating friction loss for 5” hose.

1,500 GPM flowing through a 100’ section of 5” hose would have how much friction loss?

$FL=CQ^2L$

C = .08 (coefficient for 5” hose)

Q = 15

$Q^2 = Q \times Q = 15 \times 15 = 225$

$CQ^2 = .08 \times 225 = 18$

FL = 18

1,500 GPM flowing through a 100’ section of 5” hose would have 18 psi of friction loss.

D. Fire ground operations often require the use of appliances which then must be factored into hydraulic calculations (Appliance-AP). Appliances are categorized as hoseline appliances or master stream appliances.

1. Hoseline appliances.

a. Reducers, increasers, gates, wyes, any siamese or manifolds are all hoseline appliances.

b. 10 psi friction loss must be added for each hoseline appliance if the total water flowing through it is greater than 350 GPM (i.e., master streams).

c. Flows less than 350 GPM through a hoseline appliance do not require any additional friction loss.

d. Special potential circumstance regarding flowing water to aerial master streams.

i. All AFD Aerial Apparatus have LDH inlets to supply the aerial master stream.

ii. Not all AFD Engines have a LDH discharge to supply the aerial device and may have to use multiple 2 1/2”hose lines to supply the aerial master stream.

ii. If a gated siamese (multiple 2 ½” inlets into a 5” storz) is attached to the LDH inlet of the aerial apparatus, you must account for this FL as well.

2. Master stream appliance.

a Any device that supplies a heavy, large-caliber water stream, such as an apparatus-mounted deck gun, portable monitor mounted on ground in appropriate stand, or aerial master stream nozzle mounted to an aerial device.

b. 15 psi friction loss must be added for each master stream appliance.

E. Elevation Pressure (EP) refers to the additional pressure needed to move water vertically, as to upper floors of a multi-story building, or to an objective up a significant incline.

1. Water that must be lifted requires an additional 0.434 psi per foot lifted. This is rounded to 0.5 psi per foot for calculation purposes.

2. When water is pumped to the upper floors of a multistory building, 5 psi is added for every floor above the first floor

3. If water is being pumped to a lower elevation, 0.5 psi per foot or 5 psi per floor must be subtracted.

F. The use of Multiple Supply Lines requires a friction loss consideration which can be calculated using one of two approaches.

1. Method #1: Calculate the fiction loss for the total GPM as if it were flowing through one hoseline. Then divide that friction loss by the number of hoselines squared. Divide the FL by 4 if two lines are used, 9 if three lines are used or 16 if four lines are used.

2. Method #2: Divide the total GPM by the number of hose lines. This will tell you the GPM flowing in each hose line. Then calculate the friction loss for an individual hose line.

G. When supplying Wyed Hoselines.

1. Calculations must account for the nozzle pressure and friction loss in all hoselines past the appliance, 10 psi FL (if flowing over 350 GPM) for the hoseline appliance and the friction loss of the supply hoseline.

2. When calculating the supply, add the total handline flows together to determine the GPM flowing through the supply line.

3. When determining the PDP, add the highest pressure hoseline, appliance and the supply hoseline together.

H. Standpipe operations to prevent over-pressurizing standpipe systems and keep nozzle flows (and reaction) to safe levels while providing sufficient water for operations include the following steps.

1. Establish an adequate water supply (5” hose).

2. Connect a minimum of two 2 ½” hoselines to the Fire Department Connection (FDC), keeping the hoselines as short as possible in order to reduce friction loss.

3. Ensure firefighters have closed additional outlets on other floors, have connected lines, and are ready for water on the appropriate floor.

4. Charge system to 100 psi + 5 psi per floor above the first floor.

5. Communicate with Company Officer on the fire floor to determine pressure changes.

6. Example.

   Fire is on the fifth floor. What is the PDP?

   PDP = 100 psi + (5psi x 4)

   PDP = 100 psi + 20 psi

   PDP = 120 psi

I. Sprinkler systems are supplied according to the following parameters.

1. One of the first arriving engines should supply the sprinkler system as soon as possible. This engine will NOT supply any other attack lines.

2. The following are the steps for supplying a sprinkler system.

   a. Establish an adequate water supply (5" hose).

   b. Connect a minimum of two 2 ½" hoselines to the Fire Department Connection (FDC), keeping the hoselines as short as possible to reduce friction loss.

   c. Ensure all necessary control valves are open (OS&Y, PIV, WIV).

   d. Upon orders from the Incident Commander, charge the sprinkler system maintaining a PDP of 150 psi.

i. 150 psi gives the sprinkler system the maximum rated capacity of the engine's pump.

ii. Newly-installed sprinkler systems are tested to 200 psi, but pumping the system at this pressure or higher may cause significant damage.

V. Fireground calculations

A. These vary from the formulas and calculations presented as "Theoretical Pressure Calculations." The sense of urgency and excitement present on the emergency scene seldom allow these types of calculations in the field. The following methods are used on the fireground to quickly determine friction loss and PDP.

B. Tools.

1. Flowmeters are mechanical devices installed in a discharge line that senses the amount of water flowing and provides readout in GPM.

2. Hydraulic calculators include a manual, mechanical or electronic device used to determine the friction loss for hoselines.

3. Pump charts are laminated sheets referencing the required PDP for various pre-connected hoselines for a specific apparatus.

B. Methods.

1. 1 ¾" Hose Quick Method to determine the FL in a 100' section.

a. This method requires memorizing the friction loss in a 100' section of 1 ¾" hose flowing various GPM. All of the

numbers are rounded to simplify calculations on the fireground. See Table 10.

Table 10	
Fireground Calculation Values for 1 ¾" hose friction loss per 100'	
100 GPM	15 psi
125 GPM	25 psi
150 GPM	35 psi
175 GPM	45 psi
200 GPM	65 psi
250 GPM	100 psi

2. The 2 ½" Hand Method is a quick way to determine the friction loss in a 100' section of 2 ½" hose. This method is very accurate and can be written on the glove for reference.

   a. Starting with the numbers of the left hand, as illustrated in Figure 1.0, each finger is numbered at the base in terms of hundreds of GPM. Returning to the thumb, and again moving from the left to the right, the tip of each finger is given a successive even number, beginning with two.

   b. The friction loss for 100' of 2 ½" hose can be determined by selecting the finger to which the desired flow has been assigned, and multiplying the number at the tip of the finger by the first digit at the base of the finger.

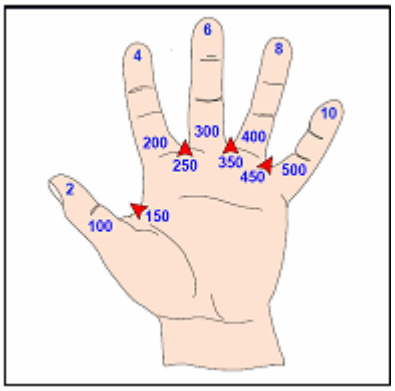
   c. Example.

      To determine the friction loss for 100' of 2 ½" hose flowing 300 GPM. Using the numbers assigned to the middle finger, use only the first digit ("3" in this case) and multiply by the number at the tip ("6"). See figure 1.

      FL = 3 x 6

      FL =18 psi per 100' section of 2 ½" flowing 300 GPM.

Figure 1.



VI. Hydrant capacity and fire flow pump capacity

A. Both are standards established by the NFPA.

B. NFPA pump requirements are shown in Table 11.

Table 11	
Pressure of	Percentage of Rated Capacity
150 psi	100%
200 psi	70%
250 psi	50%

C. Example:

A 1,250 GPM pump should be capable of flowing 1,250 GPM at 150 psi, 875 GPM at 200 psi and 625 GPM at 250 psi.

D. A fire pump must produce its capacity while drafting from a static water source.

E. If the engine company is connected to a strong hydrant, the intake pressure from that hydrant can be added to the net pump pressure.

F. Pumping more than 250 psi can be very dangerous for the pump and other components, and should be avoided at all times.

G. Hydrant Capacity is calculated by finding the difference between static pressure and residual pressures and indicates how much more water the hydrant can supply.

1. Hydrant capacity.

a. When an engine is connected to a hydrant and is not flowing water, the pressure shown on the intake gauge is the static pressure.

b. When the engine company is flowing water, the intake gauge reading is the residual pressure.

c. The difference between these two pressures is used to determine how much more water the hydrant can supply.

2. There are times when an engine company may have sufficient pressure and flow from a hydrant to supply additional water.

a. This additional water not being used by the first engine may either be used to supply additional lines, if needed, or shared (dual-pumping) with another engine company on the fireground.

b. Knowing how much water a hydrant can flow is critical when large amounts of water are needed and hydrants are not plentiful on the fire scene. Without this information time will be wasted deploying additional lines that the engine company may not be capable of supplying.

3. AFD uses two methods to determine hydrant capacity.

a. The 1st Digit Method.

i. Establish an adequate water supply (5” hose).

ii. Find the difference in psi between the static and residual pressures.

iii. Multiply the first digit of the static pressure by 1, 2, or 3 to determine how many additional lines of equal flow may be added, as explained in Table 12.

Table 12

Change in psi	Number of Additional Lines of Equal Flow which may be Added
Equal or less than the first digit of the static pressure multiplied by "1"	Three additional lines
Equal or less than the first digit of the static pressure multiplied by "2"	Two additional lines
Equal or less than the first digit of the static pressure multiplied by "3"	One additional line

iv. Example:

An engine is supplying one hoseline flowing 250 GPM.

Static pressure was 65 psi.

Residual pressure is 58 psi.

Difference in psi = static pressure - residual pressure.

Difference in psi = 65 – 58.

Difference in psi = 7.

Multiply the 1st Digit of the Static pressure x 1, 2 or 3 (whichever value is equal to or greater than the difference in psi).

6 x 1 = 6 (not greater than 7).

6 x 2 = 12 (greater than 7) indicating two more lines @ 250 GPM can be added without compromising the water supply.

b. Percentage method.

i. Establish an adequate water supply (5" hose).

ii. Find the difference in psi between the static and residual pressures (static pressure - residual static) and multiply by 100.

0 - 10% = 3 times the total GPM.

11 - 15% = 2 times the total GPM.

16 - 25% = 1 time the total GPM.

iii. Example:

An engine is supplying two hoselines flowing a total of 500 GPM. Static pressure was 60 psi. Residual pressure is 45 psi.

(60 - 45⁄60) x 100

(15⁄60) 100

(.25) 100 = 25%

An additional 1 time the total GPM can be flowed.

c. These methods may provide slightly different answers to the same problem. None of these methods provide precise answers under a full range of conditions. In each case, the answers provided by these methods provide reliable enough figures to use in fireground applications.

H. The National Fire Academy (NFA) formula for calculating Fire Flow is a quick and easy method to determine the amount of water needed to mitigate a structure fire, presuming a direct attack. The NFA fire flow formula utilizes the estimated square footage of a structure.

1. Formula.

a. NF = A/3.

b. NF = needed flow in GPM.

A = area of structure in square feet (length x width).

3 = a constant .

c. If only a portion of the structure is involved with fire divide the NF by the involved percentage of the structure.

d. Example:

A structure (60’ x 50’) is ½ involved with fire. What is the needed flow (NF)?

(60’ x 50’) = 3,000 sq. ft. structure.

3,000 sq. ft. divided by a constant (3) = 1,000.

1,000 divided by the % involved with fire (1/2).

NF = 500 GPM.

Rapid Intervention Team

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

This purpose of this guideline is to define the roles and responsibilities of Albuquerque Fire Department Rapid Intervention Team (RIT) members. The objective of a RIT is to have a fully equipped rescue team on-site, in a ready state (equipment staged), to immediately react and respond to rescue injured or trapped firefighters or civilians.

Guideline

The Albuquerque Fire Department often responds to incidents that present a high risk to firefighter safety. It is the direction of the Albuquerque Fire Department to meet the requirements for and the operation of Rapid Intervention Teams (RITs).

The appropriate practice of these guidelines increases firefighter safety at emergency incidents by providing for firefighter rescue at the outset of an incident. A RIT shall be in-place before a fire team enters an unknown atmosphere, or one that is potentially or actually immediately dangerous to life and health (IDLH). This guideline integrates with provisions that are already in effect, such as the requirement for a back-up rescue team for hazardous materials entry.

Operational Guidance

I. Command considerations

A. These guidelines will be implemented at all “working” structure fires that are beyond the incipient stage, as well as other incidents where fire department members are subject to hazards that would be immediately dangerous to life and/or health (IDLH) in the event of an equipment failure, sudden change of conditions, or other unforeseen mishap.

1. Examples of special hazards may include, but are not limited to the following examples:

a. “Working” fire operations.

b. Hazardous materials incidents - any condition that is immediately dangerous to life and health (IDLH), potentially IDLH, or is an otherwise unknown atmosphere.

c. Trench rescue.

d. Confined space rescue.

e. Any other incident having significant – actual or potential – risk.

B. An Initial Rapid Intervention Team (IRIT) is a temporary two-person RIT assigned at the outset of an incident to allow crews to enter an IDLH, potential IDLH or unknown atmosphere.

1. It is the priority of the Incident Commander is to upgrade the IRIT to full RIT as soon as is practically possible.

2. One IRIT member must be solely dedicated to tracking interior personnel. This person's function is to account for and initiate a firefighter rescue.

a. Portable radio, PPE and SCBA are mandatory.

3. The second member of the two-person IRIT is permitted to take on other roles, such as incident commander, safety officer, or equipment operator.

a. A portable radio is required.

b. PPE and SCBA should be donned as soon as possible.

II. Standard implementation initial RIT

A. An initial RIT may be used when the first-arriving company officer is directing an interior attack on a working fire (with a nozzle person), and working under a mobile command mode. In such cases, the hydrant person will assume the primary RIT position and the pump operator will assume the secondary RIT position. This will allow for an interior attack if the second-due company has a delayed response.

III. Standard exceptions to RIT requirements

A. Some exceptions may be made to RIT requirements at structure fires when specific conditions exist.

1. When there is a life hazard where immediate action could prevent the loss of a life.

2. When the fire is in an incipient stage that could be controlled with a portable fire extinguisher, and without the need for PPE.

IV. Dispatch and implementation

A. If the initially responding company declares a “working” fire in their size-up, AFD Dispatch will dispatch an additional engine company to serve as a RIT.

B. The Incident Commander will designate which engine company has RIT responsibilities based on the needs of the incident.

1. The assigned RIT unit will acknowledge their arrival via radio, such as “RIT (Unit ID) on scene”.

2, The RIT should stage on-scene in a location to maximize their options and await instruction from the Incident Commander.

3. During major operations, RITs will normally be assigned near the Command Post. A minimum of one four-person company will be required.

C. The Incident Commander may assign more than one company if deemed necessary. Operations of a large or more complex nature may call for multiple RITs to standby at different entry points.

D. After the dispatch of a RIT company, the Incident Commander has specific options available.

1. Assign the company to RIT duties at the scene and be designated “firefighter rescue group.”

2. Cancel the in-coming company after the fire has been declared “under control,” and Personnel Accountability Reports (PAR) have been obtained from all crews.

3. Assign the in-company company to other duties, such as relief for working crews.

4. If the in-coming company is assigned to anything other than RIT duties, an additional company must be requested by the Incident Commander, or assembled from available resources, to serve as a RIT unit.

V. Deployment

A. All RIT members will assume a ready state, including the use of full protective clothing and SCBA.

1. For incidents other than structural fires, the protective clothing and equipment will be appropriate for the hazards.

2. The RIT company officer will closely monitor both the dispatch and assigned tactical radio channels at all times.

B. Upon arrival at the incident, the RIT officer will report to the Command Post for a face-to-face briefing with the Incident Commander.

1. The RIT officer must size-up the incident and maintain an accurate tactical worksheet of the position of all working companies.

2. Appropriate rescue tools, including SCBA, will be staged at the RIT location -- based on the RIT officer's size-up of the incident.

C. In some cases, the RIT may need to conduct a reconnaissance to maintain awareness of working companies.

1. The team must be able to react immediately to sudden emergency events at the incident site. In all cases, the RIT must have the ability to rapidly deploy.

2. In some situations, protective hoselines and ground ladders may need to be pre-deployed.

D. In the event of a lost or trapped firefighter (or other emergency), AFD Dispatch will immediately be advised with a “May Day” declaration. AFD Dispatch will repeat the “May Day” over the air, dispatch an additional full alarm, and advise all responding units of the situation. Whenever a RIT is deployed it should be replaced as soon as possible to back up the crews involved in the rescue operation.

E. If RIT crew units are needed to respond to a sudden emergency in which the division/group officer is incapacitated, the RIT team officer will assume division/group responsibilities for the area in which the emergency exists.

1. Additional resources will be requested and sent to the rescue area as the emergency dictates.

2. An additional alarm may be requested if the need dictates.

F. If a previously assigned company is not needed as a RIT, the Incident Commander may assign this company as a relief unit, but not until it is certain that all crews are out of danger and a full PAR has been obtained.

VI. High-rise fires

A. For high-rise fires, RITs will be assigned to standby positions in the “resource division” location, or other appropriate locations. A secondary standby location may be in the “lobby division” location.

VII. RIT commitment to the rescue of a lost or trapped firefighter

A. Upon a report of a lost or trapped firefighter, the Incident Commander should deploy the RIT(s) to the last reported location of the lost/trapped firefighter(s).

B. The RIT should take an additional SCBA (from either a ladder truck or squad unit) for each firefighter reported to be lost/trapped.

C. The RIT company officer may be assigned a “firefighter rescue group” designation.

1. Appropriate rescue equipment and crews must be quickly assembled and organized.

2. The RIT Officer should utilize the RIT checklist to help organize and focus the team.

VIII. RIT checklist

A. Size-up

1. Building Dimensions (length X width X height).

2. Building occupancy.

3. Building construction type.

   a. Wood frame.

   b. Heavy timber.

   c. Ordinary construction.

   d. Noncombustible.

   e. Fire resistive.

   f. Placement of windows, doors, fire escapes, porches, etc.

   g. Potential danger of high security doors barred windows building modifications.

B. Tactics

1. Offensive, defensive, offensive-to-defensive.

2. Command operations.

   a. Check tactical worksheet and/or Command board.

   b. Check accountability (PAR).

   c. Communications/Incident Command.

d. Ladders and ladder company operations.

e. Fireground time versus progress.

C. Other operations

1. Contact Rehab Officer / assess condition of firefighters.

2. Contact Safety Officer and share information.

3. Relocate or add another RIT.

4. Assess the potential for collapse and identify a collapse area.

5. Plan for EMS for the RIT.

D. Equipment should be staged based on construction types.

1. Suggested equipment for wood frame/heavy timber/ordinary construction.

a. Pickhead axes and pike poles.

b. Circular saws fitted with blades for cutting wood.

c. Chain saws.

2. Suggested equipment for noncombustible/fire resistive construction.

a. Halligan bars.

b. Sledgehammers.

c. Circular saws fitted with blades for cutting metal.

d. Torch(es).

3. Suggested equipment for all events.

a. Search ropes.

b. Extra SCBA.

c. Charged hoseline.

d. Ground ladder(s).

Lost or Trapped Firefighter

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

The nature of firefighting places the firefighter at risk of becoming lost or trapped. The toxic environment of a fire provides only a narrow window of survivability for a lost or trapped firefighter. Survival depends on a mix of predictable self-survival actions by the lost firefighter and a sequence of actions directed by the Incident Commander. This guideline identifies individual, company and Command level activities for the search and rescue of a lost or trapped firefighters.

Guideline

The rescue of trapped or lost firefighters in a burning building is especially time sensitive. There is a very narrow “window of survivability” for a firefighter who is out of SCBA-supplied air, or is trapped by approaching fire. The following are basic guidelines for firefighters to follow if they become lost or trapped in a fire to increase their chances of survival.

Operational Guidance

Rescue needs generally fall into two categories. Either the firefighter (or firefighters) is trapped by a collapse or lost in a smoke filled and burning building. The most significant problem and difference between the two categories is that the search area can be substantially larger for a lost firefighter than that encountered in a collapse situation.

On the other hand, a collapse presents a major extrication situation. In some cases, lost or trapped firefighters may be able to radio to Command that they are lost and in need of rescue, prior to being incapacitated when the SCBA goes empty. Other problems may include: a possible secondary collapse, separated and scattered crews and confusion of the last known location of the crew (or member).

I. Command considerations

A. “May-Day” will be used by lost or trapped firefighters to report their status as being in trouble and needing rescue. Any member may use “May-Day” to report a lost firefighter.

1. Any report of “May-Day” will receive priority radio traffic. The term “May-Day” will be reserved *only* to report lost or trapped firefighters.

2. The term “Emergency Traffic” will be used to report other emergencies.

B. The Incident Commander must always assume that the missing firefighter is lost or trapped in the building until the firefighter is accounted for. Rapid, concise decisions and actions must be taken to increase survivability. The following is a list of actions to be taken by Command for a reported missing or trapped firefighter. These are guidelines and do not necessarily need to be accomplished in the order listed. The first five (5) must be accomplished very rapidly.

1. Immediately upon a report of a missing or trapped firefighter “Emergency Traffic” will be sounded to alert all personnel working on the fireground of the situation.

2. The incident Commander must restructure the plan to include a high priority firefighter rescue effort. A rapid, well thought out, rescue plan must be developed and the command organization expanded. The plan and objectives must be communicated to other Command staff and Sector Officers for implementation.

3. At least one additional alarm should be immediately requested including a medical component. Additional multiple alarms may be requested based on circumstances and potential. Level two staging should be implemented. Early consideration should be given to heavy equipment resources and Heavy Technical Rescue (HTR) assistance in structural collapses.

4. A Personnel Accountability Report (PAR) must be immediately requested from all companies operating on the fireground. This is especially important in situations of structural collapse. Command cannot develop an effective rescue plan until accurate information is available on the number of missing firefighters, their identify, their last reported work area, and which companies are affected.

5. Command should immediately send the rapid intervention team (RIT) to the most appropriate location to initiate search and rescue efforts (typically the last reported work area). The RIT will be designated as “Rescue Sector” and coordinate activities at that

location. Any additional available resources in staging may also be committed to rescue efforts.

6. Command will immediately send the rapid intervention team(s) (RIT) to the most appropriate location to initiate search and rescue efforts (typically the last reported work area).

   a. The RIT will be designated as “Rescue Sector” and coordinate activities at that location. Additional available resources in staging may also be committed to rescue efforts.

7. In some situations, such as collapse, crew members can get separated. The only practical method to obtain an accurate roll call for a PAR may be to withdraw crews to the exterior. Withdrawal is a judgment call based on circumstances at the time, information available, and resources. It may not be practical or possible to do. However, the absolute need for an accurate roll call (PAR) and information on missing firefighters remains a critical priority.

8. Abandoning firefighting positions during the rescue effort should be avoided. Command and crews should take aggressive measures to protect trapped or missing firefighters from the effects of the fire. Efforts should be concentrated on reinforcing existing positions and keeping the fire out of the rescue area and providing appropriate ventilation and lighting. In some situations it may be appropriate to write off some areas of the building in order to relocate companies and crews to better protect the rescue effort.

9. A Command Officer should be assigned to direct the Rescue Sector and rescue operations. Depending on the size of the rescue area and the complexity of operations, more than one Command Officer may be needed to fill additional support positions or sectors. The Sector Officer will assign specific areas or grids of the building to each rescue team (company) to conduct searches before entering the building. Search efforts must be closely coordinated between Sectors and Command must be kept informed.

10. Rescue operations are high risk, and the operation may be taking place in a postcollapse environment or one in which a flashover

may have occurred. A Safety Sector in the affected area will help control the risk taking.

a. A Safety Sector must be implemented, with a Command Officer assuming this Sector as soon as possible.

b. Other Safety Sector responsibilities will be to conduct an assessment of the hazards, thus, allowing time for the Rescue Sector Officer to concentrate on the critical rescue effort.

11. With additional resources en-route, along with the critical rescue needs, the Command organization must expand ahead of the demand. The incident may eventually escalate to a Branch level operation. The Incident Commander must be proactive and aggressive in developing and expanding the Command organization.

12. Additional Chief/Command Officers will be needed to fill key Sectors and Command team positions. Command should special call additional Command Officers, and initiate a call back of off-duty Command Officers, as needed.

13. The Incident Commander must have treatment personnel in a position to immediately treat any rescued firefighters. A Transportation Sector must also be in place and coordinating activities with the Treatment Sector Officer.

14. All doors in the immediate area should be unlocked or forced open, and at least the immediate interior area quickly searched. In most cases the doors should be left open to provide an emergency escape route, unless doing so will have negative effects on the fire fight. In all cases, the doors must remain unlocked.

15. Reducing smoke conditions, through effective ventilation, improves the air quality for any victims, and will enhance search and rescue capabilities through increased visibility of the interior. Both vertical and positive pressure ventilation should be aggressively employed. Early fighting of the operation (both interior and exterior) needs to be included.

16. The Incident Commander must insure that a complete, coordinated and controlled search is conducted. Close coordination of all search efforts is a must in order to eliminate duplicate searches that waste time. All areas must be thoroughly searched.

17. Each rescue (RIT) team should enter the building with an additional SCBA for each reported lost/trapped firefighter. Missing firefighters may have exhausted their SCBA air supply or may be trapped and cannot be quickly extricated. In each case, the firefighter must be provided “clean” air to increase survivability.

18. Heavy Technical Rescue Teams (HTR) and other specialized equipment should be requested at all structural collapses that have trapped firefighters.

    a. Due to the high risk nature of rescue operations, Command must establish another RIT to protect rescue crews. The RIT should stand-by at a location near the rescue operation. More than one RIT may be needed.

19. All personnel must watch the structural stability of the building throughout the rescue effort. Where a structural collapse has occurred, or the fire (or other event) has compromised the structural integrity of the building, a structural engineer affiliated with the New Mexico, Urban Search and Rescue Taskforce-1 should be called in to evaluate the structure. Heavy Technical Rescue taskforce (HTR) personnel may be called upon to assist with shoring the rescue area, or for the use of other specialized equipment.

20. Strong supervision and control will be required by all officers. Emotions will be very high. Firefighters in this situation will tend to want to free lance or take higher risk.

    a. Treatment personnel will need to be restricted to only those needed. Crowd control of our own non-essential personnel may be required.

b. Command will need to direct the control of news media early-on, and throughout the incident. Information on the identities and conditions of lost firefighters must be restricted until after next of kin are notified. Media film crews should be restricted to areas that are safe and at a distance that will prevent visual/facial identification of any victims.

21. A Welfare Sector or Branch will need to be established early. This will aid in notification of next of kin and allow Command to stay ahead of the media identification. Chief officers should be assigned to direct this Sector/Branch. Additional Chief or Staff Officers will be needed to fill subordinate positions within the Sector or Branch.

22. Command must ensure that Dispatch monitors all radio channels. Should a lost firefighter declare emergency on a channel other than the fireground tactical channel, Command must be immediately directed to the lost firefighters channel for direct communications.

II. General search considerations

A. When searching for a lost firefighter, rescue crews should keep in mind the following considerations.

1. Visible sighting of trapped firefighters such as arms or legs.

2. Knowledge of their last known location.

3. The sound of the PASS device's audible tones.

4. Shouts for help from the collapsed area.

5. The sound of tapping or other noises.

6. Sounds of portable radio broadcast in the collapse area.

7. Breathing or moaning sounds.

8. The sound of SCBA audible alarms sounding.

9. Radio requests for help from portable radios from within the collapse area.

10. Tracing attack hoselines into the collapse area.

11. Tracing of life lines into the area.

12. Evidence of building structures or locations that were described by lost firefighters.

13. Flashlight beams.

14. Location of ladders, fans, lights, or other equipment being used by missing firefighters.

B. The following actions should be performed during any search for lost or trapped firefighters.

1. Open or unlock all doors.

2. Search the immediate area of doorways first.

3. Search hallways before interior rooms.

4. Search exterior walls (interior sides) before searching interior spaces.

5. Search large interior spaces in a detailed grid pattern.

6. Ensure that all areas are searched.

7. Take one SCBA for each lost firefighter in the search area.

8. Use life lines when searching “off hoseline” to ensure the safety of rescuers.

III. Fireground considerations

A. All crews on the fireground must have a portable radio.

B. Minimum crew size is two and crews must remain together.

C. Crews must have an assignment and must be working under the direct supervision of a Company Officer, Division or Group Officer or Command.

D, Individual firefighters must not delay reporting to Command if they become lost, trapped or in need of assistance.

E. Company officers must also not delay the reporting of lost firefighters or inability to complete accountability reports.

F. Command and Division or Group Officers must always assume that the missing firefighter is lost in the building until the lost firefighter can be accounted for and must immediately restructure the fireground action plan to include a priority rescue effort.

G. A May Day radio transmission will be used by a lost or trapped firefighter to report their status as being in trouble and needing rescue. Any member may use May Day to report a lost firefighter. Any report of May Day will receive priority radio traffic.

H. The term “May Day” will be reserved only to report lost or trapped firefighters. The term “Emergency Traffic” will be used to report other emergencies.

IV. Basic self-survival responsibilities for lost or trapped firefighters.

A. Firefighters who find themselves lost or trapped must immediately use “May Day” to announce their situation while they continue to attempt to find their way out.

1. Firefighters should not delay notification of distress. Notifications should occur as soon as the firefighter recognizes they are in trouble. Delay significantly compromises the window of survivability.

2. Lost firefighters should give Command the following information:

a. Who they are.

b. How many firefighters are with them.

c. What sector they were operating in/what their assignment is.

d. Where they think they are as accurately as possible.

e. Description of building structures surrounding them.

f. Sounds of nearby activities (e.g., ventilation saw noise).

g. Any other information that might direct rescue crews (RIT) to their location.

B. If a lost firefighter cannot contact Command, Dispatch, or other units on the tactical channel assigned to the incident, the firefighter should switch channels and declare a May Day until the transmission is acknowledged. Dispatch Channel 1 is preferred.

C. A lost firefighter must manually activate their Personal Alert Safety System (PASS) device to sound the audible tone as soon as they recognize they are lost or trapped.

1. The device must remain on until rescued.

2. Only if the device interferes with the lost firefighters communicating critical radio messages to Incident Commander or rescuers may the device may be turned off temporarily. Once messages are completed, the device must again be manually activated.

D. Firefighters lost together are to stay together.

1. Crew members who become lost together and then separate from each other make it difficult for rescuers to find all firefighters.

2. Crewmembers who become lost and stay intact as a crew enhance their chances for all being rescued and allow easier, more efficient rescues.

E. Lost firefighters must stay in contact with the hoseline and make every effort to follow the hoseline (or lifeline, if being used) out of the building.

1. The female side of the couplings always leads toward the nozzle and the fire.

2. The male side of the couplings always leads toward the pump and outside.

3. The hoseline should always be treated as a safety line to the outside.

4. Where lifeline ropes are in use, follow the lifeline to the exterior.

F. A lost firefighter should always attempt to get out of the building by whatever means possible.

1. Primary means of egress include doors or windows.

2. If doors or windows are not available, a lost firefighter should next attempt to reach an exterior wall.

a. The lost firefighter will then be able to search for doorways, windows, and hallways, which generally lead to the outside.

b. Lost firefighters situated near walls increase their chances of being located by rescue crews as rescue crews will first search hallways, around walls and around windows and doors before sweeping large interior areas.

c. A lost firefighter nearing collapse should make every effort to move from the middle of middle of open spaces nearer to exterior walls to improve their chances for rescue and survival.

G. Failing to find a way out of the fire building, the lost or trapped firefighter should retreat to a point of safe refuge.

1. Safe refuge may be a protective room or floor away from the fire.

2. Walls and hallways are the safest areas in the event of structural collapse.

3. The lost/trapped firefighter must use any means available to advise Command and the rescuers of their location, including:

a. Pointing a flashlight toward the ceiling so that rescuers have another visual cue as to the location of the downed firefighter.

b. Making tapping noises (e.g., hitting a tool against a metal roll-up door) so that rescuers have another audible cue as to their location.

4. The firefighter should assume a horizontal position on the floor.

a. Horizontal position maximizes the audible affects of the PASS device.

b. The firefighter should attempt to take this position at an exterior wall, doorway or hallway that maximizes quick discovery by rescue crews who will initially search along walls before searching open expanses.

H. A conscious effort must be made by the lost firefighter to stay calm and conserve breathing air.

1. Unnecessary talking or physical activity must be ceased.

2. Firefighters must control and pace their physical activities and breathing in order to extend their SCBA air supply.

3. “No air” maneuver to undertake if SCBA air supply is depleted.

a. Position facepiece close to the floor and remove the regulator (do not remove the facepiece).

b. Place the facepiece opening down on the floor.

c. Cover the facepiece opening with hood or gloved hand (crude filter).

d. Make efforts to leave the hazard and get to an area of safe haven.

V. Lost crew

A. Company Officers or Division or Group Officers who are unable to locate a crew or firefighters assigned to them must immediately notify Command and use “May Day” to notify all personnel operating on the fireground.

B. When possible the officer should report:

1. Who is/what crew is missing.

2. How many firefighters are missing.

3. Last known location.

4. Last assignment.

5. Any other information to help direct rescue crews to their location.

6. Any actions being taken to locate the lost firefighters.

VI. Command and control considerations

A. Firefighting positions must not be abandoned during the rescue effort

1. Company and Division/Group Officers must control freelancing.

2. Command will initiate a rescue effort.

B. It is critical that all crews on the fireground continue to work together in a coordinated effort under designated Incident Action Plan after a May Day transmission. This will ensure the continued safety of all personnel and will give the lost/trapped firefighter(s) the best chance of survival.

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Attack Teams

Scope/Purpose

In many tactical situations it is desirable to band companies together in Sectors to achieve more effective results. This consolidates the efforts of the companies toward tactical goals and makes command more manageable.

The Attack Team is an extension of this concept, in which companies are assigned on the fireground in groups to work toward a specific goal and/or in a specific area. An Attack Team is an effective size operational group for many fireground tasks and provides a sound basis for the creation of Sectors which may be built upon as the incident progresses.

A standard Attack Team consists of two engine companies plus a ladder company. The basic grouping of two engine companies and one ladder provides for adequate water supply and support capability to perform strong tactical operations. In most cases these "Teams" will be created on the scene from individual companies assigned by Command. The companies may be assigned at one time to assemble an Attack Team starting with a single company and adding resources as they become available. In other situations Command may be able to assign a full Attack Team directly from Staging. The Attack Team will either report to an existing Sector Officer or will become the nucleus of an additional Sector.

In the early deployment of companies at an incident, Command should try to identify tactical requirements in terms of Attack Teams and Sectors. An Attack Team assigned to establish a Sector should be able to perform as an effective unit as well as setting up a Sector command structure. One of the Company Officers will assume the role of Sector Officer unless or until a designated Sector Officer is assigned by Command. Sector Officers should try to structure requests for additional resources in terms of Attack Teams whenever possible. Where this type of assignment is feasible, it leads to more effective teamwork. This does not mean that the officer may not request single companies or special units when the need is indicated.

A common deployment for an Attack Team involves a "forward" pumper supplied by one or two lines from a "key" pumper on a hydrant. With this configuration the Company Officer of the "forward" engine company normally becomes the Attack Team leader and initial Sector Officer.

This group could be assigned to take one side of an involved building and would be capable of significant action in either an offensive or defensive mode. Command would have the option of assigning a Sector Officer to supervise the tactical activity.

ALBUQUERQUE FIRE DEPARTMENT
STANDARD OPERATING GUIDELINES
Attack Teams

The deployment of first response units may be such that there are insufficient resources to place a full attack team at each strategic position. Command may elect to assign a single unit to a position and assign subsequent arriving units to fill out the team as they arrive. In this case the first engine would usually lay a supply line to the forward position and begin operations. The later arriving engine would pump the line or reverse a secured supply line to the hydrant and pump both lines. Personnel from this engine and the ladder company join the first crew at the attack location.

The decision could also be made by Command to utilize a full Attack Team in the most critical strategic position and leave less urgent positions for later arriving units. This is a strategic decision which must be made by Command

Emergency Communications

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

This purpose of this guideline is to establish the Albuquerque Fire Department's guidelines for emergency communications.

Guideline

It is the mission of the Albuquerque Fire Department to respond to any report of an emergency that threatens the life, safety, or property of anyone within the AFD jurisdiction. It is the responsibility of the first-arriving units to provide timely and adequate information to both AFD Dispatch and to additionally responding units.

Timely response and effective communications represent immediate priorities in the successful mitigation of an emergency event.

Operational Guidance

I. On-scene reports

A. Units arriving at the scene of incidents must report that they are "On Scene" by MDT, or by radio if an MDT is not available.

1. No voice message is necessary when only one unit is responding, unless conditions at the scene are obviously different from the reported nature of the incident.

2. When more than one unit is responding, the first arriving unit shall report that they are "On scene," and additionally report their respective unit identification, on the assigned frequency, in addition to the MDT message.

II. Size-up report

A. The first-arriving unit at the scene of a First Alarm incident will give a brief size up report describing the situation.

B. For structure fires, the report should include all relevant information.

1. Apparent conditions.

a. Nothing showing (indicates that the situation is being investigated).

b. Smoke showing (should be reported when smoke is visible).

i. The report should describe the amount, color, and location of the smoke.

c. Fire showing (as appropriate, should describe the amount and location of the fire).

d. Working fire.

e. Fully involved.

2. Structure type.

a. Construction type (wood frame, ordinary, or heavy masonry).

b. Occupancy (residential or commercial).

c. Size (large, medium, small).

d. Height (assumed one story unless reported otherwise).

3. Action(s) taken.

a. Assuming command.

b. Laying supply line

i. Catch a hydrant with a 5 inch or 2 ½ inch.

c. Attacking with (hoseline size, or quick attack).

4. Attack Strategy

a. Offensive.

b. Defensive.

5. Accountability location.

   a. Identify using recognizable place or street names.

   b. Compass points (North, South, East, or West).

C. A size-up report is also required for brush fires or for any other significant incidents.

III. Command considerations

A. Establishment of Command limits minimizes communications on the radio.

B. Once command has been established, all communication between AFD Dispatch and the incident will be directed through the Incident Commander.

IV. Progress reports

A. During active firefighting operations, Command will provide AFD Dispatch with regular progress reports when significant tactical plans are changed or unusual situations are encountered.

B. Progress reports should be given in a timely and informative manner:

1. The first progress report should be given after initial action has been implemented, and should include the correct address and improved description of the building and fire condition if the arrival report was incomplete.

2. The first report should include the declaration of a working fire when appropriate and give an indication of the time companies will be held at the scene.

   a. This will assist AFD Dispatch in making relocation assignment decisions.

   b. AFD Dispatch will repeat the significant facts from all progress reports for the information of monitoring units.

V. Working Fire

A. The term “Working Fire” indicates a situation that will require the commitment of all responding companies.

1. This report advises AFD Dispatch that the companies will be engaged in tactical activities and will be held at the scene for an extended period of time.

B. When notified of a Working First Alarm or greater, AFD Dispatch will assume specific responsibilities.

1. Assign a Tactical Channel if requested by Command.

2. Dispatch APD for traffic and crowd control.

3. Dispatch gas and electric utilities when the need is indicated.

4. Be prepared to dispatch additional units for assistance.

5. Be prepared to dispatch any special agencies or equipment when the need is indicated.

6. Evaluate the need for relocation assignments.

7. Monitor radio traffic on all incidents to assist command as needed.

VI. Staging considerations

A. Units arriving in Level I Staging will report their unit identification and travel direction on the assigned Tactical Channel.

1. If assigned to a division or group on the fireground, the “On scene” key shall be depressed.

B. If Level II Staging is requested by Command, AFD Dispatch will announce the staging location, and dispatch all further assistance to that location.

1. Units arriving at the Level II staging area will report in person to the Staging Officer.

2. The Staging Officer will manage all radio communications to and from the staging area.

VII. All Clear, Under Control, and Loss Stopped

A. AFD Dispatch will acknowledge "All Clear," "Under Control" and "Loss Stopped" reports from Command only.

1. The times received will be announced by Dispatch as the reports are given.

B. To avoid confusion between ordering primary search and reporting "All Clear," the following standard terminology will be used:

1. "Primary Search" is the term that refers to the function of performing a primary search and rescue.

2. "All Clear" is a completion report for a primary search.

a. Example: "Ladder 1 perform a primary search," is the order.

b. Example: "Ladder 1 has an All Clear," is the report indicating that a primary search has been completed.

3. "Under Control" is the term that means the forward progress of the fire has been stopped.

4. "Loss Stopped" is the term that means salvage and overhaul work is complete.

VIII. Accountability considerations

A. A Personnel Accountability Report (PAR) iinvolves a roll call of all personnel assigned to the event.

1. For the company officer, a "PAR" is a confirmation that members assigned to his/her crew are visually accounted for and indicates the crews current location.

a. Example: Command to Ladder one, are you PAR?"

b. Example: “Ladder one to Command, Ladder one is on the roof and PAR”

IX. Returning companies

A. Only Command can release companies from an incident.

1. Command will identify which units to “Hold” at the scene, and which units are being “cleared” from the incident.

2. AFD Dispatch will re-transmit this report from Command.

a. The balance of the assignment will automatically return to service, changing their status to “Available on Radio” and acknowledging their status to dispatch via the radio (AOR).

b. Committed companies returning back to service will change status to AOR when ready.

X. Division and groups

A. Division or Group officers should use a face-to-face mode of communication with assigned companies, as much as possible or practical.

B. Division or Group officers will keep Command informed of progress, by radio, regarding all significant progress or any problems that may be encountered.

XI. Support staff

A. Support staff members with fireground responsibilities will respond to greater alarms for assistance.

B. Support staff members may carry out various Division or Group functions.

1. Support staff members will report in person to the Command Post for assignment.

2. Communications from Support staff personnel should be with Command as much as possible; however, there will be situations that require direct communications with Division or Group Officers.

   a. Support staff communications should be face-to-face whenever possible or practical.

XII. Communications order model

A. Radio communications will be regulated at all times.

B. Radio communications will be regulated by the following Order Model guidelines:

1. The sender will identify themselves using their unit ID and call the receiver using the receiver's unit ID.

2. The receiver will give their ID to indicate they are ready to receive.

3. The sender will then extend their message, order, or report.

4. The receiver will respond with their ID, and acknowledge receipt of the transmitted message with a brief restatement.

5. AFD Dispatch will acknowledge all communications directed to them by a brief restatement of the message, with particular attention given to repeating on the scene, size-up and progress reports, recall reports, requests for additional resource and "All Clear," "Under Control," "Loss Stopped" and "PARs."

XIII. Emergency Traffic

A. The term "Emergency Traffic" will be used by any unit encountering an immediately perilous situation.

1. It will receive the highest communications priority from AFD Dispatch, Command, and all operating units.

B. Units may initiate emergency communications by verbally contacting the Incident Commander.

1. Example: “Ladder 1 to Command with emergency traffic.” The unit will transmit their message.

2. Command will then repeat the message one time.

3. If Command does not acknowledge the transmission, the reporting unit will then establish contact with AFD dispatch and transmit the emergency message.

   a. AFD Dispatch will then reinitiate the emergency traffic sequence with the Incident Commander.

C. The radio airwaves belong solely to the unit transmitting the “Emergency Traffic” report.

XIV. May Day messages

A. The radio message “May Day” will be used by firefighters to report their status as being in trouble and needing rescue.

B. Any member may use “May Day” to report a lost firefighter.

C. Any report of “May Day” will receive priority radio traffic.

D. The term “May Day” will be reserved only to report missing or trapped firefighters.

1. The term “Emergency Traffic” will be used to report all other emergencies.

XV. Clear text communications

A. “Clear Text” radio messages should be used in preference to numerical codes to clarify understanding

B. There is no official Albuquerque Fire Department radio code. The following coded messages (from the old AFD 10 Code) may be used in sensitive situations, if the transmission of a plain language message could cause a problem at the scene:

1. Rape: 10-43-2.

2. Dead body: 10-58.

3. Need Police Assistance Urgently: 10-83.

4. Bomb threat: 10-99.

C. Units should advise AFD Dispatch regarding the nature of their requests.

1. AFD Dispatch personnel should be aware of possible sensitive situations and word messages to field units accordingly.

XVI. Effective radio communications

A. Effective radio communications requires that users maintain radio discipline.

B. All emergency communications should follow strict guidelines.

1. Messages should be short and specific.

a. Before transmitting, you should know what you are going to say.

b. Do not make it up as you go along.

c. Choose precise terms to communicate the desired message as clearly and briefly as possible without wasting air time.

2. Messages should be task-oriented and/or company-oriented.

a. Orders received by companies should indicate a specific task that is assigned to the company.

b. It should be of a magnitude that can be reasonably performed by a single company, alone, or in concert with other companies.

3. Messages should indicate objectives.

a. In addition to being task and company oriented, assignments should indicate a clear objective to the action.

b. The assigned company should know exactly where to go, to whom they will report, what the task is, and what is the objective of the task.

c. Orders should tell what to do and not how to do it.

4. Messages should be given in a clear tone, with verbal self-control, and at an effective speaking rate.

a. Speak clearly at a practiced rate: not too fast and not too slow.

b. Deliberately control your emotions and excitement.

c. If you do not consciously control your voice, it will become garbled under stress.

5. Messages should be well-timed and effectively spaced.

a. Prioritize your messages.

b. Do not use up valuable air time with unimportant messages and insignificant details.

c. Let critical messages go first. Maintain an awareness of the overall situation and how you fit into it.

6. Do not interrupt conversations unless you have “Emergency Traffic.” Listen before transmitting and wait until a message transaction has been completed.

7. Pause between consecutive messages.

a. This will make it clear when one message has been completed and another started. It will give other units a chance to get on the air with important messages.

C. Examples of appropriate radio reports.

1. For an offensive structure fire:

a. “Engine 11 is on the scene of a large two-story school with a working fire on the second floor.

b. Engine-11 is laying a 5-inch supply line and going in with a 2½ handline to the second floor for search and rescue.

c. This is an offensive fire attack. Engine-11 will be 7th Street Command and accountability.”

2. For a defensive structure fire:

a. “Engine 1 is on the scene of a medium-size warehouse fully involved with exposures to the east.

b. Engine 1 is laying a 5 inch supply line and attacking the fire with a master stream and a 2½ inch handline to the exposure for search and rescue and fire attack.

c. This is a defensive fire. Engine 1 will be Lead Avenue Command and Accountability.”

3. For an EMS incident:

a. “Ladder 3 is on the scene of a multi-vehicle accident.

b. Dispatch two rescue units and two ambulances, Code Three.

c. Ladder 3 will be Hermosa Command.”

4. For a single company incident:

a. “Engine 6 is on the scene of a dumpster fire with no exposures.

b. Engine 6 can handle.”

May Day Communications

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

The purpose of this guideline is to identify communication priorities in the event that a firefighter is reported as lost or trapped. A well-defined communications structure is essential for any rescue operation, and AFD Dispatch plays an integral role in ensuring the effective rescue of firefighters.

Guideline

It is incumbent on Command to maintain an awareness of all fire personnel operating on the fireground. This should be accomplished primarily through the use of assignments and an appropriate accountability system. If a firefighter cannot be located through a PAR, or is otherwise considered missing, any AFD member should announce a “May Day.”

Operational Guidance

I. “May Day” radio transmission

A. The radio message “May Day” will be used by firefighters to report their status as being in trouble and needing rescue.

B. Any member may use “May Day” to report a lost firefighter.

C. Any report of May Day” will receive priority radio traffic.

D. The term “May Day” will be reserved only to report missing or trapped firefighters.

E. The term “Emergency Traffic” will be used to report all other emergencies.

II. AFD Dispatch responsibilities

A. Upon receiving a “May Day” transmission, AFD Dispatch will immediately take specific actions.

1. Upgrade the event to a Second Alarm or to the next level of alarm.

2. Notify the executive command staff of the May Day transmission.

B. AFD Dispatch will announce “Emergency Traffic” on all tactical channels

being used on the fireground.

C. AFD Dispatch will announce that a “May Day” has been transmitted for missing or trapped firefighter(s) - on all tactical channels being used on the fireground.

D. The Alarm Room Supervisor will immediately dedicate as many dispatchers to the incident as is possible.

E. AFD Dispatch will immediately advise Command to assign accountability for monitoring all fireground frequencies, in the event the missing firefighter broadcasts on an alternate channel.

F. All non-emergency activity in AFD Dispatch will be suspended and additional personnel will be requested to report on an overtime basis.

G. AFD Dispatch will closely monitor all radio channels for any transmission from the missing firefighter(s).

H. If the missing firefighter transmits on a channel other than one of the tactical channels, AFD Dispatch will maintain communications with the firefighter on that channel to ensure that once communications have been established that they are not lost.

1. The information will be relayed between the lost/trapped firefighter and Command.

I. Once the firefighter has been rescued, or at the conclusion of the incident, all personnel and outside agencies will be notified that AFD Dispatch is resuming normal operating conditions.

Deck Gun and Portable Monitor Operation

Purpose

This policy will provide a consistent operational procedure for the deployment and operation of deck guns and portable monitors in the Albuquerque Fire Department.

Scope

In order to use this equipment safely and to its full potential, all personnel must have a thorough knowledge of the capabilities and operational procedures.

Monitor

The Albuquerque Fire Department uses the ***"Akron Apollo Monitor"*** which can be attached to the top side of an Engine apparatus, in the direct mount flange, and used as a deck gun, or used along with an ***"Akron"*** portable base as a portable monitor. The monitor does not have a shut-off valve; all water flow must be controlled by the pump supplying it.

All monitors will be equipped with a set of solid stream stacked tips of the following sizes: 13/8", 1 ½", 1 ¾" and 2". The apparatus may also have a Vindicator Master Attack nozzle or fog nozzle as a spare.

The monitor and all of its mounting equipment have a maximum pressure of 200psi.

To remove the monitor from either the direct connect flange base or portable base, hold the monitor securely by the carrying handle and pull each lock pin straight out. (See Figure 1)

To install the monitor onto either the direct connect flange base or the portable base place the monitor onto the appropriate base so that the holes in the ears are aligned. Then take one lock pin at a time and insert it through the holes in' the ears.

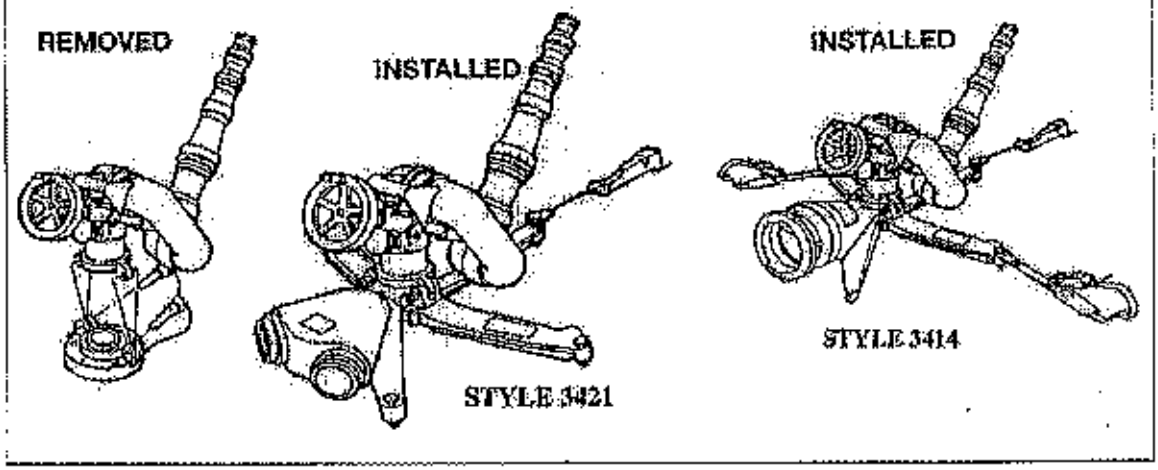
CAUTION! While operating in the direct mount flange or portable base, the two connecting pins must be fully engaged at all times.

Deck Gun
When operating on top of an Engine apparatus in the direct mount flange the monitor has the following capabilities:

- Operates at maximum flow (up to 1,250 GPM)
- Pull the safety pin, allows operation below a 35 degree angle
- One firefighter operation

When the unit is stored in direct mount flange, it is recommended that the nozzle or tips be lowered against a rigid support or removed during transportation.

Figure 1



Portable Monitor Base
There are two different styles of portable base in which to mount a monitor. One base has two-2 ½" inlets (Style 3421) and the other has a single 5" storz inlet (Style 3414).

CAUTION! When changing from the direct connect flange base to the portable flange base, be sure the outlet elbow is above the 35 degree angle vertical safety stop. Ensure all folding legs are fully deployed before use. This is essential for the proper stability of the portable base.

An adjustable safety chain with a hook is provided in the front of the portable base as an additional safety precaution. Connect the hook to a rigid stationary object such as a parking meter, manhole, car wheel, etc., in front of the unit, and pull the chain tight. To release the hook and/or lengthen the chain, hold the spring loaded latch open and pull the chain through the eye of the hook.

CAUTION! DO NOT OPERATE THE UNIT IN THE PORTABLE BASE WITHOUT SAFETY CHAIN SECURED!

When the monitor is used with the portable base on concrete, each spike must be "set" with the head of the safety hook, a 16 oz. hammer or equivalent. After the Apollo is hooked up and ready to flow, set the spikes in rotation by striking the hex head bolt, over each ground spike, with a sharp blow from a hammer or another tool sufficient to drive the spike at least 1/8" into the concrete. This process must be repeated each time the unit is repositioned on a concrete surface. As with any portable monitor, the Apollo should always be secured with the safety chain or ropes before using on any surface.

The portable base is designed to grip by imbedding the ground spikes into the surface on which it is operating. These spikes will not grip on metal, marble, or similar hard surfaces. Do not operate on these surfaces without securing the unit with rope or some other stable means, in addition to the safety chain.

The ground spikes in the portable base are made of hardened steel to remain sharp through extended use. If, after use, the flats on the ends of the spikes exceed 1/16" in diameter, the spikes must be sharpened or replaced.

Each spike must be in uniform contact with ground surface at all times during use. Make sure that no large rocks or other debris are under the portable base during use, for this may cause the spikes to come out of contact with the ground surface.

The monitor is designed with a safety stop at 30 degrees above horizontal to maintain stability when used in the portable base. Do not release the elevation stop and operate below that point unless the unit is secured to the top side of an Engine apparatus, in the direct mount flange.

Two-2 ½" Inlet (Style 3421) Portable Monitor Base
When used in the portable base, the unit should not be operated at more than 500 GPM with one hose and 800 GPM with two hoses.

The maximum length of a single 2 ½" hose line supplying this portable base is 400' (500GPM @ 295psi PDP)

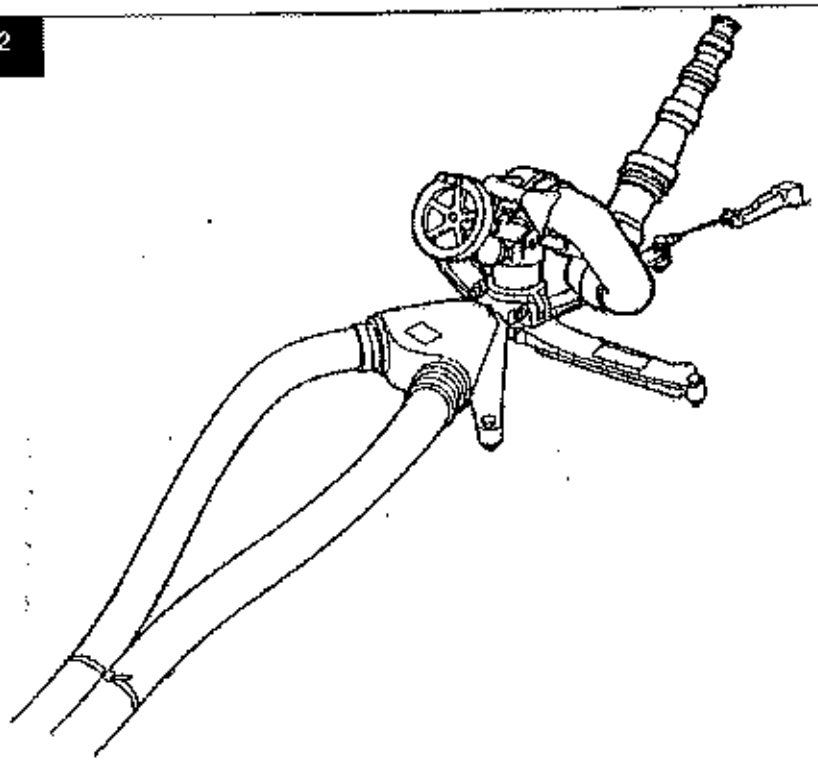
The maximum length of two 2 ½" hose lines of equal length supplying this portable base is 600' (800GPM @ 287psi PDP) *Maximum operating pressure for 2 ½" hose is 300psi.*

The set-up procedure is as follows (See Figure 2):

1. Rotate legs to the full open position.
2. Aim center leg toward target. Set spikes with hammer.
3. Ensure lock pins are fully engaged.
4. Aim discharge upward.
5. Secure safety chain.
6. Charge hose slowly
7. If unit moves while charging, reset spikes

The following hose arrangement is recommended for this style of portable base: Use two 2 ½" hoses and bring both hoses straight back from the siamese parallel to each other. Loosely tie the hoses together 10' from the monitor with webbing, rope, etc. (See Figure 2) When the unit is operating in the portable base, do not attempt to move or pick up any part of the base itself or the 10 feet of supply hose closest to the unit.

Figure 2



Single 5" Storz Inlet (Style 3414) Portable Monitor Base
When used in the portable base, the unit should not be operated at more than 1,000 GPM.

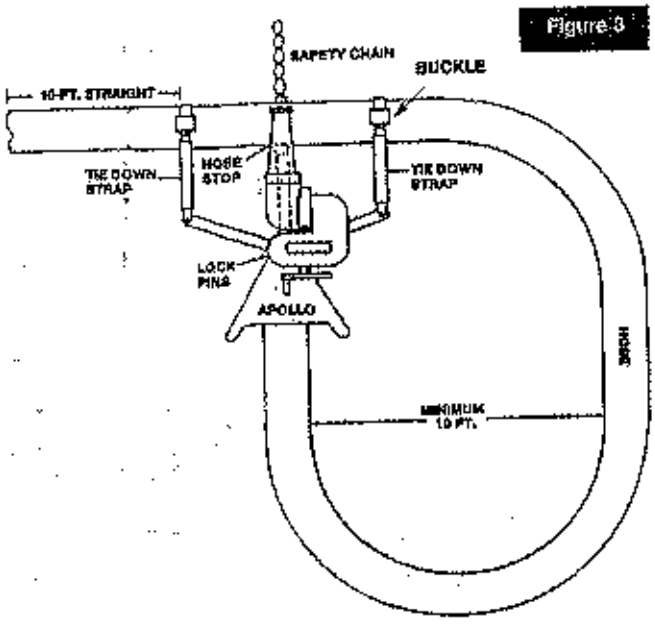
The maximum length of a single 5" hose line supplying this portable base is 1,100' (1, 000GPM @ 183psi PDP) *Maximum operating pressure for 5" hose is 185psi.*

The 5" portable base monitor can be deployed with a reverse hose lay. The Engine Co. stops the apparatus at the fire scene, removes the portable base, monitor and 5"hose with strap. The Engine will then lay 5" hose to the closest hydrant, establish a water supply, connect the 5" hose to the LDH discharge and charge the monitor when its set-up for operation.

The set-up procedure is as follows (See Figure 3):

1. Rotate legs to the full open position.
2. Slide buckles to end of tie-down straps.
3. Connect straps loosely around hose. DO NOT tighten.
4. Aim center leg toward target. Set spikes with hammer.
5. Ensure lock pins are fully engaged.
6. Aim discharge upward.
7. Secure safety chain.
8. Charge hose slowly.
9. Tighten straps around hose until it contacts hose stop.
10. If unit moves while charging, reset spikes

Figure 3



ALBUQUERQUE FIRE DEPARTMENT
STANDARD OPERATING GUIDELINES

Vehicle Fires

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

This purpose of this guideline is to establish the Albuquerque Fire Department's operations at vehicle fires. It identifies accepted operational tactics for safety and efficiency in the extinguishment of motor vehicle fires.

Guideline

To ensure personnel safety, the minimum level of protection for firefighters is full protective clothing, to include the SCBA. Due to the unique hazards and safety considerations involved in vehicle fires, the role of the Safety Officer becomes critical.

Operational Guidance

I. Apparatus placement

A. Apparatus should be positioned upwind and uphill of the incident if possible.

B. Use the apparatus as a barrier to shield the incident scene from traffic hazards, when possible.

1. Warning lights should be left operating, in conjunction with the use of traffic cones where needed.

2. The use of flares by firefighters and police officers shall be prohibited, because of the potential for potential ignition of flammable liquids or vapors.

3. Additional consideration should be given to positioning the apparatus at an angle to better protect firefighters, and to allow the removal of any hose from the pre-connect cross-lay compartments.

II. Water supply

A. Consideration must be given to the acquisition of additional water supply sources in incidents involving more than one vehicle, parking structures, etc.

1. A supply line or another engine may be required.

2. Ladder companies may be used as an improvised standpipe at incidents on elevated freeways or in parking garages.

III. Fire attack

A. A working fire involving the interior of the vehicle passenger compartment will damage the vehicle beyond repair. As such, the attack plan should consider the vehicle as a "write off," and a safe and appropriate approach and fire attack must be implemented.

B. The selection of a handline is at the company officer's discretion, however, an effective fire suppression effort will require an 1-3/4" handline.as a minimum.

C. The use of foam is recommended for fires involving flammable liquids (if available),

D. Where patients are trapped in the vehicle, water should first be applied to protect the patients and permit rescue.

E. When rescue is not a factor, first water should be applied for several seconds to extinguish the fire or to cool down the area around any fuel tanks or fuel systems such as fuel tanks with Liquefied Petroleum Gas (LPG) or Liquid Natural Gas (LNG).

F. At least one member of the attack team must have forcible entry tools in their possession to provide prompt and safe entry into the vehicle.

IV. Hazards and safety considerations

A. Liquid Petroleum Gas (LPG) and Liquid Natural Gas (LNG) are becoming commonplace as fuel for vehicles. Pressure release devices can create a lengthy "blow torch" effect. If the pressure relief device fails, a boiling liquid expanding vapor explosion (BLEVE) may occur.

1. Vehicles may not be marked to identify this fuel hazard. If there is flame impingement on a visible LPG/LNG storage tank, take action to control the fire and cool the tank.

2. If vapors escaping from the storage tank relief valve have ignited, allow the LPG/LNG to burn while protecting exposures and cooling the tank. The flow of gas through piping can be controlled by shutting off the valve at the storage tank. A request for additional equipment should be a priority in this situation.

B. Energy absorbing bumpers

1. These assemblies include devices that consist of gas and fluid filled cylinders. When they are heated during a fire, they can develop high pressures which may result in the sudden release of the bumper assembly.

2. Sudden release can result in serious injury to anyone in the path.

a. Bumper assemblies have been known to travel up to 25 feet.

b. A fire attack should be from an angle, or from the side of engine compartment.

c. Use caution when operating extrication equipment around bumpers to avoid sudden release.

C. Batteries

1. Explosion hazards exist around batteries, because of the presence of hydrogen vapors.

2. Avoid contact with battery acid.

3. When the situation is stable, disconnect battery cables (ground cable first).

D. Combustible metals

1. Some vehicles have various parts such as engine blocks, heads, or wheels, made of combustible metals,.

a. When combustible metals are burning, attempts to extinguish them with water will usually add to the intensity of

the fire. If using water on combustible metals, you must use large quantities of water to cool the metal below its ignition temperature. After some initial intensification, the fire should go out.

b. Dry chemical extinguishers can also be effective.

E. Trunk or rear hatch / engine hoods

1. Hold-open devices may employ any combination of various devices

a. Springs, gas cylinders, extending arms

i. When gas cylinders are exposed to heat, failure or rupture of these devices should be expected.

ii. Excessive pressure may develop in lift assists, causing a trunk, hatch, or hood to fly open with explosive force when the latch mechanism is released.

b. To ensure the safety of responding personnel, be sure to allow sufficient clearance when releasing latches.

c. Fires involving the trunk/cargo area should be approached with extreme caution.

i. Contents may include toxic, flammable, or other hazardous materials.

F. Fuel tanks

1. These may be constructed of sheet metal or plastic. A rupture or burn-through may occur, causing a rapid flash fire of the fuel.

2. Do not remove the gas cap, as the gas tank may have become pressurized.

3. Do not direct hose stream into tank, as this will cause pressurization of tank, which may result in the possibility of burning fuel spewing from the tank fill opening.

G. Cab interior

1. Well-sealed interiors of modern vehicles present the potential for backdraft.

2. Use caution when opening doors or breaking windows. Appropriate approach, ventilation, and safety concerns must be considered.

3. Have a charged handline ready before making entry.

H. Vehicle stability

1. Tires or split rims may explode when exposed to fire, causing the vehicle to drop suddenly.

   a. Expect exploding rim parts or tire debris to be expelled outward from the sides.

   b. Approach from the front or rear of the vehicle for maximum protection from potential flying debris.

2. Some larger vehicles, such as buses, employ air suspension systems. When these systems are exposed to heat or flame, they may fail, causing the vehicle to suddenly drop several inches.

Tire Fires

SOG Committee Action	Implemented 07/01/08	Revision	Implemented 07/01/08

Purpose

This purpose of this guideline is to establish the Albuquerque Fire Department's guidelines for tire fires. It identifies accepted operational tactics for safety and efficiency in response to tire fires.

Guideline

Tire fires present the same potential threat to the environment as an incident involving an oil tanker or a railroad tank car carrying hazardous substances and will be considered a Hazardous Materials event. Major tire fires can be considered significant public health hazards. Tire fires can potentially last days, weeks or months.

When exposed to extreme heat, tires reach a state of combustion in which volumes of toxic pyrolytic oil are produced. The average passenger car tire holds 2.5 gallons ofoil. Fire conditions can turn a tire pile into a running oil fire. Exposure hazards associated with the smoke plume, water runoff, and soil include volatile organic chemicals, polynuclear aromatic hydrocarbons, carbon monoxide and heavy metals. These toxins can be absorbed through the skin, mucous membranes or the respiratory system.

Operational Guidance

I. Hazard awareness and incident pre-planning

A. The company officer should familiarize his/her crew with all scrap tire piles located within their area of response.

B. Pre-planning should identify:

1. Site location – type of operation (salvage or recycling, managed or unmanaged)

2. Composition of tire piles (whole tires, burned tires, shredded tires, random stacks)

3. Size of tire piles

4. Available equipment

5. Hazards

6. Exposures

7. Utilities – Overhead wires, underground gas, electrical or communication

8. Geographical and topographical information

9. Emergency contacts

II. Dispatch

A. Major tire fires be handled as hazardous materials incidents

B. The dispatcher will obtain all available information from the caller to determine what exactly is on fire

III. Size-up

A. Upon arrival the company officer must determine the stage of combustion the tire pile is in (incipient, free-burning, smoldering) and consider the appropriate tactics to employ for the situation at hand:

1. Incipient stage

a. The incipient stage of a tire fire begins with a point of ignition. Once a tire has gained an open flame front, the heat of the fire is absorbed by the surrounding tire material.

b. Immediately separating the burning tire from the rest of the pile and/or applying water and foam would eliminate the threat to the remaining tires.

2. Free-burning stage

a. During the free burning stage, fire spreads quickly and there is a dramatic increase in smoke and heat. Use of water in this stage of a tire fire could increase the products of incomplete combustion like carbon monoxide and particulate matter.

b. Smoldering stage

i. Tires may continue to pyrolize, producing large quantities of oil. A crust may form over the pile while internal temperatures reach about 2,000 degrees Fahrenheit. Oil not consumed by the fire will leach into the soil, pool, and begin to flow under the pile. Heat from the fire could ignite the oil, resulting in a three-dimensional fire. Products of incomplete combustion continue to be a health hazard.

B. During initial size-up, the company officer must determine if the fire can be extinguished quickly without endangering personnel. If the fire is in the free burning or smoldering stage the most immediate concern will be the life safety of firefighters and the community. Approach to the incident should be in accordance with tactics common to other potential hazardous materials incidents.

C. Initial size-up must evaluate the emergency in terms of:

1. Personnel safety

2. Public health

3. Environmental impact

4. Threatened exposures

5. Extent of fire

6. Need for additional resources

D. Other Command concerns to be addressed by first-in officer or subsequent ICs:

1. Scrap tire fires can potentially last days, weeks or months.

2. Tire fires are highly toxic and dangerous

3. Activation/utilization of the following may be appropriate:

   a. Emergency Operations Center (EOC)

   b. Emergency Operations Plan

   c. Accountability systems and Rapid Intervention Teams

   d. Haz Mat, Safety, Environmental, Evacuation, Public Information, Welfare, Resource, Rehabilitation, Decontamination, Staging Divisions or Groups

   e. Public Safety Liaison/Air Operations Liaison

   f. Water Department Communications/Liaison

   g. Mutual Aid response

IV. Personnel safety

A. Awareness of the hazards involved in a tire fire can be the best personnel protection.

B. Heat exhaustion and working in less than ideal conditions is a reality in a large tire fire.

C. Command will want to prepare for total exposures, health hazards, and personnel injury hazards.

D. PPE at major tire fires:

1. Full turnout gear - required

2. SCBA - required

3. Surgical gloves under the leather gloves will give added protection from contact with the contaminated water, oil, and mud.

E. Extent of toxicity

1. The risk of exposure to toxic chemicals continues after the fire is out. Smoldering tires are as toxic as tires in a free burning state. Flying ash and contaminated soil are also potential hazards.

2. The temptation to dress down for overhaul should be resisted until the hazardous materials team has determined the appropriate level of protective clothing required.

3. The Incident Commander will establish a decontamination zone for all personnel leaving the fire area. All protective clothing, firefighting equipment, and apparatus may need to be decontaminated as well.

F. Other hazards

1. Contact with rodents, mosquitoes, snakes, spiders or scorpions will be reduced with the use of protective clothing.

2. Be aware of the dangers of machinery and heavy equipment operating on the fireground.

3. Collapsing walls of tires can block escape routes or cut off water supplies.

V. Public health

A. Command should determine early whether to evacuate the surrounding areas.

B. No strategy for managing the incident should bypass evacuation considerations, since burning tires are extremely difficult to extinguish.

C. An Evacuation Division or Group should be established early on in the incident to coordinate the evacuation process.

VI. Environmental impact

A. Command should size-up the potential environmental consequences of the fire and notify appropriate agencies immediately. Early notification will facilitate timely placement of relevant agencies into the Command structure and overall management of the event.

B. Areas of concern include:

1. Life safety

2. Proximity of wildlands and bodies of water

3. Potential toxic run-off

4. Smoke plume and wind direction/speed

VII. Tactical considerations

A. Life safety

1. Immediate evacuation of the incident scene is a high priority

2. Fire crew safety will be addressed continuously

3. Rapid Intervention Teams will be established..

B. Protecting exposures - Buildings, equipment, and utilities in the proximity of the fire will need to be protected.

C. Command must determine the amount of fuel actively burning and the total amount of fuel available to estimate the rate of spread to determine what will be allowed to burn and where fire breaks will be cut through the pile to limit fire extension

D. Creating fire breaks in a large tire pile is a long and time-consuming process. It can be accomplished with heavy machinery and front-end loaders.

E. Consideration must be given to the potential hazard of overhead or underground utilities

VIII. Strategic considerations

A. Burn it

1. Letting a tire pile burn has its merits. Soil and water pollution may be drastically reduced when many of the products of combustion go up in smoke. Clean-up costs can be lower when compared to other options

2. Adding water to fires or hazardous materials which react to water can exacerbate the emergency

3. It is a priority to protect exposures and separate unburned tires from the tires already on fire

B. Bury it

1. Burying a tire pile has merits. Sand, cement dust, quick lime and crushed coral rock are all high in calcium content. Calcium scrubs sulfur from the emissions, creating calcium sulfate or gypsum.

2. The bury it strategy is useful in areas with minimal water supply or in areas that are densely populated. Burying a tire fire reduces toxic smoke for the sake of public health.

3. When a tire fire is buried, fires can still pyrolize and push toxic oil into the soil and underground water sources. Burying a tire fire that is on top of clay soils may delay the oil from filtering to underground water supplies. To determine the release of pyrolytic oil, check down gradient from the pile for contamination. Utilize the Environmental Health Department for assistance in making this determination.

C. Drown It

1. Utilize water, foam and additives

2. The drown it strategy is best employed with forethought and careful preplanning which takes into consideration the topography and exposure hazards, in particular, hazards to water sources.

3. Drawbacks to the drown it strategy include:

   a. An increase in the toxic air emissions as the fire is cooled

   b. An inordinate amount of water run-off combined with pyrolytic oil

   c. The effectiveness of water applied to a tire fire is questionable and handlines alone cannot reach the interior spaces of a tire fire.

4. The drown it strategy utilizing a fog stream on chunk and chipped tires can be effective. Separating unburned inventory from the burning area is important to the control and extinguishment of this type of fire.

5. Foam would best be employed on small tire fires or when the fire is in the incipient stage. Pulling a larger tire pile apart with heavy machinery and applying foam can be effective. Foam should only be employed as part of a predetermined strategy.

IX. Clean-up and overhaul

A. Clean-up on tire fires will, in all probability, be turned over to an appropriate environmental protection agency.

B. Hazards to personnel exist long after the fire is out. Toxicity levels of tire fire sites suggest high concentrations of contaminates. Flying ash and contaminated soil blown around the site may increase exposure risks.