



FEMA

MANAGING COMPANY TACTICAL OPERATIONS: TACTICS

STUDENT MANUAL

**UNITED STATES FIRE ADMINISTRATION
NATIONAL FIRE ACADEMY
1st Edition, 1st Printing**

FEMA/USFA/NFA-
MCTO-T-SM
1st Edition, 1st Printing

Managing Company Tactical Operations: Tactics



FEMA

MANAGING COMPANY TACTICAL OPERATIONS: TACTICS

STUDENT MANUAL



**UNITED STATES FIRE ADMINISTRATION
NATIONAL FIRE ACADEMY
January 1999**

NOTICE:

This material has been developed by the National Fire Academy (NFA) of the United States Fire Administration (USFA) for use by state and metropolitan fire training programs. NFA endorsement of this material is conditional on use without modification. NFA material, whether printed text or software, may not be used in any manner that would mislead or that would suggest or imply endorsement by NFA of any commercial product, process, or service.

FEDERAL EMERGENCY MANAGEMENT AGENCY

UNITED STATES FIRE ADMINISTRATION

NATIONAL FIRE ACADEMY

FOREWORD

The Federal Emergency Management Agency (FEMA) was established in 1979. FEMA's mission is to focus federal effort on preparedness for, mitigation of, response to, and recovery from emergencies encompassing the full range of natural and manmade disasters.

FEMA's National Emergency Training Center (NETC) in Emmitsburg, Maryland, includes the United States Fire Administration (USFA), its National Fire Academy (NFA), and the Emergency Management Institute (EMI).

To achieve the Academy's legislated mandate (under Public Law 93-498, October 29, 1974), "to advance the professional development of fire service personnel and of other persons engaged in fire prevention and control activities," the National Fire Academy has developed an effective program linkage with established fire training systems which exist at the state and local levels. It is the responsibility of this division to support and strengthen these delivery systems. Academy field courses have been sponsored by the respective state fire training systems in every state.

The Managing Company Tactical Operations (MCTO) curriculum is designed to meet the needs of Company Officers responsible for managing the operations of one or more companies in structural firefighting operations. The curriculum consists of three separate, but interdependent courses: *MCTO: Preparation*; *MCTO: Decisionmaking*; and *MCTO: Tactics*. The three courses provide a systematic approach to fire incident management; as such, they are designed to be taken sequentially.

Recently, the curriculum for this course has been revised. The revisions were made to apply recent work in naturalistic decisionmaking, and particularly a Recognition-Primed Decision (RPD) model of how fireground commanders actually make decisions when faced with time pressure and uncertainty.

Calderwood (*Fire Command*, August, 1988) has described the research project that showed that fireground commanders rarely generate alternative options and evaluate these options systematically to select the best. There simply is not sufficient time. Moreover, the fireground commanders are able to use their experience to identify a reasonable course of action as the first one they consider. Generally, commanders take advantage of their experience to initiate a course of action rapidly, which is how they can make decisions so quickly. If the commanders are concerned about whether the typical course of action will be successful in the actual situation they are facing, the common strategy is to imagine how the course of action will be carried out, looking for ways in which it might lead to complications. If none are found, the course of action is initiated. If minor complications are found, the fireground commander will try to improve the action. If the improvements aren't going to work, the commander will reject the action and consider another typical strategy.

Although the RPD model appears to describe how fireground commanders make decisions, we have not included the model in the student materials. Little is to be gained by explaining to you how you already think. Instead, the revisions have been based on the RPD model. Since situation awareness, or sizeup, is so central to effective decisionmaking, we have enhanced the materials describing the critical cues for making difficult judgments. Critical cues are those that can cause a shift or an elaboration in the commander's assessment of the situation. This should help you gain a better sense of what you are monitoring. A second modification is to provide guidance to instructors about how best to use debriefings that follow exercises.

As you proceed through the course, you may have questions that can't be answered in these materials. The United States Fire Administration (USFA) has many publications that may be helpful. A list of these can be obtained by calling 1-800-238-3358, extension 1358.

To request one of these publications by title or by publication number, call the automated service number: 1-800-238-3358, extension 1660.

The USFA's Learning Resource Center also is available to assist with further research; call 1-800-238-3358, extension 1030.

The staff of the National Fire Academy is proud to join with state and local fire agencies in providing educational opportunities to the members of the nation's fire services.

TABLE OF CONTENTS

	PAGE
Foreword	iii
Table of Contents	v
Course Schedule	vii
MODULE 1: INTRODUCTION	SM 1-1
MODULE 2: VENTILATION AND RESCUE	SM 2-1
MODULE 3: FIRE CONFINEMENT AND EXTINGUISHMENT	SM 3-1
MODULE 4: WATER SUPPLY AND EXPOSURE PROTECTION	SM 4-1
MODULE 5: SALVAGE, OVERHAUL, AND SUPPORT ACTIVITIES	SM 5-1
MODULE 6: PRIVATE DWELLING SIMULATIONS	SM 6-1

COURSE SCHEDULE

MODULE

Module 1: Introduction

Module 2: Ventilation and Rescue

Module 3: Fire Confinement and Extinguishment

Module 4: Water Supply and Exposure Protection

Module 5: Salvage, Overhaul, and Support Activities

Module 6: Private Dwelling Simulations

MODULE 1: INTRODUCTION

OBJECTIVES

The students will:

1. *Explain the purpose and use of the Communications Model and the Quick Access Prefire Plan in tactical operations at fire incidents.*
 2. *Define the relationship between incident priorities, strategy, tactics, and implementation in the command sequence.*
 3. *Select the appropriate strategic mode, based upon consideration of risk/benefit and available resources.*
 4. *Describe the six steps required to implement the Tactical Action Model.*
 5. *List the factors on which apparatus placement is based.*
-

NOTE-TAKING GUIDE

I. INTRODUCTION

- A. Administrative details.

- B. The Managing Company Tactical Operations (MCTO) curriculum.
 - 1. MCTO: Preparation.

 - 2. MCTO: Decisionmaking.

 - 3. MCTO: Tactics.

II. HISTORY OF THE INCIDENT COMMAND SYSTEM

In the early 1970's, Southern California experienced several devastating wildland fires. The overall cost and loss associated with these fires totaled \$18 million per day. This multijurisdictional disaster was the impetus for the development of an improved interagency incident management system known as the Incident Command System (ICS). ICS is one of the beneficial results of a federally funded project called FIRESCOPE that was convened after these fires, and whose charter was to examine various aspects of interagency response to incidents.

FIRESCOPE derives its name from: **FI**re **RE**Sources of **Ca**lifornia **O**rganized for **P**otential **E**mergencies. The FIRESCOPE ICS is primarily a command and control system delineating job responsibilities and organizational structure for the purpose of managing day-to-day fire and rescue operations. It also is flexible enough to manage catastrophic incidents involving thousands of emergency response and management personnel.

The National Inter-Agency Incident Management System (NIIMS) is another system using ICS that was developed by the wildland community in order to provide a common system for wildland fire protection agencies at the local, State, and Federal levels. The NIIMS organization includes the Bureau of Land Management, the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service, the U.S. Forest Service, representatives of State Foresters, and the National Park Service. NIIMS consists of five major subsystems that collectively provide a total systems approach to risk management:

- The ICS which includes operating requirements, eight interactive components, and procedures for organizing and operating an onscene management structure.
- Training that is standardized and supports the effective operations of NIIMS.
- A qualification and certification system that provides personnel across the Nation with standard training, experience, and physical requirements to fill specific positions in the ICS.
- Publications management that includes development, publication, and distribution of NIIMS materials.
- Supporting technologies such as orthophoto mapping, infrared photography, and a multiagency coordination system that supports NIIMS operations.

Since the development of the ICS, the fire service has experienced several challenges in understanding its application. As a result, inconsistencies in the system began to develop; other hybrid systems came into existence, further distancing a common approach to incident command. A single incident management system is critical for effective command and control of major incidents. At these incidents, a single department may interface with other agencies on the local, State, and Federal level. In order to reduce the inherent confusion that may be associated with larger scale incidents, using a common command system is a must.

Recognizing the challenges that were occurring in the fire service in applying a common approach to incident command, the National Fire Service Incident Management System Consortium was created. Developed in 1990, its purpose is to evaluate an approach to developing a single Command system. The Consortium consists of many individual fire service leaders, representatives of most major fire service organizations, and representatives of Federal agencies including FIREScope. One of the significant outcomes of the work done by the Consortium was the identification of the need to develop operational protocols within ICS, so that fire and rescue personnel would be able to apply the ICS as one common system. In 1993, as a result of this, the IMS Consortium completed its first document: *Model Procedures Guide for Structural Firefighting*. FIREScope adopted this in principle as an application to the Model FIREScope ICS. The basic premise is that the organizational structure found in the FIREScope ICS now is enhanced with operational protocols that allow the Nation's fire and rescue personnel to apply the ICS effectively regardless of what area in the country they are assigned. The National Fire Academy, (NFA), having adopted the FIREScope ICS in 1980, has incorporated this material in its training curriculum and will continue to reach the thousands of fire service personnel with one common incident command and control system.

It is important to note that the FIREScope Model ICS has had other applications or modules similar to the structural firefighting applications that have been in place for some time. These create a framework for other activities to operate in and further enhance the use of ICS. As an example, there are the Multi-Casualty, Hazardous Material, and the Urban Search and Rescue applications.

The Federal Emergency Management Agency (FEMA) formally adopted FIREScope ICS as the incident management system for any Federal response required by the agency. Since then, several other Federal agencies have adopted FIREScope ICS.

III. THE MCTO: TACTICS COURSE

A. Course goal.

MCTO: Tactics is designed to develop the management skills needed by Company Officers (COs) to accomplish assigned tactics at structure fires.

NOTE-TAKING GUIDE

- B. Target audience: Company Officers.
- C. Activities and scenarios: based on structure fires in buildings of three stories or less.
- D. Student Manual.

IV. COMMUNICATION

- A. Effective communication is critical to successful incident management.
- B. It contributes to improved firefighter safety, accountability of personnel, effective use of resources, incident scene coordination, and interagency cooperation.
- C. The Communications Model. (See SM 1-16)

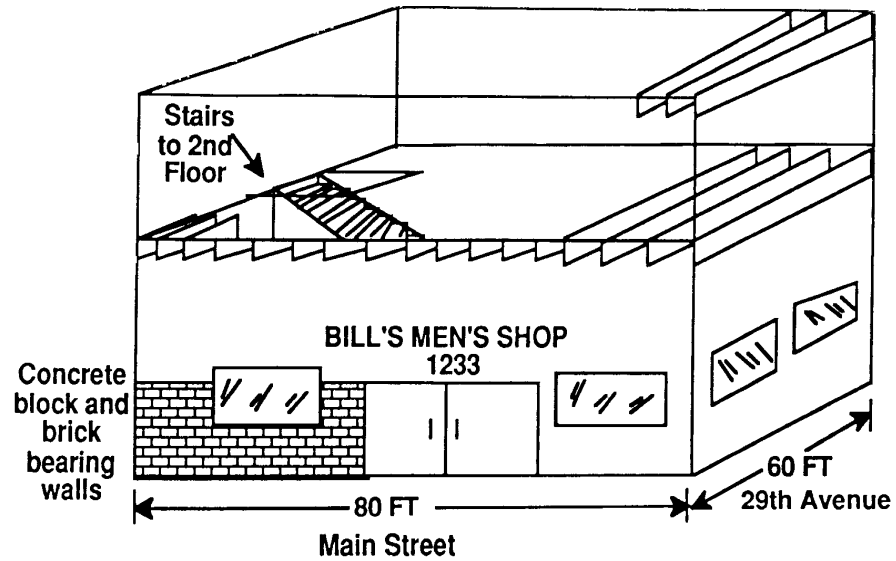
NOTE-TAKING GUIDE

D. Example of the Communications Model. (See SM 1-17)

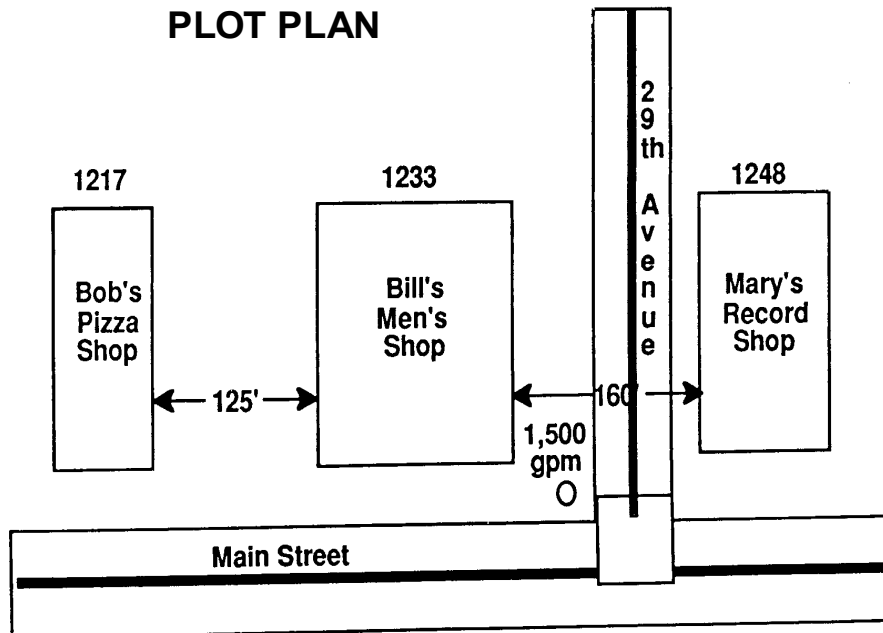
V. REVIEW OF QUICK ACCESS PREFIRE PLAN (QAP)

NOTE-TAKING GUIDE

SAMPLE PLOT PLAN/FLOOR PLAN



PLOT PLAN



NOTE-TAKING GUIDE

Sample Quick Access Prefire Plan																			
Building Address: <i>1233 Main Street</i>																			
Building Description: <i>2-story "ordinary" construction with basement</i>																			
Roof Construction: <i>Beam and rafter, 1" x 8" sheathing, composition covering</i>																			
Floor Construction: <i>2" x 10" joists; 1" x 6" sheathing</i>																			
Occupancy Type: <i>Mercantile "men's clothing"</i>		Initial Resources Required: <i>1 Rescue, 2 Engines, 1 Ladder</i>																	
Hazards to Personnel: <i>Large amount of rental clothing stored in basement</i>																			
Location of Water Supply: <i>Main Street & 29th Avenue</i>		Available Flow: <i>1,500 gpm</i>																	
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="padding: 5px;">Estimated Fire Flow</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Level of Involvement</td> <td style="padding: 5px; text-align: center;"><i>25%</i></td> <td style="padding: 5px; text-align: center;"><i>50%</i></td> <td style="padding: 5px; text-align: center;"><i>75%</i></td> <td style="padding: 5px; text-align: center;"><i>100%</i></td> </tr> <tr> <td style="padding: 5px;">Estimated Fire Flow</td> <td style="padding: 5px; text-align: center;"><i>800</i></td> <td style="padding: 5px; text-align: center;"><i>1,600</i></td> <td style="padding: 5px; text-align: center;"><i>2,400</i></td> <td style="padding: 5px; text-align: center;"><i>3,200</i></td> </tr> </tbody> </table>					Estimated Fire Flow					Level of Involvement	<i>25%</i>	<i>50%</i>	<i>75%</i>	<i>100%</i>	Estimated Fire Flow	<i>800</i>	<i>1,600</i>	<i>2,400</i>	<i>3,200</i>
Estimated Fire Flow																			
Level of Involvement	<i>25%</i>	<i>50%</i>	<i>75%</i>	<i>100%</i>															
Estimated Fire Flow	<i>800</i>	<i>1,600</i>	<i>2,400</i>	<i>3,200</i>															
Fire Behavior Prediction: <i>Rapid horizontal and vertical spread</i>																			
Predicted Strategies: <i>Rescue, confinement, ventilation, extinguishment</i>																			
Problems Anticipated: <i>Only one access/egress to basement and second floor</i>																			
<input type="checkbox"/> Standpipe: <i>No</i>	<input type="checkbox"/> Sprinklers: <i>No</i>	<input type="checkbox"/> Fire Detection: <i>No</i>																	

NOTE-TAKING GUIDE

VI. REVIEW OF THE COMMAND SEQUENCE

- A. Incident priorities: life safety, incident stabilization, and property conservation.

- B. The command sequence--a three-phase decisionmaking process used to determine how incident priorities are achieved.
 - 1. Performing sizeup: the **thinking** phase.

 - 2. Determining strategy and selecting tactics: the **planning** phase.

 - 3. Implementing the action plan: the **acting** phase.

- C. Example of using the command sequence.
 - 1. Conditions.

NOTE-TAKING GUIDE

2. Problem identification.

3. Action plan.

4. Tasks.

VII. RISK/BENEFIT EVALUATION

- A. Firefighting is not without risk; the Incident Commander (IC) must determine if risks taken are worth the benefits gained.
- B. Company Officers (COs) must also make risk/benefit judgments.
- C. COs must always be sensitive to changes in conditions that might affect their company or others; when such conditions exist, COs must communicate the facts to those potentially affected.

NOTE-TAKING GUIDE

VIII. STRATEGIC MODE

- A. Choice of mode is based on risk/benefit evaluation and/or assessment of required and available resources.
- B. Strategic modes: offensive, defensive, and transitional.
- C. Offensive: coordinated interior attack.
- D. Defensive: attempt to keep fire to area of present involvement with minimum risk to personnel.
- E. Transitional: switching from one mode to the other.
 - 1. Defensive to offensive.
 - 2. Offensive to defensive.

NOTE-TAKING GUIDE

IX. TACTICAL ACTION MODEL

- A. A six-step process whereby the CO receives and implements a tactical or task order.
- B. Step 1: Receive a tactical or task order.
- C. Step 2: Conduct a tactical sizeup.
- D. Step 3: Assign tasks.
- E. Step 4: Take action to complete tactical assignment.
- F. Step 5: Evaluate effectiveness of tactical operations.
- G. Step 6: Report to supervisor on the effectiveness of tactical operations.

NOTE-TAKING GUIDE

X. APPARATUS PLACEMENT

A. Placement is based on five factors.

1. Strategic mode.
2. SOPs for first-arriving companies.
3. Prearranged staging procedures.
4. Direct order from IC.
5. Decision made by CO upon arrival.

B. Placement considerations.

NOTE-TAKING GUIDE

- C. Tactical assignment examples that dictate placement.
 - 1. Engine being used for water supply.
 - 2. Engine being used to supply sprinkler or standpipe.
 - 3. Engine being used for initial fire attack.
 - 4. Engine being used for defensive operation/master stream.
 - 5. Truck being used on a rescue assignment.
 - 6. Truck being assigned roof ventilation.
 - 7. Truck being assigned to provide ground ladders and equipment.

NOTE-TAKING GUIDE

8. Truck being used for defensive operation/master stream.
9. Rescue unit being used for equipment usage.
10. Tanker/tender being used for water shuttle.

XI. SUMMARY

INTRODUCTION

The Managing Company Tactical Operations (MCTO) curriculum is designed for newly appointed Company Officers (COs) and for firefighters who may have acting CO responsibilities. It also serves as an excellent review for experienced officers. The curriculum presently includes three components: Preparation, Decisionmaking, and Tactics. This module includes a review of material from MCTO: Preparation and MCTO: Decisionmaking that is critical to understanding this course. It also provides an overview of this course and some brief background information on the Tactical Action Model, strategic mode, and apparatus placement.

Managing Company Tactical Operations: Preparation provides a foundation for managing one or more companies operating at structural fire incidents. Key content areas include: Roles and Responsibilities; Readiness; Communication; Building Construction and Fire Behavior Factors; and Preincident Preparation.

Managing Company Tactical Operations: Decisionmaking provides an effective approach to command decisionmaking and organization. Key content includes: The Command Sequence; Sizeup; Developing an Action Plan; Implementing the Action Plan; and Introduction to the Incident Command System. The extensive use of simulation provides the opportunity to apply concepts and develop tactical skills.

Managing Company Tactical Operations: Tactics develops the management skills needed by Company Officers to accomplish assigned tactics at structure fires. Key content areas include: An Introduction; Ventilation and Rescue; Fire Confinement and Extinguishment; Water Supply and Exposure Protection; Salvage, Overhaul, and Support Activities; and Private Dwelling Simulations. The extensive use of simulation provides the opportunity to apply concepts and develop tactical skills.

COMMUNICATION

Effective communication is critical to successful incident management. It contributes to improved firefighter safety, accountability of personnel, effective use of resources, incident scene coordination, and interagency cooperation.

The Communications Model

The meaning of words is based on prior knowledge and experiences of the individual. Communication fails when individuals associate different meanings with the same word. The purpose of communication is to establish mutual understanding. Following the Communications Model develops confidence in your ability to communicate effectively, and it makes good communication a matter of habit.

The Model is a six-step process.

Step one: The sender formulates an idea that he/she wants to convey to another person.

The idea must be clear and concise. If the idea is not clear to the sender it will be less so to another person. Too much information in the message increases the chance that some of it will be lost.

Step two: The sender sends the message.

First, the sender must get the attention of the intended receiver and then convey the information.

Step three: The message is transferred through a medium - orally, visually, or in writing.

Step four: The receiver receives the message.

First, the receiver lets the sender know that he/she is ready to receive the message; then, the receiver receives the actual message.

Step five: The receiver interprets the message.

The receiver must have the background knowledge and experience to understand the message.

Step six: The receiver confirms that the message has been received and understood by providing feedback to the sender.

This gives the sender an opportunity to correct any confusion or misunderstanding.

Example of the Communications Model

Formulation of idea:

Sender: "I want Engine 1 to take a 1-3/4-inch line to the second floor." (**Thought**)

The sender prepares to send the message:

Sender: "Engine 1, Command." (**Getting attention of receiver**)

The receiver lets the sender know he/she is ready to receive the message.

Receiver: "Command, Engine 1." (**I'm paying attention**)

Transfer through medium: (**Radio transfers message from sender to receiver**)

The sender conveys the desired information.

Sender: "Take a 1-3/4-inch line to the second floor." (**Conveying information**)

The receiver interprets the message.

Receiver: "I'm going to have my crew take a 1-3/4-inch line to the second floor." (**Thought**)

The receiver provides feedback that the message is understood.

Receiver: "Taking a 1-3/4-inch line to the second floor." (**Feedback that Engine 1 understands assignment**)

The sender acknowledges that there is common understanding.

Sender: "Affirmative, Engine 1."

REVIEW OF QUICK ACCESS PREFIRE PLAN (QAP)

The Quick Access Prefire Plan (QAP) provides you with need-to-know information recorded in a form that you can use when responding to an incident. The information is critical for sizeup, for setting incident priorities, and for making other early "informed" decisions. Lack of information forces you to guess when analyzing the situation.

The QAP provides information about building address and description, roof and floor construction, occupancy, and required initial resources. In addition, it indicates unique hazards to personnel, required and available water supply, predicted fire behavior, possible strategies, problems anticipated, and fixed protection and detection systems. It also should contain a plot plan and/or floor plan.

The QAP has value only if it is continually updated and shared by those who might respond to the particular structure. Training in its use is essential.

REVIEW OF THE COMMAND SEQUENCE

The initial minutes at an incident scene are often confusing and can overwhelm the first-arriving officer. There are demands for action and decisions that must be made with little hard information on which to base them. Reactive fire officers tend to implement their first idea without any thought of an overall incident management plan. In this situation, what starts bad tends to get worse.

The proactive officer follows a systematic decisionmaking process. He/She takes command, identifies problems, establishes priorities, uses resources effectively, coordinates all activities, and assures firefighter safety. The command sequence provides the officer with a systematic decisionmaking process.

Incident Priorities

Incident priorities--life safety, incident stabilization, and property conservation--define the mission of the fire department and form the basis of the CO's decisionmaking process, the command sequence. They are the same for every incident and should be reflected in every action taken.

The Command Sequence

The command sequence is a three-phase decisionmaking process used to determine how incident priorities are achieved.

Phase One--Sizeup.

Sizeup is an ongoing process of gathering and analyzing information to identify critical incident factors. It is the **thinking** phase and leads to problem identification.

Phase Two--Determining strategy and tactics.

Determining strategy and selecting tactics is the **planning** phase and is based on problems identified during sizeup. Strategy consists of broad goals that make up the overall plan to control the operation. It defines what has to be done to solve the problem. Tactics are specific, measurable objectives that are necessary for the achievement of strategies. Tactics define how actions are performed. Strategy and tactics lead to an action plan.

Phase Three--Implementing the action plan.

Implementation involves communicating and executing the action plan, which is determined by strategy and tactics. Implementation of the action plan leads to task assignments and is the **acting** phase.

Example of Using the Command Sequence

Conditions:

Alarm at 2:45 a.m.

Fire on floor one of a two-story single-family dwelling of wood-frame construction.

Victim reported on second floor.

Problem identification:

Rescue of possible victim(s).

Fire on first floor, and spread of heat, smoke, and fire to second floor.

Additional damage to structure.

Part of the action plan addressing rescue. (There also are other necessary strategies and tactics.)

Initial strategy: Rescue victim on second floor and conduct primary search.

Tactics:

- Primary search of entire dwelling.
- Evacuate occupants.
- Protect means of egress from second floor.
- Horizontal ventilation.

Tasks to address rescue:

- Conduct right-hand search on second floor.
- Do primary search of first floor.
- Advance a 1-3/4-inch line between fire and stairway.
- Provide a 1-3/4-inch protective line for search crew.
- Provide positive-pressure horizontal ventilation on first and second floors.
- Place ladder to second floor window away from fire for secondary means of egress.

RISK/BENEFIT EVALUATION

Firefighting is not without risk; the IC must decide if risks taken are worth the benefits gained. COs must also make risk/benefit judgments based upon their assignment and upon factors that are facing them. COs must be sensitive to changes in conditions that might affect their company or others; when such conditions exist, COs must communicate the facts to those potentially affected.

Safety of firefighters should be the driving force that guides all incident decisions. Safety is an attitude that must be continually reinforced. In emergencies, we do what we have practiced.

STRATEGIC MODE

The choice of offensive, defensive, or transitional mode is based on risk/benefit evaluation and/or assessment of required and available resources.

Offensive Mode

Coordinated interior attack takes place when operating in the offensive mode. A decision to operate in this mode requires that adequate resources are available to meet incident demands and that the predicted benefits are worth the risks taken by firefighters.

Fast attack mode situations are those that must be stabilized immediately and require the Company Officer's assistance and direct involvement in the attack. In these situations the Company Officer goes with the crew to provide the appropriate level of supervision. Examples of these situations include:

- Offensive fire attacks (especially in marginal situations).
- Critical life safety situations (i.e., rescue) which must be achieved in a compressed time frame.
- Any incident where the safety and welfare of firefighters is a major concern.
- Obvious working incidents that require further investigation by the Company Officer.

Defensive Mode

In the defensive mode, an attempt is made to keep the fire confined to the initial area of involvement with minimum risk to personnel. Usually the risk is too great for the potential benefit, or there are insufficient resources available to deal with the incident. Personnel do not make entry and are kept out of collapse zones and out of danger as much as possible to maximize their safety. Containing the fire in the area of initial involvement requires protecting exposures and initiating master stream operations, and assumes the probable loss of the building.

Transitional Mode

The transitional mode involves switching from one operational mode to the other. If there are inadequate resources, the incident starts in the defensive mode where no entry is made until additional resources are available. As additional resources arrive there is a shift to the offensive mode and interior attack begins. Transition from the offensive to the defensive mode is required in order to complete possible rescues before shifting to confinement and exposure protection.

TACTICAL ACTION MODEL

The Tactical Action Model is a logical six-step process whereby the CO receives and implements a tactical or task order.

Step 1: Receive a Tactical or Task Order

Tactical orders can be given by assignment of tactics or assignment of tasks. Assignment of tactics defines what is to be done and allows the CO to select the most appropriate or effective task activities to accomplish them. Use of standard tactical evolutions simplifies this approach.

Assignment of tasks involves specific task orders given when specific actions are required to accomplish the action plan. Task orders are usually given to inexperienced COs or when the CO is not familiar with the expectations of the IC. They also may be given to officers from mutual-aid companies who are not familiar with departmental procedures.

Step 2: Conduct a Tactical Sizeup

Assignment of resources for the completion of assigned tactical objectives or tasks is based on key tactical decisions and on resources made available by the IC. Sizeup must provide the information to make these critical tactical decisions.

Important sizeup factors include safety considerations, construction and occupancy, area of involvement, and probable fire spread.

To complete tactical sizeup, problems must be identified and prioritized, and resources must be evaluated.

Step 3: Assign Tasks

The CO assigns tasks to firefighters based on tactical sizeup, and firefighters must operate within the action plan established by the CO. Standard tactical evolutions simplify task assignments by identifying responsibilities of each crew member. Communication of task assignments must be clear and specific.

Step 4: Take Action to Complete Tactical Assignment

While taking action to complete the tactical assignment, it is necessary to maintain crew integrity and to communicate with superiors to assure coordination.

Step 5: Evaluate Effectiveness of Tactical Operations

Evaluation seeks the answers to four questions:

- Is it working?
- Do I need more resources?
- Can I release any resources?
- Is there any emergency or hazardous condition that prevents completion of my assignments?

Step 6: Report to Supervisor on the Effectiveness of Tactical Operations

There are six conditions that require reports to superiors:

1. When tactical assignment cannot be completed.
2. When assignment is completed.
3. When additional resources are needed to complete assignment.
4. When resources can be released.
5. When an emergency or hazardous condition exists that affects tactical assignment.
6. Periodically.

APPARATUS PLACEMENT

Apparatus placement is based on five factors. Placement may be determined by mode of operation. When operating in the offensive mode, apparatus is placed close enough to the structure for effective interior operations. In the defensive mode, apparatus is placed in a safe position, based on a pessimistic view of fire extension and the possibility of building collapse. In the transitional mode, apparatus is placed close enough for effective interior operations, but with a constant awareness of the possibility of fire extension and building collapse.

Some departments develop and use SOPs for first-arriving companies that define use and placement of apparatus to cover normal and anticipated responses. However, SOPs do not negate the need to evaluate conditions.

Placement also may be determined by prearranged staging procedures, direct order from the IC, or a decision made by the CO upon arrival.

Placement Considerations

The key to proper placement is **mobility**. Access to the incident scene and operating space should be provided so that each apparatus can operate to best advantage. Neither firefighters responding to the scene in their own cars nor citizens should be allowed to block scene access.

Building characteristics, fire progress, exposures, and the operating positions of other companies are critical operational factors affecting placement. Apparatus should be positioned to cover as much of the building as possible while considering its vulnerability and safety. It should be staged while waiting for assignment.

Some considerations for engine placement include access to attack lines and fire department connections, maintaining the ability to lay lines, and providing for master stream operation out of collapse zones. Probable location of victims, the need for access by aerial devices or ground ladders, and the ability to remove ladders and equipment are truck placement considerations. Tanker/tenders must maintain the ability to maneuver, and rescue apparatus should be positioned in proximity to point of use.

SUMMARY

Effective use of the Communications Model and the Quick Access Prefire Plan are topics from MCTO: Preparation that are critical to this course. The command sequence and risk/benefit evaluation from MCTO: Decisionmaking also contribute to understanding materials covered in this course.

The Tactical Action Model provides a structure in which the CO can make tactical decisions necessary to carry out the IC's action plan. It is important that all personnel operating at incidents understand the functioning strategic mode. Following good apparatus placement principles provides flexibility to the IC.

MODULE 2: VENTILATION AND RESCUE

OBJECTIVES

The students will:

- 1. Select appropriate ventilation tactics based upon identified ventilation principles and tactical considerations.*
 - 2. Develop a Ventilation Action Plan based upon the tactics selected.*
 - 3. Select appropriate rescue tactics based upon identified rescue principles and tactical considerations.*
 - 4. Develop a Rescue Action Plan based upon the tactics selected.*
-

NOTE-TAKING GUIDE

I. VENTILATION

- A. Definition: A planned, systematic procedure for reducing, redirecting, or removing heat, smoke, and fire gases from a structure, and replacing them with clean, fresh air.

- B. Ventilation principles.
 - 1. Ventilation for life safety.

 - 2. Ventilation for incident stabilization.

 - 3. Ventilation for property conservation.

 - 4. Ventilation to support other tactical operations.

NOTE-TAKING GUIDE

- C. Determine where ventilation is needed.
 - 1. Planned, systematic approach to determining location.
 - 2. General location priorities.
- D. Select appropriate tactic(s).
 - 1. Horizontal ventilation.
 - 2. Vertical ventilation.
 - 3. Combination of vertical and horizontal ventilation.

NOTE-TAKING GUIDE

E. Ventilation methods.

1. Natural ventilation.
2. Self-ventilation.
3. Forced (mechanical) ventilation.

All mechanical methods force fresh air into structure and remove contaminated air.

4. Types of forced ventilation.
 - a. Fog streams.
 - b. Building HVAC system.
 - c. Negative pressure.
 - d. Positive pressure.

NOTE-TAKING GUIDE

- F. Tactical sizeup for ventilation.
 - 1. Considerations.
 - 2. Sizeup questions.
 - 3. Continuing sizeup is required to monitor changing conditions.
 - 4. Company Officers must communicate with their immediate supervisor.
- G. Support for ventilation.
- H. Ventilation hazards.

NOTE-TAKING GUIDE

- I. Ventilation coordination issues.
 - 1. With rescue.
 - 2. With entry and fire attack.
 - 3. Make sure hoselines do not hinder ventilation.
- J. Develop a Ventilation Action Plan.

Activity 2.1: (See SM p. 2-23)

II. RESCUE

- A. Definition/Principles: Rescue is a systematic process used to safely locate, protect, and remove occupants and fire victims from a structure and convey them to a place of safety.
- B. Select appropriate rescue tactic(s).

NOTE-TAKING GUIDE

C. Conduct primary search.

1. Definition: Rapid search of all areas involved in or exposed to fire, if they can be entered, to verify removal and/or safety of occupants.
2. Key elements.
3. Removal of victims.
4. The "**ALL CLEAR**."

D. Conduct secondary search.

1. Definition: Extremely thorough search of interior fire area after initial fire control, ventilation, and interior lighting are completed, to ensure that there is no possibility of victims remaining undiscovered.
2. Key elements.

NOTE-TAKING GUIDE

- E. Provide for rescued occupants.

- F. Tactical sizeup for rescue.
 - 1. Sizeup factors.
 - a. Stage of fire development.

 - b. Number, location, and condition of victims and effect of fire on victims affects order of rescue.

 - c. Capability of onscene companies.

 - 2. Sizeup questions.

NOTE-TAKING GUIDE

G. Support for rescue operations.

1. Timing.
2. Protective lines.
3. Entry.
4. Ventilation.
5. Laddering.
6. Confinement/Extinguishment.

H. Rescue coordination issues.

NOTE-TAKING GUIDE

- I. Develop a Rescue Action Plan.

Activity 2.2: (See SM p. 2-25)

Activity 2.3: (See SM p. 2-27)

III. SUMMARY

INTRODUCTION

Nearly all structure fires require ventilation to support basic tactical operations (rescue and advancement of lines). The Company Officer (CO) must understand how fire behavior affects the time and place to ventilate. Because firefighters work in close proximity to the fire, safe tactics and procedures must be established and followed.

Entry followed by search and rescue takes precedence over every other strategic goal at the incident scene. Company Officers must develop proficiency in rescue operations because of their overriding importance.

Ventilation and rescue should be **safe**, **timely**, and **efficient** operations. Many firefighters are killed and injured each year while performing them. Company Officers who understand and apply risk/benefit concepts to their operations reduce the likelihood of firefighter injury or death. Company integrity and accountability always must be in the officer's mind.

VENTILATION

Ventilation is a planned and systematic procedure designed to reduce, redirect, or remove heat, smoke, and fire gases from a structure, and replace them with clean, fresh air.

Ventilation Principles

There are four basic principles that guide ventilation decisions. Considering incident priorities, ventilation may be needed for life safety, incident stabilization, property conservation, or to support other tactical operations, in that order. **Ventilation for life safety** involves channeling heat, smoke, and gases away from victims, while allowing firefighters to enter and rescue them. Its need is based on life hazard, and heat, smoke, and fire conditions in the structure.

Ventilation for incident stabilization allows firefighters access to the structure so they can locate and attack the fire and limit extension. Its need is based on exposures, the extent and location of fire, wind direction, and construction features of the building, including vertical and horizontal openings.

Ventilation for property conservation channels products of combustion away from unburned, undamaged property to allow firefighters to salvage it. Its success is dependent on the CO's knowledge of methods.

Finally, ventilation may be needed in order **to effectively support other critical tactical operations**. Decisions about where ventilation is needed and the method used are guided by which tactical operation(s) need support.

Determine Where Ventilation is Needed

A planned, systematic approach for determining where to ventilate first considers the location and condition of possible victims, as well as the type, age, and structural integrity of the building, and the type and style of roof. The rate of burning and possible paths of fire travel, safe routes of travel, and escape routes, and needed and available resources also should be considered.

Products of combustion should be channeled away from occupants, and removed from above stairways, hallways, over the fire, and the rest of the building in that order.

Select Appropriate Tactic(s)

The type of ventilation should be matched to the fire and smoke conditions encountered, construction and condition of the building, weather conditions, the available resources, and the time restriction placed on the operation by other tactical requirements.

Horizontal ventilation, normally through windows and doors, is appropriate for minor to moderate size fires, as long as heat and/or products of combustion would not be pushed toward occupants attempting to evacuate. By minor to moderate, we mean low percentages of involvement, relatively small buildings, and low fire intensity. For example, fires that involve a volume no larger than one to two rooms of an ordinary dwelling generally can be handled with horizontal ventilation. An exception may be an attic fire due to the limited number of horizontal openings. Horizontal ventilation takes advantage of existing openings and can be performed from the ground with portable ladders, or from the interior.

Vertical ventilation through roof openings is more efficient because it takes advantage of the natural tendency of heated materials to rise. It usually slows horizontal extension, but requires longer ladders, more

personnel, and is generally not as safe. If possible, natural roof openings such as vertical shafts, skylights, hatches, ventilators, and penthouse openings should be used. If not, firefighters should make openings. Vertical ventilation normally is required in larger fires, provided there is a path for the heat and smoke to travel to the roof assembly and ventilation hole from the fire area in the structure. An important consideration for vertical ventilation is the likelihood that the fire and/or heat can push horizontally through the structure. Vertical ventilation stops or significantly reduces this horizontal spread.

In some situations, it is appropriate to use a **combination of horizontal and vertical ventilation**. For example, when there is smoke in a basement, use a fan blowing air down the stairs (vertical ventilation) to force smoke out at the first floor and use horizontal ventilation to remove the smoke from the first floor.

Ventilation Methods

There are two basic methods for moving heat and combustion products to the outside of a structure--natural and forced (mechanical) ventilation. **Natural ventilation** takes advantage of natural convection currents existing in the building or those created when firefighters make openings.

Natural ventilation often is inadequate, due to lack of horizontal paths and openings, lack of vertical paths, a prevailing wind that hinders ventilation, high humidity, life or property exposures, and in fires of low heat intensity. Poor ventilation is indicated when the smoke and heat are not leaving the building as rapidly as needed to conduct effective interior operations.

The earliest form of natural ventilation was **self-ventilation**. This method involves simply allowing the fire to continue to burn and find its most direct path to the outside. It is sometimes the safest and most effective method.

Forced, or mechanical ventilation uses mechanical devices to **force** contaminants out of the structure and replace them with fresh air. **Water fog streams** are the simplest, but least effective type of mechanical ventilation because they have the potential for high water damage and must be used in contaminated atmospheres.

When available, **building HVAC systems** may be used to ventilate, but their effectiveness is dependent on system capabilities and knowledgeable operators. They also can move contaminants to unaffected parts of the building.

Negative pressure ventilation uses a blower placed inside the building to **exhaust** contaminants while bringing in fresh air through other openings. Although this method works satisfactorily, it has disadvantages. Personnel are exposed to hazardous contaminants while positioning the blower. Depending on their placement, blowers can interfere with the movement of personnel. The smoke may churn around the blower and opening, and there often is limited flow of air at the top of the area being ventilated.

With **positive pressure ventilation**, blowers are placed outside the building and fresh, pressurized air is **forced into** the building. Because pressure is uniform in the structure, contaminants are forced from controlled openings in all parts of the building.

Positive pressure ventilation may be desirable because access to the building and in the building is not blocked by the blowers, the blowers can be set up in less time and more safely in noncontaminated areas, and products of combustion are removed more efficiently. A disadvantage is the danger of fanning a smoldering fire into a serious one. Positive pressure ventilation requires a high degree of coordination and proper sequence of opening and closing windows as each room is cleared.

Proper ventilation requires a knowledge of the advantages and disadvantages of each method. The CO must select a method appropriate to the specific incident.

Tactical Sizeup for Ventilation

Ventilation must be performed as part of the overall attack plan. Begin ventilation as soon as a life hazard is recognized. If fire is free-burning, begin ventilation at the same time as, or shortly after, initial attack. If there is danger of backdraft or flashover, ventilate before entry and as high as possible. Ventilation is an effective method of reducing the flashover potential or minimizing its effect. Flashover is a phenomenon that occurs in the early stages of a fire, when the heated contents of a space produce sufficient gaseous fuels in the presence of sufficient oxygen to cause rapid combustion throughout the involved space. In a backdraft situation, vertical ventilation over the fire is the best method of moving the high temperature components out of the building and reducing the internal temperatures. Backdraft can occur either during the early stages of a fire or during the smoldering phase when the heated contents of a space produce sufficient gaseous fuels and the oxygen content is below that which is necessary for rapid combustion to take place. Both situations (flashover and backdraft) will require the application of water immediately

after ventilation is accomplished. Follow the Tactical Action Model when carrying out ventilation assignments.

When completing the initial sizeup the CO must consider whether ventilation is needed for life safety, incident stabilization, property conservation, and/or to support other tactical operations. After determining the reason, it is necessary to decide where it is needed. Finally, the specific ventilation tactic is selected.

Continuing sizeup is required to monitor changing conditions so tactical operations can be adjusted. The CO should inform others of information that might affect their operations.

COs must communicate with their immediate supervisor when their ventilation assignment is completed or if it cannot be completed. It is also necessary to notify the supervisor if additional resources are need, to give advance warning of need for relief crews, and when crews are available for reassignment. Periodic status reports enable the supervisor to manage the incident more effectively.

Support for Ventilation

The CO should consider proper apparatus placement, hoseline placement, and entry techniques in support of ventilation efforts. Apparatus should be positioned so that truck companies have ready access to the fire area and areas above the fire. Hoselines should be placed between any occupants and the fire to be ready for increased intensity as ventilation allows more oxygen into the fire area. Forcible entry must be made at the right place to effect ventilation as well as to support the advancement or placement of hoselines. Selection and placement of ladders, adequate lighting, and a replacement supply of breathing air also may be necessary.

Ventilation Hazards

The CO should be aware of the hazards introduced into ventilation operations by opening below the fire, opening too soon, opening in the wrong place, or opening into a blind attic. Opening below the fire may draw the fire toward entering firefighters or exiting civilians. Opening before hoselines are ready to check increased fire intensity may allow the fire to gain considerable headway as it extends unchecked. Opening a building in the wrong place can draw the fire toward unburned areas or areas where civilians and firefighters are. Opening into a blind attic (one without other openings), especially from below, can cause a sudden flashover or backdraft to occur. Firefighters must coordinate hoseline placement and ventilation efforts when pulling a blind attic ceiling from

below. When the ceiling is pulled, the fire will intensify. Without hoselines and ventilation, this fire can easily blow down on the firefighters pulling the ceiling, causing injury or death. Insufficient openings--ones that endanger exposures--or openings delayed too long also are hazards.

Ventilation Coordination Issues

Coordinating ventilation with rescue should receive the highest priority. It improves the environment for victims and firefighters. Ventilation also should be coordinated with entry and fire attack. Opening too early will increase fire spread and damage. Opening too late will make extinguishing the fire more difficult and will increase risk to firefighters.

Allowing hoselines to hinder ventilation is a fundamental tactical error. Examples include hose streams in roof openings, opposing hoselines, and lines being operated from the outside and the steps in basement fires.

Develop a Ventilation Action Plan

A Ventilation Action Plan must be developed so that tactical operations can be completed effectively and efficiently. The CO must identify the tactic(s) that ventilation is supporting and must determine the sizeup factors that are critical to a specific incident. He/She then decides where ventilation will take place and the specific tactic(s) to be used. Required support and necessary coordination with other tactical assignments must be considered. Needed equipment, apparatus, tools, and personnel must be identified. Because of the hazardous nature of ventilation efforts, the CO must continually monitor the safety of assigned firefighters.

RESCUE

Rescue is a systematic process used to safely locate, protect, and remove occupants and fire victims from a structure, and convey them to a place of safety.

Select Appropriate Rescue Tactic(s)

There are three basic rescue tactics: Conduct a primary search, conduct a secondary search, and provide for rescued occupants.

Conduct Primary Search

A primary search is a rapid search of all areas involved in or exposed to fire, if they can be entered, to verify removal and/or safety of occupants. It is a quick search for live victims and should consider risk/benefit. It should be a routine function performed at every structure fire. An effective approach is to have an interior team search the immediate fire area and normal exit paths while an exterior team makes direct entry to upper floors from the outside, bypassing severe conditions in the fire area.

If possible, the search team should work outward from the fire area. If not, they should work inward from normal entry points. Victims usually are found in routes they use to enter and exit, behind doors and under windows, and in bedrooms.

When removing victims, choose a method that will move people out of danger in the fastest and safest way. Usually this involves using the stairs. The **"ALL CLEAR"** should be transmitted upon completion of the primary search.

Conduct Secondary Search

The secondary search is an extremely thorough search of the interior fire area after initial fire control, ventilation, and interior lighting are completed, to ensure that there is no possibility of victims remaining undiscovered. It is often combined with overhaul and may involve body recovery. Different people should do primary and secondary searches, if possible. All spaces that could possibly hold a human being, including those not damaged by fire, must be examined.

Provide for Rescued Occupants

The best victim removal path is interior stairs, followed by escorting victims down exterior fire escapes. The least desirable method is to use ground or aerial ladders. After removal, victims should be taken to a triage area and treated and transported as required. It is also necessary to make provision for uninjured, displaced persons.

Tactical Sizeup for Rescue

When making a rescue tactical sizeup, consider: the stage of fire development; the number, location, and condition of victims; the effect of fire on victims; and the capability of onscene companies to enter building, protect or remove occupants, and control the fire.

The **stage of the fire** affects your approach to rescue. A simple interior primary search is all that is required at investigations. Minor fires require a primary search with attack lines. Primary search, attack lines, and support are needed at working offensive fires. Primary search in accessible areas should be completed in transitional fires where the mode is switching between offensive and defensive. No primary search occurs at defensive fires.

The **number, location, and condition of victims** and the effect the fire is likely to have on them affects the order of rescue. In general, victims are first rescued from the fire floor, then from the floor above, then from the top floor, and, finally, from the rest of the building.

The **capability of onscene companies** to enter the building, protect or remove occupants, and control the fire will have a significant effect on the successful outcome of the rescue effort.

Other sizeup questions that must be addressed by the CO include the number and location of the victims, whether or not exits are accessible, the location and direction of travel of the fire, and the best method for reaching and protecting victims. It also is important to determine whether ventilation and/or protective hoselines can aid the rescue effort. Finally, the CO must identify any specific hazards to firefighters.

Support for Rescue Operations

Almost all support functions open the structure in some way and can magnify the problem, so **timing is critical**. Support should be just ahead of rescue to enable personnel to function where needed.

Protective lines serve two purposes. They protect firefighters and citizens by separating fire from people closest to it, by controlling interior stairways and corridors so firefighters can advance and occupants can be evacuated, and by protecting firefighters searching above and around fire areas. They also serve as guidelines to escape paths.

Rapid entry is required when fire threatens to cut off escape routes or has trapped victims. The most likely place to find victims is in the path to doors the occupants normally use.

Ventilation allows entry, increases safety of interior operations, and improves visibility. Ventilation must be coordinated with search and protective lines should be in place before search begins. Opening the roof assists rescue and attack; rapid ventilation by exterior ladders can support interior search.

Portable and aerial ladders should be raised if and where needed to place personnel on upper floors, remove occupants, lower the injured, and provide a secondary means of egress.

The best way to protect occupants is to put the fire out. Therefore, **confinement and extinguishment** efforts should be initiated as soon as possible, but outside streams should not be used in occupied buildings.

Rescue Coordination Issues

Teamwork, organization, and good communication are vital to effective operations. Rapid ventilation should be used to prevent further buildup of products of combustion, being careful not to draw them toward occupants. Use the first hoseline to keep fire away from people, and advance other lines to protect escape routes. Laddering may be necessary to ventilate and advance protective hoselines.

Develop a Rescue Action Plan

A Rescue Action Plan must be developed so that tactical operations can be completed effectively and efficiently. Critical sizeup factors include the stage of the fire; the number, location, and condition of victims; and the capability of the onscene personnel. Specific primary search assignments should be made for every incident. After control of the incident, a secondary search should be executed. Provision should be made for rescued occupants. Support required and necessary coordination with other tactical assignments must be considered. Determine needed tools, apparatus, equipment, and personnel. Because of the hazardous nature of the ventilation efforts, the CO must continually monitor the safety of assigned firefighters.

SUMMARY

Safe, timely, and efficient ventilation and rescue should be the primary operational goals of the CO. The ability to develop and carry out a planned and systematic procedure for removing heat and other products of combustion from a burning structure and for completing search and rescue is critical to achievement of incident priorities and to the success of fire department operations.

ACTIVITY 2.1

VENTILATION ISSUES

Purpose:

To give you an opportunity to recognize ventilation issues unique to the type of structure and the location of the fire in the structure.

Directions:

For each slide, you will be asked to describe ventilation issues unique to the type of structure and/or the location of the fire in the structure. Each slide contains key words to focus your attention on important areas.

Summary:

In addition to understanding general principles of ventilation, it is important to recognize ventilation issues that are unique to particular structures and to the location of fire within those structures.

The list of issues developed by the class should be regarded as **representative** of various types of structures. As a followup to this activity you should study the structures found in your own community and determine their unique characteristics.

ACTIVITY 2.2

RESCUE ISSUES

Purpose:

To give you an opportunity to recognize rescue issues unique to the type of structure and the location of the fire in the structure.

Directions:

For each slide, you will be asked to describe **rescue issues unique to the type of structure and/or the location of the fire** in the structure. Each slide contains key words to focus your attention on important areas.

Summary:

In addition to understanding general principles of rescue, it is important to recognize rescue issues that are unique to particular structures and to the location of fire within those structures.

The list of issues developed by the class should be regarded as **representative** of various types of structures. As a followup to this activity you should study the structures found in your own community and determine their unique characteristics.

ACTIVITY 2.3

VENTILATION AND RESCUE

Purpose:

To allow you to demonstrate the ability to implement the tactical assignment of rescue or ventilation in support of rescue.

Directions:

After completing the walk-through scenario in class, your group will develop a Ventilation Action Plan or Rescue Action Plan for one of two scenarios.

Review the materials provided (Scenario, Factsheet, QAP, Plot Plan/Floor Plan). Then use the appropriate part of the activity worksheet to answer the questions relating to either the Ventilation Action Plan or the Rescue Action Plan. Assume that you are developing your action plan and making assignments independently. Overlapping assignments will be discussed in the activity debriefing.

Select a spokesperson to present your group's final decisions to the class.

ACTIVITY 2.3 (cont'd)

WALK-THROUGH SCENARIO

A fire has been reported in a two-story rowhouse with basement. The fire is located in the basement, and smoke is issuing from the basement, first floor, and from under the eaves of the roof. The time is 0630 hours.

Rescue assignment:

Complete primary search of the entire dwelling in no more than 5 minutes.

Ventilation assignment:

Ventilate to support a primary search operation on the first and second floors.

Other tactical operations assigned:

One engine company is deploying a hoseline to protect search and ventilation crews.

ACTIVITY 2.3 (cont'd)

WALK-THROUGH SCENARIO

FACTSHEET

DESCRIPTION

Construction:

Built in 1948
Each unit is 35' x 18', 2-story with garage in basement
Eight units
Every two units separated by firewall
No access to cockloft
Rear exterior basement and garage door

Exposures:

Units are exposures to one another

Water supply:

1,000 gpm, 300 feet to east

Weather:

Temperature 30°F
Wind from west at 5 mph

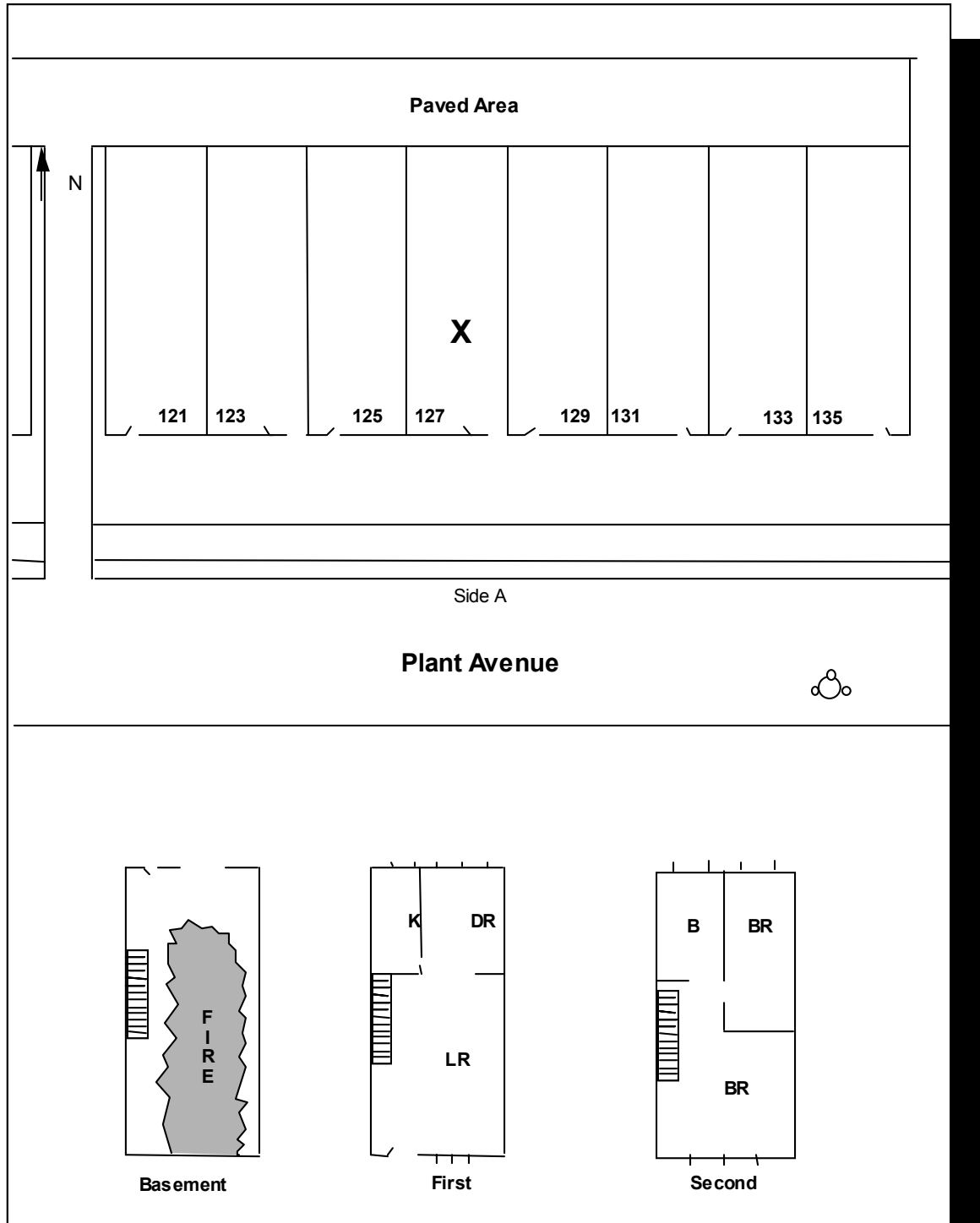
Resources:

2 Engines, 1 Truck

Fire conditions:

Fire reported at 0630 hours at 129 Plant Avenue
Heavy smoke from first floor on Side A and from under eaves
Fire visible from basement window on Side A

ACTIVITY 2.3 (cont'd)
WALK-THROUGH SCENARIO
PLOT PLAN/FLOOR PLAN



ACTIVITY 2.3 (cont'd)
WALK-THROUGH SCENARIO
QUICK ACCESS PREFIRE PLAN

Building Address: *121 - 135 Plant Ave.*

Building Description: *35' x 18', 2-story, ordinary, common cockloft (2 units) garage below*

Roof Construction: *2" x 6" rafters, plywood sheathing, composition*

Floor Construction: *2" x 8" joist, platform, plywood sheathing, hardwood*

Occupancy Type:
Rowhouse

Initial Resources Required:
2 Engines, 1 Truck

Hazards to Personnel:
No unusual hazards

Location of Water Supply:
Plant and Woodland Ave.

Available Flow:
1,000 gpm

	Estimated Fire Flow*			
Level of Involvement	<i>25%</i>	<i>50%</i>	<i>75%</i>	<i>100%</i>
Estimated Fire Flow	<i>150</i>	<i>300</i>	<i>450</i>	<i>600</i>

**Fire flow based on 1 unit with 2 exposures; 2/3 of water being used for fire extinguishment at any level of involvement*

Fire Behavior Prediction:
Rapid horizontal and vertical spread, with possible extension into cockloft

Predicted Strategies:
Rescue, ventilation, exposures, confinement, extinguishment

Problems Anticipated:
Each 2 units have common cockloft



Standpipe:
No



Sprinklers:
No



Fire Detection:
No

WALK-THROUGH SCENARIO

SUGGESTED RESPONSES

Ventilation Action Plan

1. What tactic(s) is ventilation supporting?
 - Rescue.
2. What tactical sizeup factors are critical to the Ventilation Action Plan?
 - Horizontal ventilation of lower floors.
 - Common cockloft, ventilate before roof becomes unsafe.
 - Vertical ventilation if fire extends into cockloft.
3. Where is ventilation needed?
 - Basement, first, and second floors.
 - Exposures.
4. List in priority order the appropriate tactics.
 - Horizontal ventilation from interior of first floor.
 - Horizontal ventilation of second floor from exterior.
 - Horizontal ventilation of basement from exterior.
 - Horizontal ventilation of exposures, as required.
5. What support must be provided for ventilation efforts?
 - Backup hoseline to first floor for stairway protection.
 - Ladder to second floor.
6. What other tactical assignments require coordination with ventilation?
 - Rescue.
 - Fire attack coordinated with ventilation at basement door.
7. What safety concerns relate to personnel assigned to ventilation?
 - Accountability.

Rescue Action Plan

1. What tactical sizeup factors are critical to the Rescue Action Plan?
 - Working offensive fire requiring rapid ventilation, primary search, and fire attack.
2. List in priority order the appropriate primary search assignments.
 - First floor.
 - Second floor.
 - Exposures.
 - Basement.
3. What provisions will be made for rescued occupants?
 - EMS for treatment and transportation of possible victims.
4. What secondary search assignments will be made? When?
 - Entire fire building.
 - When ventilation and initial fire control are completed.
5. What support will be required for rescue efforts?
 - Ventilation.
 - Protective lines.
 - Laddering second floor.
6. What other tactical assignments require coordination with rescue?
 - Ventilation.
 - Fire attack.
7. What safety concerns relate to personnel assigned to rescue?
 - Accountability.

ACTIVITY 2.3 (cont'd)

SCENARIO 1

A kitchen fire has been reported at the Mile Post Inn. The time is 1900 hours, Friday. Due to the large amount of smoke on the second floor and coming from the attic area on arrival, it is evident that the first-floor kitchen fire has penetrated to the second floor. There is light smoke on the first floor.

Rescue assignment:

Complete a primary search of the entire building in no more than 10 minutes.

Ventilation assignment:

Ventilate to support the primary search operation.

Other tactical operations assigned:

One engine company is deploying a hoseline to protect search and ventilation crews and to begin confinement of the fire.

ACTIVITY 2.3 (cont'd)

SCENARIO 1

FACTSHEET

DESCRIPTION

Construction:

Original section built in 1926
Wood frame, 100' x 75'
Partial attic
Basement under original section
Multiple renovations
Multiple and overlapping roofs

Exposures:

Two-story, ordinary construction retail store, 35 feet to east

Water supply:

Primary: 1,800 gpm, 400 feet east of building
Secondary: 1,200 gpm, 200 feet north of building

Weather:

Temperature 80°F
Wind from west at 10 mph

Resources:

2 Engines, 1 Truck

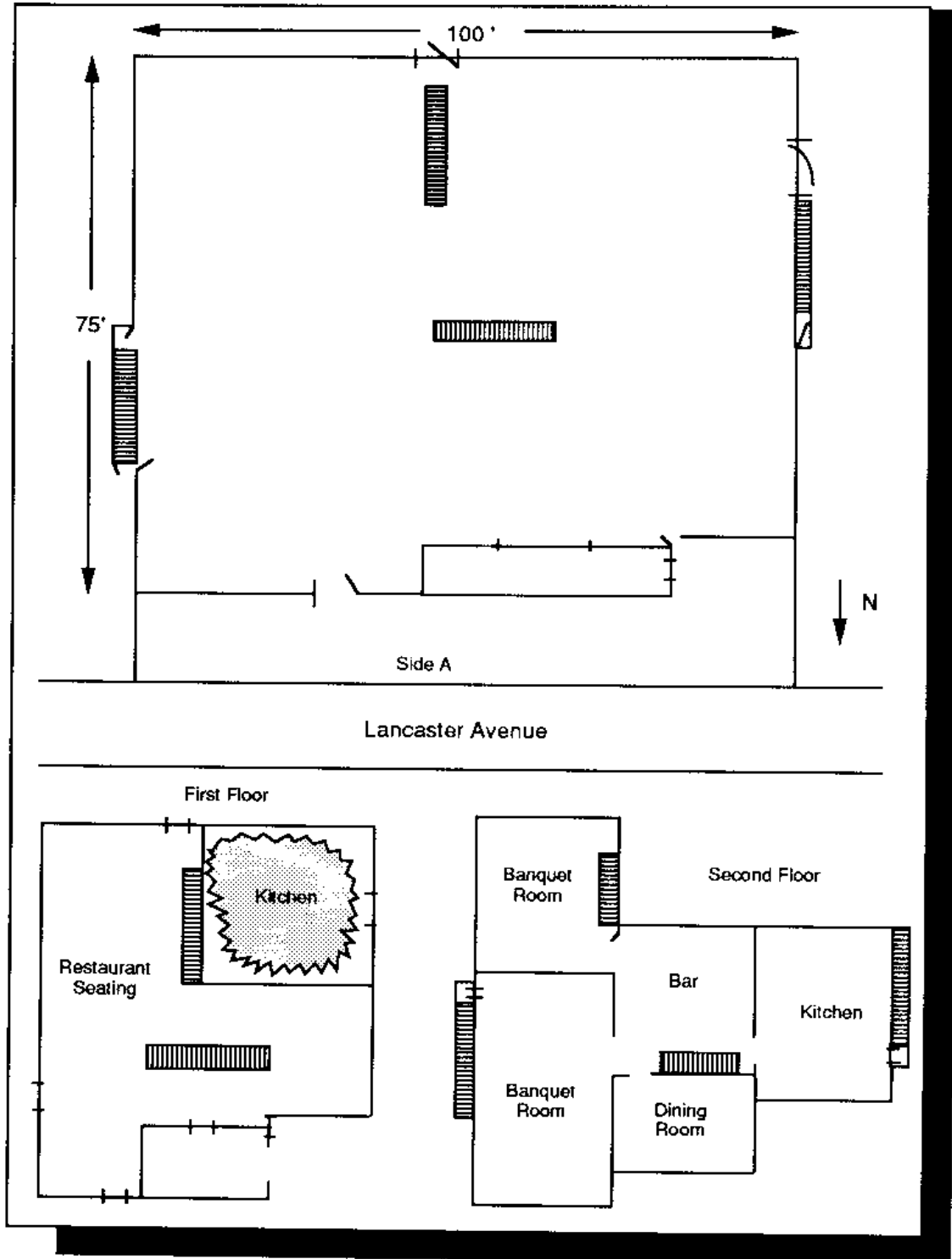
Fire conditions:

1900 hours on a Friday
Banquet for 25 people being served on second floor
40 people on first floor
Fire is reported to have started on stove in kitchen and is extending through ceiling to second floor
Heavy smoke on second floor and coming from attic windows on west side of building
Light to medium smoke on first floor
Evacuation has started, and there are many people milling around parking lot

ACTIVITY 2.3 (cont'd)

SCENARIO 1

PLOT PLAN/FLOOR PLAN



ACTIVITY 2.3 (cont'd) SCENARIO 1 QUICK ACCESS PREFIRE PLAN																			
Building Address: <i>644 Lancaster Avenue, Mile Post Inn</i>																			
Building Description: <i>100' x 75', 2-story, wood-frame construction, partial basement</i> Roof Construction: <i>Ridgepole and rafter with asphalt shingles; built-up roof over kitchen</i> Floor Construction: <i>Platform, 2" x 10" joist, 1" x 6" sheathing</i>																			
Occupancy Type: <i>Restaurant - first floor</i> <i>Banquet room - second floor</i>		Initial Resources Required: <i>2 Engines, 1 Truck</i>																	
Hazards to Personnel: <i>No unusual hazards</i>																			
Location of Water Supply: <i>Primary - Lancaster, 400' east</i> <i>Secondary - Eagle 200' north</i>		Available Flow: <i>1,800 gpm</i> <i>1,200 gpm</i>																	
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td></td> <td colspan="4">Estimated Fire Flow*</td> </tr> <tr> <td style="text-align: left;">Level of Involvement</td> <td>25%</td> <td>50%</td> <td>75%</td> <td>100%</td> </tr> <tr> <td style="text-align: left;">Estimated Fire Flow</td> <td>1,250</td> <td>2,500</td> <td>3,750</td> <td>5,000</td> </tr> </table>						Estimated Fire Flow*				Level of Involvement	25%	50%	75%	100%	Estimated Fire Flow	1,250	2,500	3,750	5,000
	Estimated Fire Flow*																		
Level of Involvement	25%	50%	75%	100%															
Estimated Fire Flow	1,250	2,500	3,750	5,000															
<i>*Based on 2-story building</i>																			
Fire Behavior Prediction: <i>Rapid horizontal and vertical spread</i>																			
Predicted Strategies: <i>Rescue, confinement, extinguishment, ventilation</i>																			
Problems Anticipated: <i>Multiple renovations; multiple and overlapping roofs; concealed spaces. Access to second floor</i>																			
<input type="checkbox"/> Standpipe: <i>No</i>		<input type="checkbox"/> Sprinklers: <i>No</i>		<input checked="" type="checkbox"/> Fire Detection:															

ACTIVITY 2.3 (cont'd)

SCENARIO 1

Ventilation Action Plan

1. What tactic(s) is ventilation supporting?
2. What tactical sizeup factors are critical to the Ventilation Action Plan?
3. Where is ventilation needed?
4. List in priority order the appropriate tactics.
5. What support must be provided for ventilation efforts?
6. What other tactical assignments require coordination with ventilation?
7. What safety concerns relate to personnel assigned to ventilation?

Rescue Action Plan

1. What tactical sizeup factors are critical to the Rescue Action Plan?
2. List in priority order the appropriate primary search assignments.
3. What provisions will be made for rescued occupants?
4. What secondary search assignments will be made? When?
5. What support will be required for rescue efforts?
6. What other tactical assignments require coordination with rescue?
7. What safety concerns relate to personnel assigned to rescue?

ACTIVITY 2.3 (cont'd)

SCENARIO 2

A fire has been reported at the Crestwood Apartments. The time is 1330 hours, Friday. Upon arrival, heavy smoke is seen coming from several windows on the second floor, Side A. A third-floor occupant reports that her kitchen is filling with smoke. Medium smoke conditions are encountered in the second-floor corridor, and elderly occupants are attempting to use the elevator.

Rescue assignment:

Complete primary search of the second floor of the building in no more than 10 minutes. In 15 minutes, conclude primary search of entire building.

Ventilation assignment:

Ventilate to support the primary search operation.

Other tactical operations assigned:

One engine company is deploying a hoseline to begin confinement of the fire from the interior.

ACTIVITY 2.3 (cont'd)

SCENARIO 2

FACTSHEET

DESCRIPTION

Construction:

Built in 1962
Fire-resistive construction
Three-story, 230' x 50', with 60' x 30' section on Side A
36 apartments
Formed concrete floors, wood roof

Exposures:

Apartments are enclosed in 1-hour rated walls
Each apartment has exposure apartments surrounding it on each floor
One additional exposure on floor above

Water supply:

1,000 gpm, 500 feet to east, 1,000 gpm, 700 feet to west

Weather:

Temperature 30°F
Wind from south at 10 mph

Resources:

2 Engines, 1 Truck

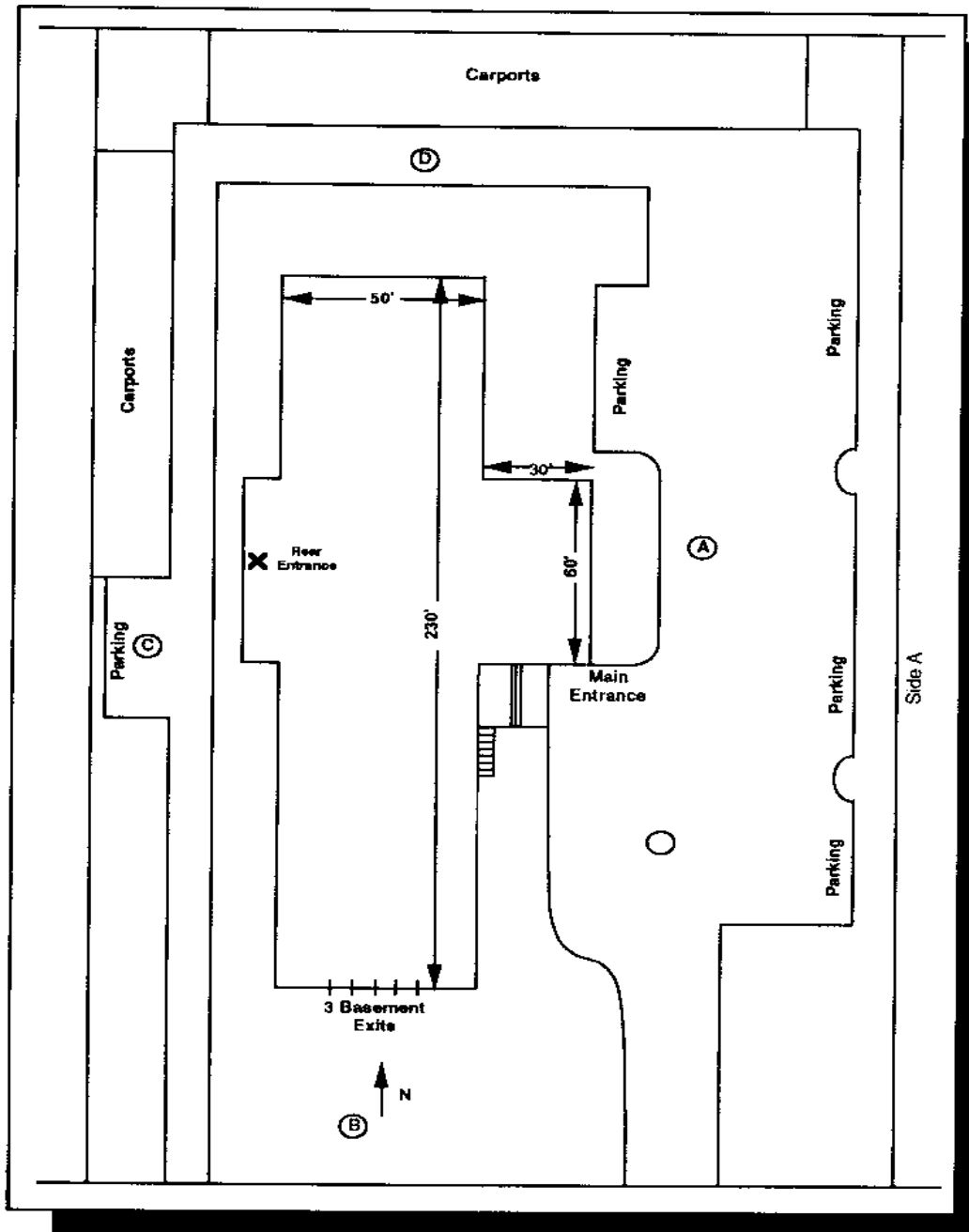
Fire conditions:

Apartment B-9 (second floor) occupant reports her kitchen is filling up with smoke at 1330 hours
Upon arrival, heavy smoke is seen coming from several windows on second floor, Side A, and light smoke is coming from an apartment on the third floor
First-arriving firefighters find medium smoke in second-floor corridor, with elderly occupants attempting to use elevator

ACTIVITY 2.3 (cont'd)

SCENARIO 2

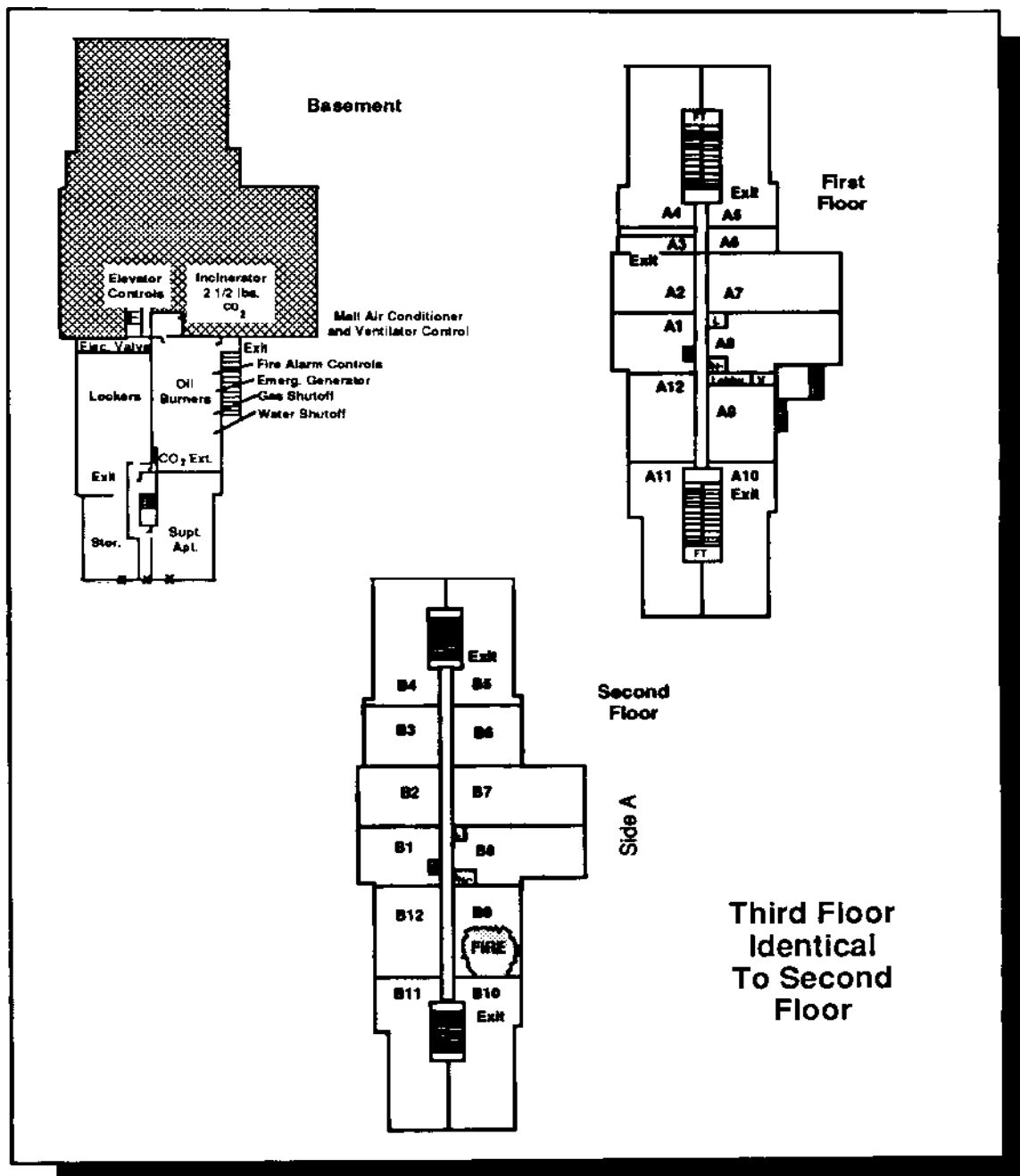
PLOT PLAN



ACTIVITY 2.3 (cont'd)

SCENARIO 2

FLOOR PLAN



ACTIVITY 2.3 (cont'd)
SCENARIO 2
QUICK ACCESS PREFIRE PLAN

Building Address: *421 Lancaster Avenue, Crestwood Apartments*

Building Description: *230' x 50', 3-story and basement, noncombustible construction with 60' x 30' section Side A, center corridor apartment*

Roof Construction: *Wood truss with plywood sheathing, asphalt shingle*

Floor Construction: *Formed concrete*

Occupancy Type:
36-unit center corridor apartment

Initial Resources Required:
2 Engines, 1 Truck

Hazards to Personnel:
Roof collapse during attic fire

Location of Water Supply:
Lancaster Ave. and St. Davids Road

Available Flow:
2,000 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	<i>110</i>	<i>220</i>	<i>330</i>	<i>440</i>

**Fire flow based on 1 unit with 1 horizontal and 1 vertical exposure*

Fire Behavior Prediction:
Rapid spread within apartment, vertical spread through pipe chases, rapid spread if fire gets in attic

Predicted Strategies:
Rescue, confinement/extinguishment, ventilation

Problems Anticipated:
Block walls separating apartments - cut off at attic floor level - attic undivided - access through trap door, most residents elderly



Standpipe:
No



Sprinklers:
No



Fire Detection:

ACTIVITY 2.3 (CONT'D)

SCENARIO 2

Ventilation Action Plan

1. What tactic(s) is ventilation supporting?
2. What tactical sizeup factors are critical to the Ventilation Action Plan?
3. Where is ventilation needed?
4. List in priority order the appropriate tactics.
5. What support must be provided for ventilation efforts?
6. What other tactical assignments require coordination with ventilation?
7. What safety concerns relate to personnel assigned to ventilation?

Rescue Action Plan

1. What tactical sizeup factors are critical to the Rescue Action Plan?
2. List in priority order the appropriate primary search assignments.
3. What provisions will be made for rescued occupants?
4. What secondary search assignments will be made? When?
5. What support will be required for rescue efforts?
6. What other tactical assignments require coordination with rescue?
7. What safety concerns relate to personnel assigned to rescue?

MODULE 3: FIRE CONFINEMENT AND EXTINGUISHMENT

OBJECTIVES

The students will:

- 1. Select and deploy the appropriate hoselines to accomplish fire confinement and extinguishment.*
 - 2. Identify and explain the actions required to support fire confinement and extinguishment activities.*
 - 3. Explain the correct procedures and select the appropriate size hoselines for attaching to a fire department connection.*
 - 4. Describe the procedures for deployment of a hoseline from a standpipe system.*
-

NOTE-TAKING GUIDE

I. DEFINITIONS AND PRINCIPLES

A. Fire confinement.

Those actions taken to confine a fire to a given area of present involvement by preventing the spread of fire into any uninvolved area.

B. Fire extinguishment.

Those actions taken following fire confinement to extinguish a fire by removing the fuel, air supply, or, most commonly, the heat.

C. Principles of fire confinement and extinguishment.

1. Keep fire from extending into unburned areas.
2. When confinement has been accomplished, fire extinguishment is the next tactical operation.

NOTE-TAKING GUIDE

II. FIRE CONFINEMENT TACTICS

A. Purpose of a tactical assignment for fire confinement is to stop the progress of the fire for a specific purpose.

1. Search or rescue.
2. Defensive operational mode.
3. Save uninvolved areas.

B. Sizeup for confinement.

1. Location and extent of the fire.
2. Building construction classification and occupancy.
3. Fire flow requirements.
4. Lead time.

NOTE-TAKING GUIDE

5. Fixed suppression equipment.

6. Personnel.

7. Coordination.

C. Selection of hoseline and nozzle for fire confinement.

1. Size of hoseline.

Type of Line	Size	Characteristics			
		Fast	Mobile	Volume	Reach
Medium	1-1/2" to 2"	Yes	Yes	Medium	Medium
Large	2-1/2"	No	No	Large	Long

2. Length of hoseline.

3. Type and size of nozzle.

NOTE-TAKING GUIDE

- D. Positioning of hoseline to support tactical assignment of fire confinement.

- E. Fire Confinement Tactical Action Plan.

Activity 3.1: (See SM p. 3-27)

III. FIRE EXTINGUISHMENT TACTICS

- A. Purpose of tactical assignment for fire extinguishment is to bring the burning materials below their ignition temperature to stop flame production.

- B. Sizeup for extinguishment.

NOTE-TAKING GUIDE

- C. Nozzle selection.
- D. Hoseline selection.
- E. Positioning of hoseline for extinguishment.
- F. Coordinate fire extinguishment with other tactical assignments.
- G. Safety.
- H. Fire Extinguishment Tactical Action Plan.

Activity 3.2: (See SM p. 3-43)

NOTE-TAKING GUIDE

IV. SUPPORTING AND USING FIXED FIRE PROTECTION EQUIPMENT

A. Automatic sprinkler system.

A system of piping, valves, and water discharge heads to confine and/or control the fire during the first stage of burning.

B. Standpipe system.

A system of piping and valves that are located on each floor of a building to provide a reliable and sustained source of water for firefighting operations.

National Fire Protection Association Standard #14
Standpipe and Hose System Classification

Class	Connection Size	Minimum Flow	Minimum Pressure
I	2-1/2"	500 gpm	65 psi
II	1-1/2"	100 gpm	65 psi
III	2-1/2" to 1-1/2"	500 gpm	65 psi

C. Preincident planning.

NOTE-TAKING GUIDE

- D. Connecting to a fire department connection.

- E. Pumping into automatic sprinkler system.

- F. Connecting attack line to standpipe connection.

- G. Coordination.
 - 1. It is imperative that the officer assigned the responsibility of fire confinement and extinguishment effectively coordinate with other operations taking place at the incident scene.

 - 2. Company officers given a tactical assignment to confine and/or extinguish a fire must coordinate their assignment with all other tactical assignments.

- H. Safety considerations.

NOTE-TAKING GUIDE

- I. Supporting and using Fixed Fire Protection Tactical Action Plan.

Activity 3.3: (See SM 3-59)

V. SUMMARY

DEFINITIONS AND PRINCIPLES

Fire confinement tactics are those actions taken to confine a fire to a given area of present involvement by preventing the spread of the fire into any uninvolved area.

Fire extinguishment tactics are those actions taken following fire confinement to extinguish a fire by removing the fuel, air supply, or, most commonly, the heat.

The most basic principle of fire confinement is to keep the fire from extending into unburned areas. Once fire confinement has been accomplished the next step is to extinguish the fire. Often this will be accomplished by the same hoseline and will appear to be a simultaneous effort.

Many structures have been equipped with **fixed fire protection equipment** to confine a fire, extinguish a fire, or make it easier for fire suppression personnel to apply water to a fire by placing a reliable water supply in stairwells at each floor. As fire officers, we must provide for the support and proper use of this equipment as part of our tactical operations.

A fire incident will require several **tactical assignments**, and all tactical assignments must be closely coordinated with other Company Officers (COs) and the Incident Commander (IC). A CO given a tactical assignment of fire confinement or extinguishment may also be supporting other assignments, such as primary search; similarly, other tactical assignments, such as ventilation, may be supporting confinement and extinguishment. Close coordination of all tactical assignments is one of the management tools for a smooth and successful conclusion to a fire incident.

FIRE CONFINEMENT TACTICS

When given a tactical assignment for fire confinement, the CO should be clear on **why** fire confinement was assigned. If the purpose is not clear, he/she must ask the IC to clarify it. One typical fire confinement assignment may be to provide support for a search or rescue effort. Given this assignment, the CO should position the hoseline to protect the means of egress, such as stairways and hallways, for the rescue team. Of particular concern when supporting a search effort is the potential for a flashover; the hoseline can be used effectively to stop the buildup of heat that precedes flashover.

Another tactical assignment for fire confinement may result when resources are not adequate to initiate an inside attack (offensive) and it may be necessary to initiate an exterior attack (defensive) until more resources arrive. A third assignment for fire confinement may be to save the unburned portion of a structure by confining the fire to the burning portion. This usually occurs when it is unsafe to initiate an extinguishment effort, or when resources are not adequate to accomplish fire extinguishment.

Sizeup For Confinement

Sizeup for fire confinement includes several considerations. The first consideration is determining the **location and extent of the fire**: where is the fire now, where is it going to go, and who or what is in its way? **Building construction** classification and occupancy may provide a clue to floor plan and/or potential problems, such as a structural deficiency. The **fire flow requirements** to accomplish the assignment must be evaluated, and maximum gallons per minute (gpm) from available resources must be identified.

It is also important to consider the **lead time required** to place the hoselines in operation. It does no good to finally get a hoseline in position only to find that it was five minutes late and the fire has passed your location. Another sizeup factor is the presence of **fixed suppression equipment** such as sprinklers or standpipes. The presence of sprinklers may indicate that the fire will likely be contained or extinguished, while a standpipe will provide a reliable water supply at the upper floors of the structure. The **number of personnel available** to complete the assignment will dictate the size or number of hoselines that can be placed in service in a timely manner.

It is critical to **coordinate** fire confinement with other tactical operations, such as primary search, ventilation, forcible entry, other hoselines, and the placement of ladders. Some tactical assignments, such as primary search, will be dependent on your ability to confine the fire, and the success of the fire confinement assignment may also be dependent on other tactical assignments, such as ventilation or the placement of ladders.

Selection Of Hoseline and Nozzle For Fire Confinement

The selection of a hoseline and nozzle should be made after several factors are considered. The first consideration is the amount of water that must be produced to overcome the heat produced by the fire. Once the **fire flow requirements** are determined, it is important to view the fire apparatus as

a tool box that contains several tools for water application; it is the CO's responsibility to select the most appropriate tool. Yesterday's fire may have been successfully extinguished with a 1-1/2" line with a fog nozzle that was flowing 100 gpm, while tomorrow's fire may require a 2-1/2" line with a straight stream-smooth bore nozzle flowing 250 gpm. Depending on the structure's configuration, size, and fire involvement, hose stream reach and cooling ability may be critical to stopping and extinguishing the fire. Smooth-bore nozzles flowing higher gpm have the ability reach further and cool more.

Some additional considerations should be the **maneuverability** attainable by the available personnel, and the ability of the hose to supply the water that the nozzle will require. Small hoselines (1 inch or less in diameter) are easily maneuverable, but have very limited water-flow capabilities. Medium size hoselines (ranging from 1-1/2 to 2 inches) have flow rates in excess of 100 gpm, but require more personnel to place in operation than do the small lines. Large lines are generally 2-1/2 to 3 inches in diameter, have flow rates in excess of 200 gpm, and are hard to move once charged. Unfortunately, the fire doesn't care how many personnel you have, how tired you are, or what hoseline you normally use. It will only react when you can apply water to the seat of the fire and absorb more heat than it is producing. It is the CO's responsibility to select the correct tools to deliver the desired fire flow. In any event, the hoseline selected must be long enough to reach the seat of the fire or the area to be protected plus an additional fifty feet of hose for maneuverability.

Another critical decision is the selection of the nozzle for the **application rate** and the **most effective pattern** of water application. A **straight stream-smooth bore nozzle** is ideal when long reach and penetration is required, e.g., for a building which is not compartmentalized into small and manageable areas, such as a high school gymnasium. Water from ineffective hoselines may turn to steam long before it reaches the seat of the fire, and if the water does not get into the seat of the fire and absorb the heat at that location, the fire will continue to burn. Water must be applied at the seat of the fire and, when operating in large open areas such as school auditoriums, grocery stores, and office buildings, the straight stream nozzle may be the best choice for water application.

When the fire building is compartmentalized into manageable areas for fire extinguishment, such as a dwelling, the **fog nozzle** is an excellent choice. The smaller the drops of water leaving the nozzle, the more surface area is created for each gallon of water and the more heat can be absorbed.

Like hoselines, nozzles are tools on the fire apparatus and it is important to use the tool box approach to select the correct tool for the job. Yesterday's bedroom fire may have been best handled with a fog nozzle, and tomorrow's supermarket fire may require a smooth bore-straight stream nozzle. The selection of the correct tools is one of the most important decisions that a CO will make at any incident scene.

Hoseline Placement

Once the hoseline and nozzle are selected, the next critical decision will be the placement of that line. The objective of the assignment will determine the best hoseline position. If the IC has not been clear in the assignment objective, ask for clarification. There could be a significant difference between where a line is put into operation for supporting a primary search effort and where a line is placed to protect from the extension of fire into an adjacent part of the structure.

Hoseline placement for fire confinement to support search and/or rescue generally follows several principles. These include: placing the first hoseline between the fire and the victims and/or rescue team; protecting vertical openings, such as open stairwells; protecting hallways from fire extension; and protecting the rescue area from flashover or rollover. When the assignment is completed, back the line out. If conditions deteriorate and the rescue team has left, back the lines out. **Never abandon your hoselines**, since you may need the protection of the water before you can get your confinement team out.

Hoselines will also be used to prevent further destruction by being positioned **to confine the fire to the burning area**. This requires determining the best point to enter from the unburned side, and moving to the position where the progress of the fire is to be stopped. This may include hallways, crawl spaces, or other voids where it has been determined the forward progress of the fire must be stopped. It is extremely important to provide for a backup line to protect the confinement line, and a safe means of egress for the personnel.

In some situations the only viable option is to initiate an attack from the burning side. Buildings such as row houses, mercantile row buildings, or areas with only one means of access available can force a direct attack on the fire rather than an attack from the unburned side. All options, such as going through a neighboring structure or returning into the rear of the burning structure, must be considered. **Initiate a frontal attack only as a last resort, when no other options are available.**

Coordination

All fire attack operations must be coordinated with ventilation. If possible, ventilation should be accomplished just prior to the initial fire attack, which will allow a place for the heat to be released from the structure, and allow the steam that is generated a place to be released. In addition, safety will be enhanced by improving visibility and, at the same time, reducing the potential of flashover. Other considerations include getting a backup line in position as soon as possible and pushing the fire back to its area of origin. Remember, the fire has the potential for extension on six sides.

Tactical Action Plan

A Tactical Action Plan for fire confinement will include: selection of hoseline(s) and nozzle(s); determination of hoseline placement(s); identification of tactics required to support confinement; identification of required personnel and equipment; identification of required coordination; safety considerations; and determination of task assignments for crew(s).

FIRE EXTINGUISHMENT TACTICS

The purpose of the tactical assignment for fire extinguishment is to **stop the combustion process**. This is most commonly accomplished by bringing the temperature of the burning materials below their ignition temperature by absorbing the heat with water, resulting in fire extinguishment. This tactical assignment should include a **geographic location** of where the fire is to be extinguished. For example, the assignment may be to extinguish the fire on the second floor of a dwelling, to extinguish the fire in the south wing of the high school, or to extinguish the fire in the basement of the shoe store.

Sizeup For Extinguishment

When given an extinguishment assignment, one of the first steps must be to conduct an extinguishment sizeup. This sizeup process should include determining the **location and extent of the fire**: where is the fire now? where is the fire going? and who or what is in its way?

The **risk** to the personnel assigned to extinguishment also must be evaluated against the benefit that is expected. Extinguishing a fire on the third floor of a high-rise office building to protect the lives of the people above the fire floor may be viewed differently than sending personnel into

a vacant structure that is suspect for early collapse. The greater the risk, the greater the need for the management of safety with items such as backup lines and ventilation.

Evaluate areas of access and egress and select the most appropriate for hoseline advancement into the structure. Evaluate the building for its **construction classification**, since this may provide valuable insight as to how the fire may spread, anticipated floor plans, and potential problems. Consider all structural deficiencies in determining the risk/benefit evaluation.

Nozzle Selection

The selection of nozzle(s) should be appropriate for the fire area and be able to produce the fire flow required. At many fire incidents multiple lines may be necessary to accomplish this goal. If unsure of the correct size hoseline to initiate, **select the largest hoseline you can advance with the personnel available**. It is better to be 100 gallons over what is needed to put the fire out than 100 gallons short. Remember that straight stream nozzles have a much better reach than fog nozzles. Fog nozzles produce much smaller drops of water and absorb heat faster than straight stream nozzles. Nozzle selection is an important step in preparing for successful fire extinguishment and should be considered carefully.

Hoseline Selection

The hoseline selected should reach the seat of the fire with at least an additional fifty feet available, and should be large enough to accommodate the flow requirements of the nozzle that will be attached. Typically, fire apparatus will be equipped with small, medium, and large hoselines. The selection of the correct line is an important step in preparing for a successful fire attack.

Hoseline Position

Positioning hoselines for extinguishment is similar to the procedure for fire confinement. Select the available areas of access and egress, and initiate the attack from the unburned side when possible. If the fire is in the front, attack from the rear. If the fire is located in the rear of the structure, attack from the front.

Fires below grade require special consideration for safety and ventilation. Fires on upper floors may require an attack from below before moving upward. In some situations, windows on upper floors also can be considered for hoseline access and ventilation. Occasionally, the fire load can be controlled by reducing the fuel, e.g., closing a valve on a flammable liquid line that is feeding a fire, or controlling the building utilities or closing the gas supply valve.

The position for backup lines should be selected as carefully as it was for the attack lines, and the backup lines should be of the same size as the attack line or larger. All efforts must be made to eliminate opposing hoselines, which can occur if the placement is not carefully planned. The backup line should be placed into service as soon as possible after the attack line(s) are initiated and, if possible, should originate from a separate water supply.

Coordination

Fire extinguishment must be coordinated with all other tactical assignments. Since extinguishment efforts are best if initiated after ventilation, it is imperative to coordinate with the ventilation team. Premature ventilation before hoselines are into position may result in extensive fire spread. Delayed ventilation may keep the fire area untenable because of the heat, and may make the extinguishment efforts ineffective. **Coordination of ventilation and fire attack** is extremely important to the success of fire extinguishment.

Fire extinguishment also must be coordinated **with forcible entry**. If the extinguishment team is expected to provide for its own forcible entry efforts, this should be clarified prior to entry so that the team can carry the proper tools.

Ladders may be required to advance hoselines into upper floors for fire extinguishment, which will require the person in charge of the fire extinguishment to coordinate with the person in charge of laddering. If there is no one assigned to laddering, the fire extinguishment team may have to provide its own ladders for fire extinguishment. Many ICs will require that ladders be placed as a routine part of the incident management. The extinguishment team should note ladders being raised, as they may be needed to provide a secondary means of egress in an emergency.

Lighting is another important part of an incident, especially during nighttime hours. Coordinating extinguishment efforts with those of lighting will make the incident scene safer, and it will be more effective for the

extinguishment team to seek out areas of hidden fires and complete their assignment.

Safety

The CO must consider the safety of the personnel given the tactical assignment of extinguishment. The extinguishment team will be extremely vulnerable to injuries as it will be in the hottest part of the structure, the portion of the structure that is the most vulnerable to collapse, and at the greatest risk for flashover. If the IC has assigned a safety officer, the CO should inform that person where he/she will be making entry and the area where the extinguishment team is expected to be operating. This is important should an unanticipated problem occur which requires assistance. Remember: under the Incident Command System if the IC does not implement the Safety Officer position and staff it, the IC **is** the Safety Officer in addition to command. The most important responsibility of a CO is to manage the safety of the crew.

Firefighter Survival Risk Profiles

- We will always begin our response with the assumption that we can save lives and property.
- We **may** risk our lives a lot in a calculated manner to save savable lives.
- We **may** risk our lives, only a little, in a calculated manner to save property.
- We will **not** risk our lives for lives and property already lost.

Incident Scene Accountability

All officers holding positions within the Command organization are responsible for the welfare and accurate accountability of all assigned firefighters. Several fireground accountability systems have been developed by various fire departments around the country. While they may vary in overall design, there are common elements of personnel accountability that fire departments should apply at emergency incidents to fully account for their personnel. These common elements are

- required use;
- hardware--nametags/documentation;
- point-of-entry control of nametags;
- accountability officers;
- benchmarks for required roll-calls throughout operations;
- plans for describing the Command organization response to reports of lost firefighters; and
- use of Rapid Intervention Crews (RIC's).

Whatever the design, the system must be able to locate every firefighter within a small geographic work area within the hazard zone at any moment in time. Further, the system must be able to determine if a firefighter is delayed from an assignment, initiate an immediate rescue effort, if indicated, and fully integrate into the Incident Command System (ICS). **All fire departments are strongly encouraged to develop and implement a workable accountability system for their department.** The final product should be compatible with metro-area or regional accountability systems.

The last step before entering the structure to accomplish extinguishment should be to **inform the IC** of your activity and the location where you will complete fire extinguishment. After extinguishment tactics are initiated, **regular progress reports** are vital for the IC to determine if the incident strategies are being successful, if additional resources will be required, or if a new incident strategy is in order. The best information that the IC will receive about the extinguishment of the fire is the CO's progress reports.

Rapid Intervention Crew

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, requires having specifically designated rescue crews at the incident scene. This requirement is based on the realization that firefighters are exposed to the highest risk of injury or death while operating at the scene of an emergency and that one of the most effective mechanisms for reducing that risk is to have a Rapid Intervention Crew (RIC) ready to come to the assistance of emergency personnel should the need arise.

One of our primary concerns should be to reduce the risks that we and our firefighters are exposed to during emergency operations.

It is not realistic, however, to assume that all the risks can be avoided, controlled, or eliminated from the firefighter's environment. We realize that danger is part of our work environment, and the possibility that things can go wrong always must be considered. Recognizing this possibility, we must make some provisions to assist members who find themselves in trouble.

An important aspect of incident management is to identify the risk characteristics of the situation and to evaluate specific risk factors that apply to each activity. A situation involving a high level of risk requires a greater commitment to rapid intervention for the rescue of emergency personnel should something go wrong. An interior fire in a small, single-story building presents a certain level of risk to the firefighters who enter to search for occupants and to extinguish the fire. While a situation may appear to be routine, there are still things that could go wrong and place firefighters in imminent danger. A flashover could envelop them in flames, a structural collapse could trap them, or a faulty self-contained breathing apparatus (SCBA) could cause a firefighter to run out of breathable air. In a small, single-story occupancy, the chances are fair that firefighters could extricate themselves from most situations if they are a short distance from an exit that leads directly to the exterior.

The same fire situation in a large building, in a basement or an upper floor, in the hold of a ship or in a high-rise building presents a much greater danger simply because, in these areas, the ability of individuals to rescue themselves is reduced by the distance they would have to travel to reach a safe area and the difficulties they might encounter along the way.

The risk also may be increased by the nature of the task in which firefighters are involved. Rescuing an unconscious worker from a confined space that is filled with toxic and flammable vapor is much more dangerous to rescuers than removing an unconscious person from a wrecked automobile on a city street. Both situations involve a degree of risk to the rescuers, but the nature and degree of the risks are very different.

The composition and placement of RIC's may be somewhat agency-specific, dictated by individual needs and resource availability. However, it is important that written procedures/guidelines be developed for the use of these crews, especially when they are performing exterior operations in support of interior crews. These written procedures also should include evacuation signals and guidelines for implementing evacuation and relocation of personnel from the area of danger. In addition, for agencies

involved in auto/mutual-aid response, it is important to develop consistency among the participating agencies in the use of RIC's.

A RIC should consist of a minimum of two members, full equipped with appropriate clothing, SCBA's, portable radio, and necessary tools to be effective. It also should monitor the tactical radio channel to maintain a complete and accurate understanding of operations and changing conditions as well as location of tactical personnel. This information should be documented on a tactical worksheet by a member of the RIC. In the early stages of an incident, RIC personnel may perform other functions, e.g., secure utilities, flake-out hoselines, work in the Command Post (CP). However, they must remain prepared to redeploy to perform rapid intervention functions. As the incident expands in size or complexity, personnel should be assigned as a **dedicated** RIC. Placement of the RIC may be dependent on the incident; for example, in a high-rise operation, the RIC should be located in Staging (two floors below the fire). In many other situations, a good location would be near the CP or close to Operations. It should not be located in a position that would interfere with CP operations. If the incident covers a large geographic area, more than one RIC may be required.

In a hazardous materials operation, the Entry Team Leader must ensure that there is an RIC of at least two personnel in the appropriate level of protection before the primary entry team accesses the hot zone. In a hazardous materials operation, this team is designated as the Backup Team. The personnel of the Backup Team need to have the same level of required technical competency as the Entry Team. This includes the appropriate level of protection required for the material(s) involved.

While there is some flexibility in procedural issues regarding Rapid Intervention, it is paramount that whenever personnel are operating in positions or performing functions that would subject them to immediate danger in the event of equipment failure or other unexpected sudden event, at least one properly attired RIC must be available to provide assistance or rescue.

Rapid intervention procedures should not be confused with initial interior structural firefighting operations addressed in NFPA 1500. NFPA 1500 requires the presence of four personnel before beginning interior structural firefighting. Two members operate in the hazardous atmosphere, while the other two members are the rescue team outside the hazardous atmosphere. If there is an immediate life safety situation, rescue may be initiated, but members should evaluate carefully the level of risk that they would be exposed to by taking such actions. If it is determined that the situation warrants such action, incoming companies should be notified so that they will be prepared to provide necessary support and backup upon

their arrival. When waiting to be deployed, members of the RIC may be assigned to other tasks, e.g., pump operator, initial Incident Commander (IC), as long as these other activities do not interfere with their ability to respond as an RIC.

Example: A chief officer with two engines and one truck is operating at a structure fire. A portion of the second floor collapses. That information is transmitted to the IC. At this point, a likely scenario is as follows:

- The IC activates a signal and, by radio, orders all personnel out of the building.
- A Personnel Accountability Report (PAR) is taken, and it is found that one member is missing. That member was last seen working near the collapse area.
- The RIC Team is directed to enter the structure, quickly assess its stability, recover the missing firefighter, and remove the member from danger.

Tactical Action Plan

A Tactical Action Plan for fire extinguishment will include: selection of hoseline(s) and nozzle(s); determination of hoseline placement(s); identification of tactics required to support confinement/extinguishment; identification of required personnel and equipment; identification of required coordination; safety considerations; and determining task assignments for crew(s).

SUPPORTING AND USING FIXED FIRE PROTECTION EQUIPMENT

Many buildings today will be equipped with built-in fire protection devices. These systems are often used to detect a fire, alert the occupants to an emergency, initiate a response from the fire department, control or extinguish the fire, or provide a reliable water supply on each floor of a building.

Automatic Sprinkler System

The automatic sprinkler system is an arrangement of piping, valves, and water discharge heads designed to detect a fire (usually through a rapid rise in heat) and to operate to confine and/or control the fire. Properly installed and maintained sprinkler systems enjoy a very successful rate of confining or extinguishing the fire before the fire department arrives on the scene.

Standpipe System

A standpipe system is an arrangement of piping, valves, and discharge hose connections strategically placed in a structure to provide an effective and reliable water supply for fire suppression teams. These systems generally are provided where the advancement of water supply lines are difficult due to the size or height of the structure. Systems that are engineered and installed for fire department use will have a 2-1/2 inch hose connection that will supply 500 gallons per minute (gpm) at a minimum of 65 pounds of pressure.

The National Fire Protection Association Standard 14, titled *Installation of Standpipe and Hose Systems*, identifies three classifications of standpipe systems. A Class I system is intended solely for fire department use and consists of one 2-1/2 inch male hose connection controlled by a valve at the connection. A Class II system is intended for the occupants of the structure or for fire brigade use and consists of one 1-1/2 inch male hose connection and generally 100 feet of hose with a nozzle attached. A Class III system is a combination of a Class I and Class II, consisting of one 2-1/2 inch male hose connection that is reduced to one 1-1/2 inch male connection and generally has 100 feet of hose with a nozzle attached. The Class I and III systems are designed to provide 500 gallons per minute at a minimum of 65 pounds pressure. A Class II system is designed to provide 100 gallons per minute at a minimum of 65 pounds pressure. Each of the standpipe systems are designed to provide the required flow at a minimum of 65 pounds pressure for thirty minutes without the fire department having to supplement the water supply.

Preincident Planning

Preincident planning must include a review of the sprinkler or standpipe system, and critical data should be recorded on the completed **preplan forms**. The water supply source should be evaluated for reliability, and valves should be checked to ensure that the system is adequately supplied.

While the most common **water source** is from a municipal water supply, occasionally systems will also be supplied from on-site storage tanks or from fire ponds with fire pumps. It is important to evaluate the pump to determine the power source for the pump and whether it is automatically started. Pumps may be electrically powered and, when such pumps are identified, the auxiliary electrical backup power should also be evaluated. Pumps may be powered from gasoline, diesel fuel, natural gas, or liquefied propane gas engines. If the pumps are not automatically started, the method of starting them must be noted on the preplan form and posted at the pump control room. If the pumps are automatically started it should be noted on the preplan form, so that the fire attack crews can be prepared for a pressure surge when the pump is activated.

Generally the water supply to the systems is controlled by one of three different types of **valves**. The most common valve is called the **Outside Stem and Yoke (OSY)**; it should be remembered that when the stem (threaded shaft) is out the valve is open. As a rule of thumb, if the unit is an eight-inch valve you will find eight inches of stem exposed when the valve is fully open. A six-inch valve would show six inches of exposed thread, and other size valves would follow the same pattern. A second control valve is called the **Wall Valve (WV)** and is generally installed on an outside wall of a building. This allows the valve to be inside the structure while the control of the valve is outside the structure. A third type of control valve is called a **Post Indicator Valve (PIV)** and will rise out of the ground approximately forty inches. This valve controls the water in the supply pipe and may be remote from the actual system. It is equipped with an observation window to indicate whether the valve is in the open or closed position.

The **fire department connection** should be evaluated to see if the connection may supply more than one system, such as both a sprinkler and standpipe system. In large buildings there may be more than one system that could be supplied by more than one connection, or some systems may be interconnected and can be supplied from one of several fire department connections at the structure. The connection should be checked to ensure that the check valves are free of debris and in working order. A system which does not have clapper (check) valves in the fire department connection should be noted on the preplan, so that special precautions can be taken during the supply operations. Finally, all hose connections should be checked during the preincident evaluation to ensure that the hose threads are compatible and all components such as the valve control handles are in place and operational.

Connecting To A Fire Department Connection

Connecting supply lines to a fire department connection should be completed as soon as possible at a fire incident. If the connection has protective covers, they should be removed and the connection checked for debris. Any debris found should be quickly removed, and the connection process begun. If the water supply has only one hose connection, connect the water supply line and commence pumping. If the connection has two water supply hose connections and operable clapper valves, one line should be connected and pumping commenced before the second line is connected. Should the clapper valves be inoperable or not exist, it is important to connect both water supply lines before commencing water supply pumping. It is generally recommended to restrict the pressure at the supply connection to 150 pounds unless the system is specifically designed for additional pressure.

Pumping Into An Automatic Sprinkler Or Standpipe System

When pumping into an automatic sprinkler or standpipe system, be aware that when the pressure from the fire department pumper exceeds the pressure from the normal water supply, the fire department pumper will become the total water supply for the system.

The pumper operator can be a valuable resource to the CO and the IC in determining how many gallons of water are flowing into the sprinkler system. If the fire apparatus is equipped with flow meters on the discharge side of the pump, this is easily determined by reading the flow rate. If the apparatus is equipped with pressure gauges, the pump operator must make a determination based upon the difficulty the pump is having in maintaining the desired pressure. A pump working at an idle is probably not flowing much water, while a pump working at full throttle to maintain pressure is probably moving a great deal of water. This is valuable information in determining the size of the fire area, how many sprinkler heads have opened, or if there has been system failure.

Connecting Attack Line To Standpipe Connection

If a fire department has structures with standpipe systems, or if it might respond under mutual aid to a structure so equipped, it should prepare prior to the response by assembling a **standpipe kit** for the incident. The kit should include items that may be needed on an upper floor in order to initiate an initial fire attack. Items for consideration include a minimum of

100 feet of attack hose and a nozzle appropriate for the occupancy, spanner wrench, spare control valve handle, a pair of locking pliers or small pipe wrench to open stuck valves, and a 2-1/2 by 1-1/2 inch Wye to connect two lines to the 2-1/2 inch hose connection. If the structure has recessed wall hose cabinets it may be advisable to carry a short length of 2-1/2 inch hose to connect to the supply connection in the cabinet and then connect the Wye adapter onto the short length of hose. (It is not normally possible to connect the Wye directly onto the supply connection inside the hose cabinet without first using the short length of supply hose.) When working from a standpipe system with a fire pump that is activated when the water pressure of the system is reduced to a hoseline being opened, prepare for a sudden increase in pressure when the pump is activated. When the fire department apparatus becomes the sole supply of water it may be necessary to coordinate pump pressure information with the pump operator to obtain the desired operating pressure at the standpipe discharge connection.

Coordination

Officers given the tactical assignment of fire confinement or extinguishment must coordinate their efforts carefully with other tactical assignments. For example, it is imperative that fire confinement assigned to support a search effort be closely coordinated with the search team activity. This may include the determination of the area to be searched, how long the search effort will take, how many searchers will be involved, and where the fire is located in relation to the area to be searched. Coordination with other hoselines also is critical, since all hoselines dedicated to a specific tactical assignment must work together in order to accomplish the assignment successfully and safely. Hoselines should be closely coordinated so as not to oppose each other and should be placed so that a safe exit may be made if necessary.

Coordination between fire confinement/extinguishment and water supply also is important if water supply is carried out by someone other than the personnel assigned to fire confinement or extinguishment. A water supply that is not consistent with the application rate will spell danger for both the confinement or extinguishment team and the success of the assignment. Effectively supplying water to an incident scene means that water equal to the needed gpm, or greater, is available for use in fire attack hoselines. When insufficient water is being supplied to the fire scene, all personnel dependent on the fire attack team extinguishing the fire can be jeopardized (this also can occur if adequate backup lines are not in place). If possible, backup lines should come from a separate water source so that in the event

of a loss of water or equipment failure the backup line is still operational and can be used to assist the fire confinement or extinguishment team to safety. Coordination with ventilation is also vital to the success of fire confinement and extinguishment. A fire attack without ventilation support is extremely dangerous and difficult. A ventilation effort before hoselines are ready and in position can also be dangerous as a result of the fire that will occur.

Laddering, forcible entry, auxiliary lighting, and items such as contamination from asbestos fibers are also vital coordination factors that the officer in charge of fire confinement and extinguishment must consider. Soon after the fire attack is started, a new supply of air is a critical coordination factor that must be planned for. During overhaul and salvage, hoselines may be needed to extinguish hidden fires in voids, furniture, or other areas. The need for a protective or extinguishment hoseline should be coordinated with the officers responsible for the overhaul and salvage assignments.

Safety Considerations

As CO, the safety of your firefighters is your first and foremost priority. As the risk involved with the incident increases, management of safety considerations must also increase. For each tactical assignment the CO must evaluate the potential risk to personnel compared to the benefits to be gained. The CO may find that the risk is too great and the Incident Commander should be made aware of that concern.

It is important to remain aware of time and to recognize that, as the fire continues to burn, the structural elements are probably being weakened. As structural elements weaken, gravity will eventually take over and pull the structure down. The CO is the Safety Officer for the personnel assigned to his/her tactical operation. The safety of all personnel must be planned for and supported throughout the entire incident. Safety must always be the first consideration.

Tactical Action Plan

A Tactical Action Plan for supporting and using fixed fire protection will include: selection of supply line; selection of correct pressure for connecting to fire department connection; connection of standpipe hose; identification of tactics required to support fixed fire protection activities;

identification of required personnel and equipment; identification of required coordination; safety considerations; and determination of task assignments for crew(s).

SUMMARY

The tactical assignment for fire confinement is intended to stop the progress of a fire for a specific purpose. Fire confinement may be used to provide time to conduct a primary search, as a defensive action until additional resources arrive to safely initiate an offensive operation, or as a method of preventing fires from extending into unburned portions of the structure or exposures.

The tactical assignment for fire extinguishment is intended to bring the fire under control by reducing the temperature of the burning materials below their ignition temperature and stopping flame production (combustion). Successful accomplishment of this assignment requires matching the water application rate with the amount of heat being produced by the fire by selecting the appropriate size hoseline and nozzle. Some flow requirements may require multiple lines working together to accomplish the desired flow rate. The attack lines, if possible, should be positioned so that the fire attack is made from the unburned side. Backup lines should always be deployed to assist with extinguishment and to provide a measure of safety should something unplanned occur which may jeopardize the safety of firefighters.

When a structure has been equipped with fixed fire protection equipment such as sprinklers and standpipe systems, the CO should understand how they work, how they can be supplemented with water, and how to fully utilize their capabilities. The building owner may have invested considerable resources to protect the structure or make fire suppression work easier and the CO should be fully prepared to make the best use of the devices that were installed.

Coordination of all tactical assignments is critical to a successful outcome. The tactical assignment of fire confinement may be in support of other assignments such as primary search. Similarly, a fire extinguishment assignment will be supported by other tactical assignments, such as water supply and ventilation. Coordination of all tactical assignments is critical for both a timely and a safe fire incident operation.

Fire confinement and fire extinguishment are two of the most critical tactical assignments at a fire incident. A successful CO will understand how his/her assignment fits into the overall strategy, conduct a sizeup to determine what must be done to accomplish the assignment, determine

what tools are best suited to the assignment, evaluate the safety of personnel, and develop a plan to accomplish fire confinement and extinguishment safely.

ACTIVITY 3.1

FIRE CONFINEMENT

Purpose:

To give you an opportunity to implement the tactical assignment of fire confinement to support search and rescue or fire confinement for property conservation.

Directions:

The instructor will assign your group **one** of the three scenarios and **one** of the two tactical assignments for the scenario. It is important that you focus on your assigned tactical assignment; for the purpose of this activity assume that the other tactical option for the scenario does not exist. In other words, if you are assigned tactical assignment #1, for the purpose of this activity, tactical assignment #2 does not exist; if you are assigned tactical assignment #2, tactical assignment #1 does not exist.

After reviewing the materials provided (Scenario, Plot Plan/Floor Plan, and QAP), reach group consensus on a response to each of the questions. Use the worksheet on the following pages to document final group decisions.

ACTIVITY 3.1 (cont'd)

1. What sizeup considerations are critical for your tactical assignment?

2. What size and length of hoseline will you select?

3. What nozzle will you select? Why?

4. Where will you place the hoseline for your tactical assignment?

5. With what other tactical operations will you need to coordinate?

6. What safety considerations will you have for your crew?

ACTIVITY 3.1 (cont'd)

SCENARIO 1

A fire has been reported in a two-story single-family dwelling located at 34 Southgate Road. The time is 0630 hours on a Saturday morning; weather conditions are clear with a temperature of 65°F. The structure was originally constructed in 1927 with a one-story addition completed in 1948.

The fire is burning in the one-story addition with heat and smoke building in the remainder of the structure. The structure is 25% involved with fire. The Incident Commander (IC) has developed a strategy and has issued your engine company one of the following assignments:

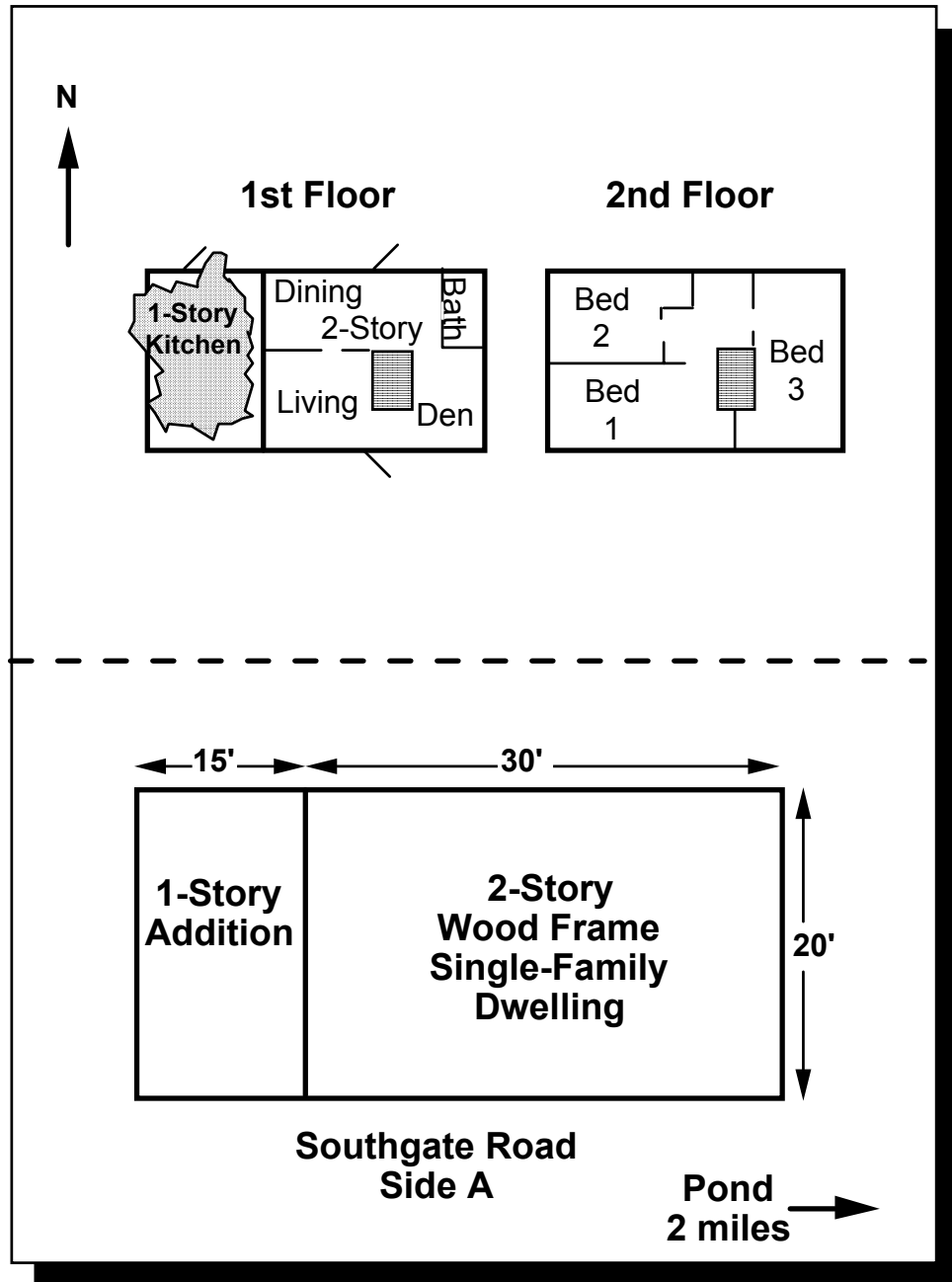
1. Provide fire confinement protection to the primary search team assigned to the second floor.
2. Confine the fire to the one-story addition of the structure. A second hoseline from the other engine company will be available to assist you, if you request it.

Other personnel will be conducting other tactical assignments of establishing a water supply and ventilation. No one has been assigned forcible entry or laddering. The rescue company has been assigned primary search and ventilation while the two tanker/tenders have been given the tactical assignment of water supply.

ACTIVITY 3.1 (cont'd)

SCENARIO 1

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.1 (cont'd) SCENARIO 1 QUICK ACCESS PREFIRE PLAN																			
Building Address: <i>34 Southgate Road</i>																			
Building Description: <i>45' x 20'; two-story, wood frame, balloon construction, with a basement</i>																			
Roof Construction: <i>Ridgepole and rafter, 1" x 6" sheathing</i>																			
Floor Construction: <i>2" x 10" floor joists, 1" x 6" sheathing</i>																			
Occupancy Type: <i>Single-family dwelling</i>		Initial Resources Required: <i>1 heavy rescue, 2 engines, 2 tanker/tenders</i>																	
Hazards to Personnel: <i>No special hazards</i>																			
Location of Water Supply: <i>Sawmill Road Pond</i>		Available Flow: <i>Dry hydrant - accessible all year</i>																	
<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td></td> <th align="center" colspan="4">Estimated Fire Flow*</th> </tr> <tr> <th align="center">Level of Involvement</th> <th align="center">25%</th> <th align="center">50%</th> <th align="center">75%</th> <th align="center">100%</th> </tr> <tr> <th align="center">Estimated Fire Flow</th> <th align="center">150</th> <th align="center">300</th> <th align="center">450</th> <th align="center">600</th> </tr> </table>						Estimated Fire Flow*				Level of Involvement	25%	50%	75%	100%	Estimated Fire Flow	150	300	450	600
	Estimated Fire Flow*																		
Level of Involvement	25%	50%	75%	100%															
Estimated Fire Flow	150	300	450	600															
<i>*Fire flow based on full dimension times 2 stories - no exposures</i>																			
Fire Behavior Prediction: <i>Balloon construction, one-story addition tied into open wall stud channel - quick extension into upper floors</i>																			
Predicted Strategies: <i>Rescue, ventilation, confinement, extinguishment</i>																			
Problems Anticipated: <i>Water supply for involvement over 50% will require additional resources</i>																			
<input type="checkbox"/> Standpipe: <i>No</i>	<input type="checkbox"/> Sprinklers: <i>No</i>	<input type="checkbox"/> Fire Detection: <i>No</i>																	

ACTIVITY 3.1 (cont'd)

SCENARIO 2

A fire has been reported in a two-story ordinary constructed building located at 41 Main Street. The structure houses a bakery on the first floor and two apartments on the second floor. The structure was constructed in 1939 and since that time has had several renovations including two false ceilings in the bakery. The time is 1000 hours on a Tuesday; the weather is clear and the temperature is 89°F.

The fire is burning in the bakery and has already ventilated out through the front window. The wife of the owner states that she can't find her husband and feels that he may be inside the bakery. A young male occupant of the second floor reports that his nine-month-old child is in the rear apartment on the second floor. The structure is 25% involved with fire. The Incident Commander has developed a strategy and has issued your engine company one of the following assignments:

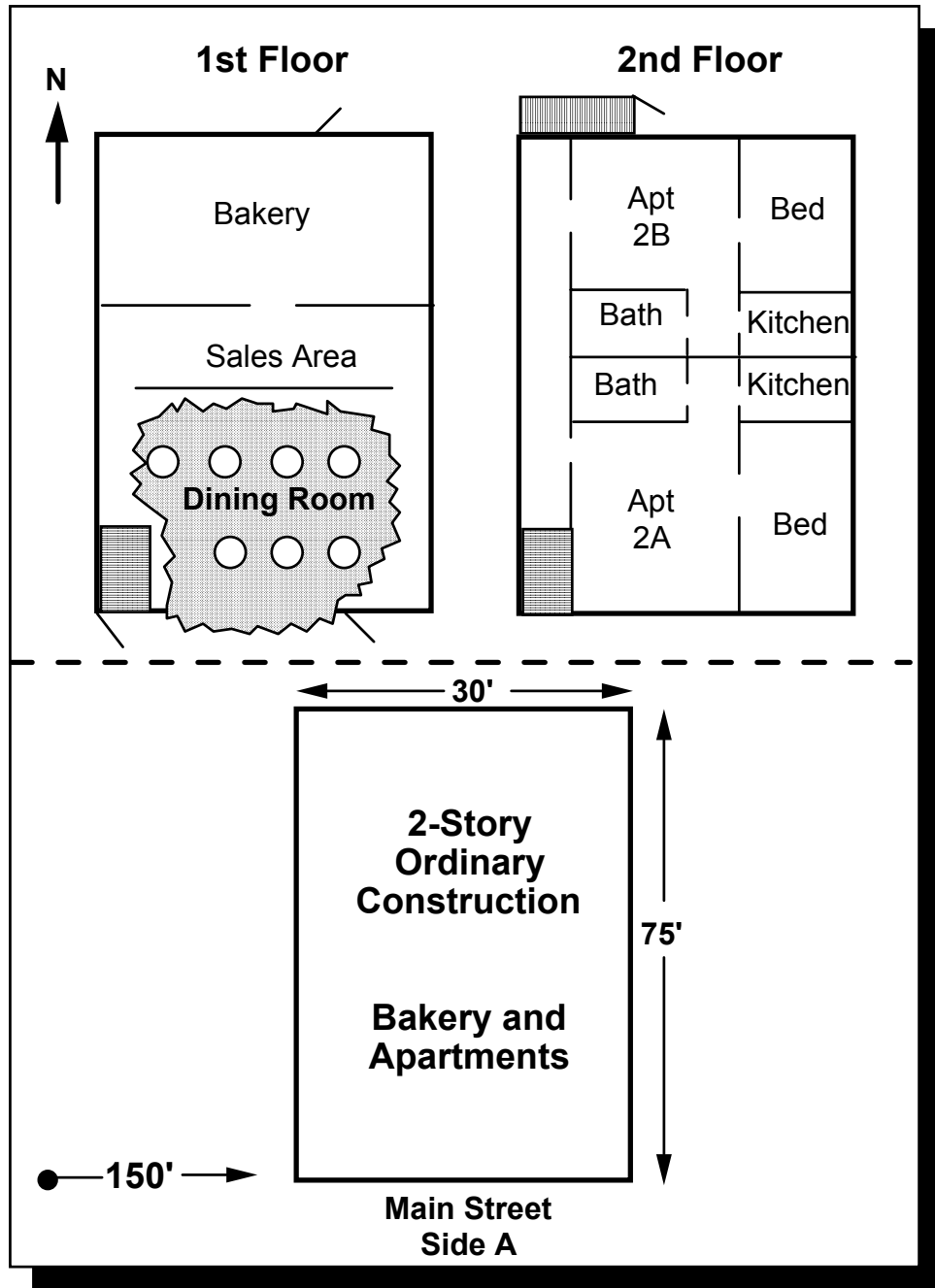
1. Provide fire confinement protection for the search team going to the second floor for primary search.
2. Confine the fire to the front of the bakery sales area so that a primary search effort may be conducted in the rear portion of the bakery.

Due to the two search operations the only other tactical assignments that were initiated were horizontal ventilation for the first floor and development of a water supply; both were assigned to the second engine company. The tactical assignment for primary search was given to the rescue company.

ACTIVITY 3.1 (cont'd)

SCENARIO 2

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.1 (cont'd)
SCENARIO 2
QUICK ACCESS PREFIRE PLAN

Building Address: *41 Main Street*

Building Description: *30' x 75'; two-story, ordinary construction, with a basement*

Roof Construction: *2" x 8" rafters, 1" x 6" sheathing with built-up tar roof*

Floor Construction: *2" x 10" floor joists, 1" x 6" sheathing*

Occupancy Type:
First floor: Bakery, sales, dining
Second floor: Two apartments

Initial Resources Required:
1 heavy rescue, 2 engines

Hazards to Personnel:
Bakery equipment, hot ovens (gas fired), heavy floor load in bakery section of first floor

Location of Water Supply:
37 Main Street

Available Flow:
1,000 gpm

	Estimated Fire Flow*			
Level of Involvement	<i>25%</i>	<i>50%</i>	<i>75%</i>	<i>100%</i>
Estimated Fire Flow	<i>375</i>	<i>750</i>	<i>1,125</i>	<i>1,500</i>

**Fire flow based on two stories - no exposures*

Fire Behavior Prediction:
Several voids created by numerous renovations will allow fire spread both horizontally and vertically

Predicted Strategies:
Rescue, ventilation, confinement, extinguishment. Large fire load in bakery portion of structure - need to increase fire flow, protect second floor stairwell to permit primary search

Problems Anticipated:
Two false ceilings in bakery



Standpipe:
No



Sprinklers:
No



Fire Detection:
No

ACTIVITY 3.1 (cont'd)

SCENARIO 3

A fire has been reported in the local Post Office which is a one-story noncombustible structure located at 74 Maxwell Avenue. The time is 1430 hours on a Wednesday and the weather is clear with a temperature of 10°F.

The fire is burning in the mail sorting section behind the customer service area. While the Postmaster believes that everyone is outside, she does not appear to be certain about two letter carriers who were working on something in that part of the structure just prior to the explosion and fire. The structure is 25% involved in fire. The IC has developed a strategy and issued your engine company **one** of the following assignments:

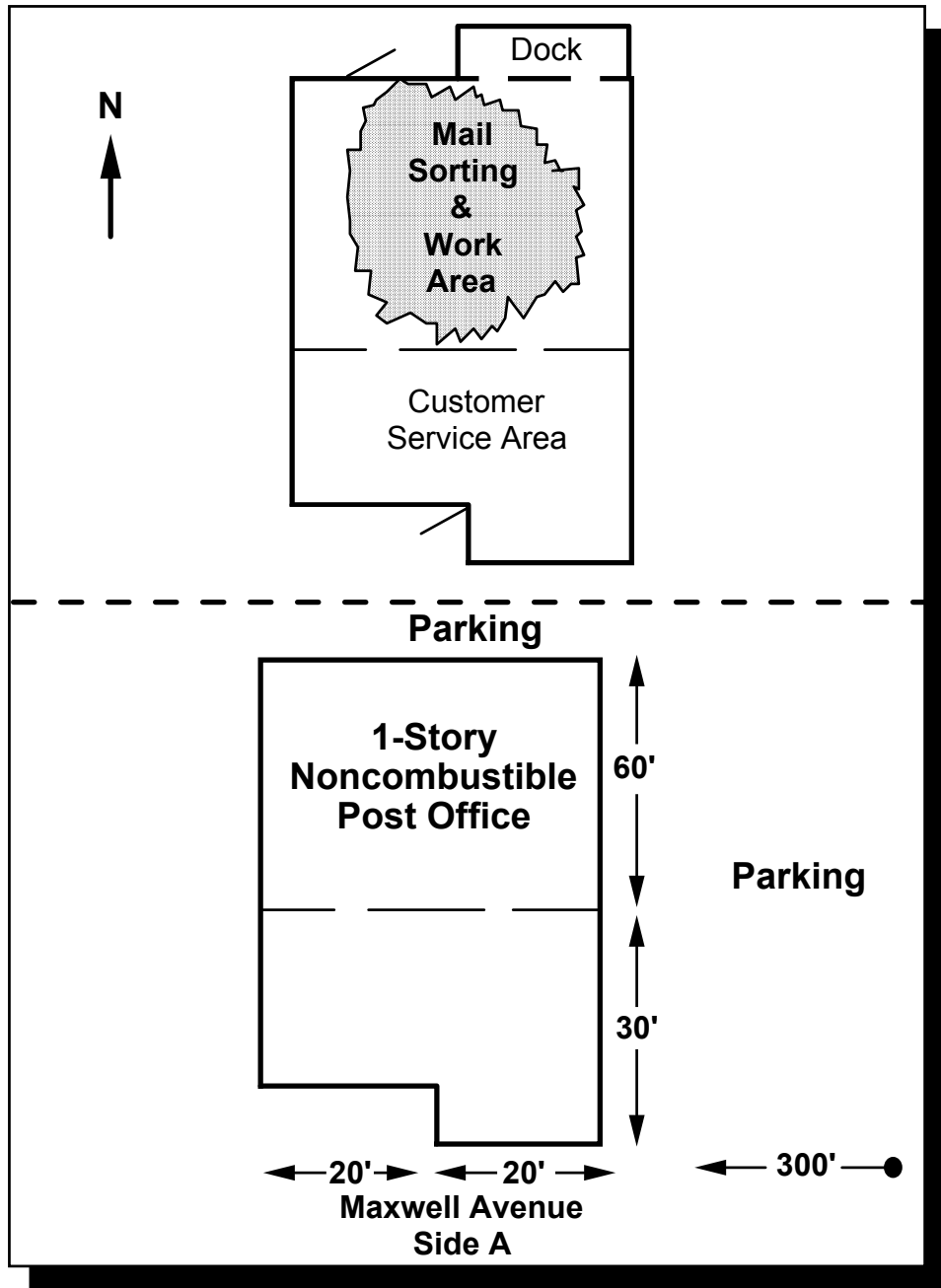
1. Provide fire confinement protection for the search team that will be conducting primary search in the rear half of the structure looking for the two mail carriers.
2. Provide a confinement line to prevent the fire from spreading into the customer service and mailbox area in the front of the building. A second hoseline from the other engine company will be available to assist you, if you request it.

Other tactical assignments include horizontal ventilation and laddering for the ladder company. The rescue company has the tactical assignment of primary search.

ACTIVITY 3.1 (cont'd)

SCENARIO 3

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.1 (cont'd)
SCENARIO 3
QUICK ACCESS PREFIRE PLAN

Building Address: *74 Maxwell Avenue*

Building Description: *90' x 40'; one-story, noncombustible construction, no basement*

Roof Construction: *Steel bar joists, metal decking, built-up tar roof*

Floor Construction: *Concrete slab*

Occupancy Type:
U.S. Post Office

Initial Resources Required:
*1 heavy rescue, 2 engines,
 1 ladder truck*

Hazards to Personnel:
*Unknown hazardous materials being shipped through mail
 Early roof collapse--heavy air conditioners on roof*

Location of Water Supply:
54 Maxwell Avenue

Available Flow:
1,000 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	300	600	900	1,200

**Fire flow based on 1-story building - no exposures*

Fire Behavior Prediction:
Rear 2/3 of building open floor plan - rapid fire growth

Predicted Strategies:
Ventilation, confinement, extinguishment

Problems Anticipated:
Fast fire growth, potential for unknown hazardous materials in mail



Standpipe:
No



Sprinklers:
No



Fire Detection:

ACTIVITY 3.2

FIRE EXTINGUISHMENT

Purpose:

To give you an opportunity to implement the tactical assignment of fire extinguishment.

Directions:

The instructor will assign your group **one** of the three scenarios and **one** of the two tactical assignments for each scenario. It is important that you focus on your assigned tactical assignment; for the purpose of this activity proceed with an understanding that the other tactical assignment will be completed by another group.

After reviewing the materials provided (Scenario, Plot Plan/Floor Plan, and QAP), reach group consensus on a response to each of the questions. Use the worksheet on the following pages to document final group decisions.

Select a spokesperson to present the group responses to the class.

ACTIVITY 3.2 (cont'd)

1. Is your assignment clear? If not, ask the Incident Commander (instructor) for clarification.
2. What are the critical sizeup factors?
3. What are the fire flow requirements to extinguish the fire?
4. What nozzle(s) will you select? Why?
5. What size and length hoseline will you select?
6. Where will you position your line(s)?
7. With what other tactical assignments will you need to coordinate?

8. What safety considerations are of prime concern?

9. Have you initiated an accountability system?

10. Have you notified the IC of your company's location?

ACTIVITY 3.2 (cont'd)

SCENARIO 1

A fire has been reported in a two-story, wood frame, single-family dwelling located at 2 Knob Hill Road. The time is 1930 hours on a Thursday; the weather is clear with a temperature of 74°F. The structure was originally constructed in 1955, and the second floor was expanded in 1961.

The fire is burning on the first floor with smoke showing from the attic louvres. The structure is 25% involved with fire. The IC has developed a strategy and has issued your engine company **one** of the following tactical assignments for fire extinguishment (the other assignment has been given to another crew at the fire incident):

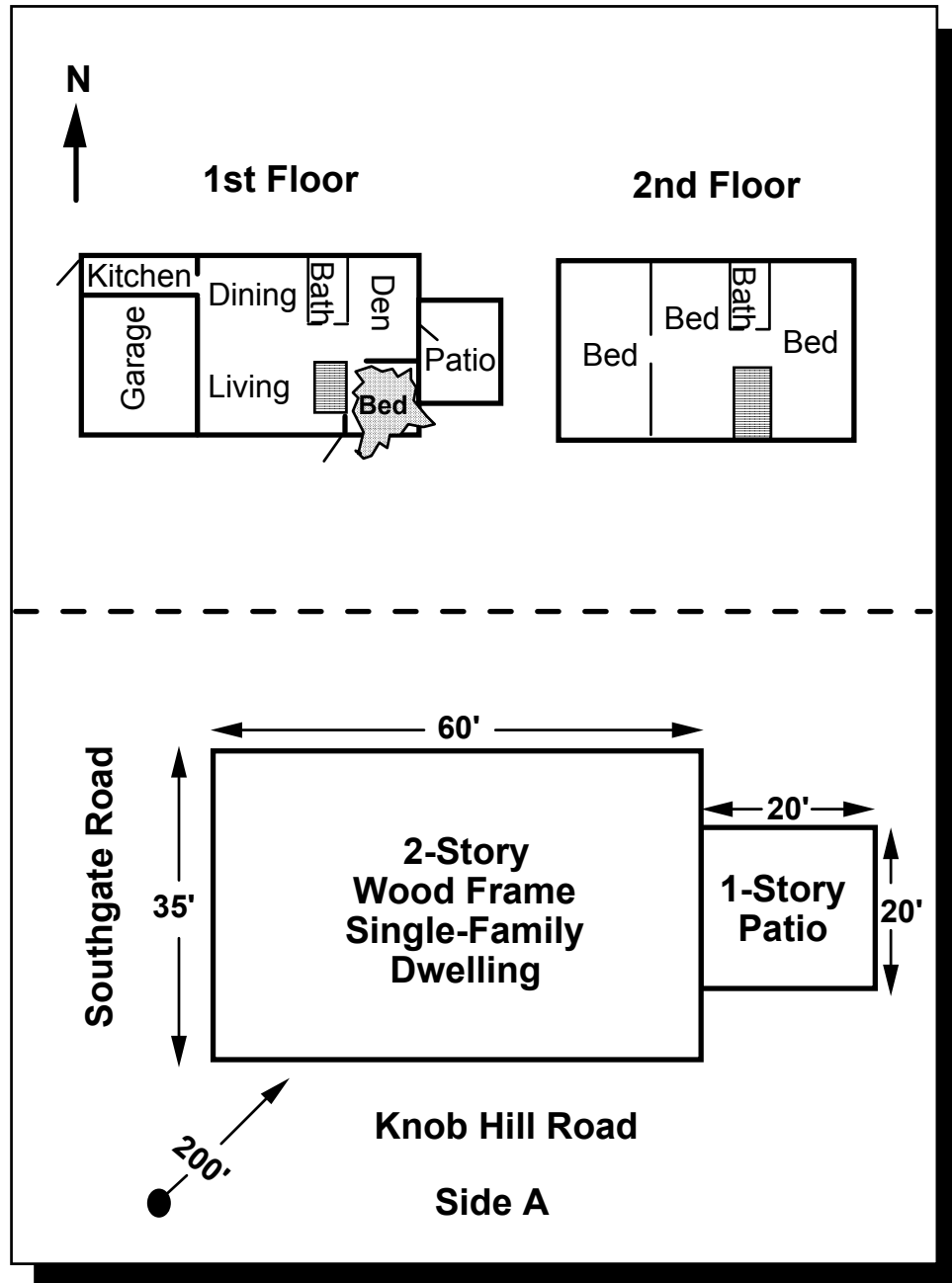
1. Extinguish the fire on the first floor.
2. Extinguish the fire that has extended into the attic.

Your engine company has established a water supply from the hydrant at the intersection of Knob Hill and Southgate Roads. Other personnel have been given the tactical assignments of ventilation and providing you with a backup line if you need it.

ACTIVITY 3.2 (cont'd)

SCENARIO 1

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.2 (cont'd)
SCENARIO 1
QUICK ACCESS PREFIRE PLAN

Building Address: *2 Knob Hill Road*

Building Description: *35' x 60'; two-story, wood frame, platform construction, no basement*

Roof Construction: *Ridgepole and rafter, 1" x 8" sheathing with asphalt shingles*

Floor Construction: *Concrete slab*

Occupancy Type:
Single-family dwelling

Initial Resources Required:
1 heavy rescue, 2 engines

Hazards to Personnel:
No special hazards

Location of Water Supply:
Knob Hill and Southgate Roads

Available Flow:
2,500 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	350	700	1,050	1,400

**Fire flow based on 2 stories - no exposures*

Fire Behavior Prediction:
Rapid horizontal and vertical spread
Void space in area where roof meets the front wall which will allow fire to spread along entire front wall on Side A

Predicted Strategies:
Rescue, ventilation, confinement, extinguishment

Problems Anticipated:
Voids created by knee wall along Side A of second floor will permit rapid fire spread



Standpipe:
No



Sprinklers:
No



Fire Detection:
No

ACTIVITY 3.2 (cont'd)

SCENARIO 2

A fire has been reported in a three-story, six-family dwelling located at 19 Arsenal Street. The three-story portion of the structure is ordinary construction and houses five apartments. The two-story portion is wood frame and houses one apartment. The original portion of the structure, constructed in 1947, houses two apartments each on the first and second floors. In 1972, an attic apartment was added, and another apartment was added to the wood frame portion. The time is 0645 hours on Sunday and the weather is clear with a temperature of 67°F.

The fire is burning on the first floor with **smoke showing throughout the structure**. The person who reported the fire stated that when he first saw the fire he could hear someone inside screaming for help, but the screaming has stopped. The structure is 25% involved with fire. The IC has developed a strategy and issued your engine company **one** of the following tactical assignments (the other assignment has been given to another crew at the fire incident):

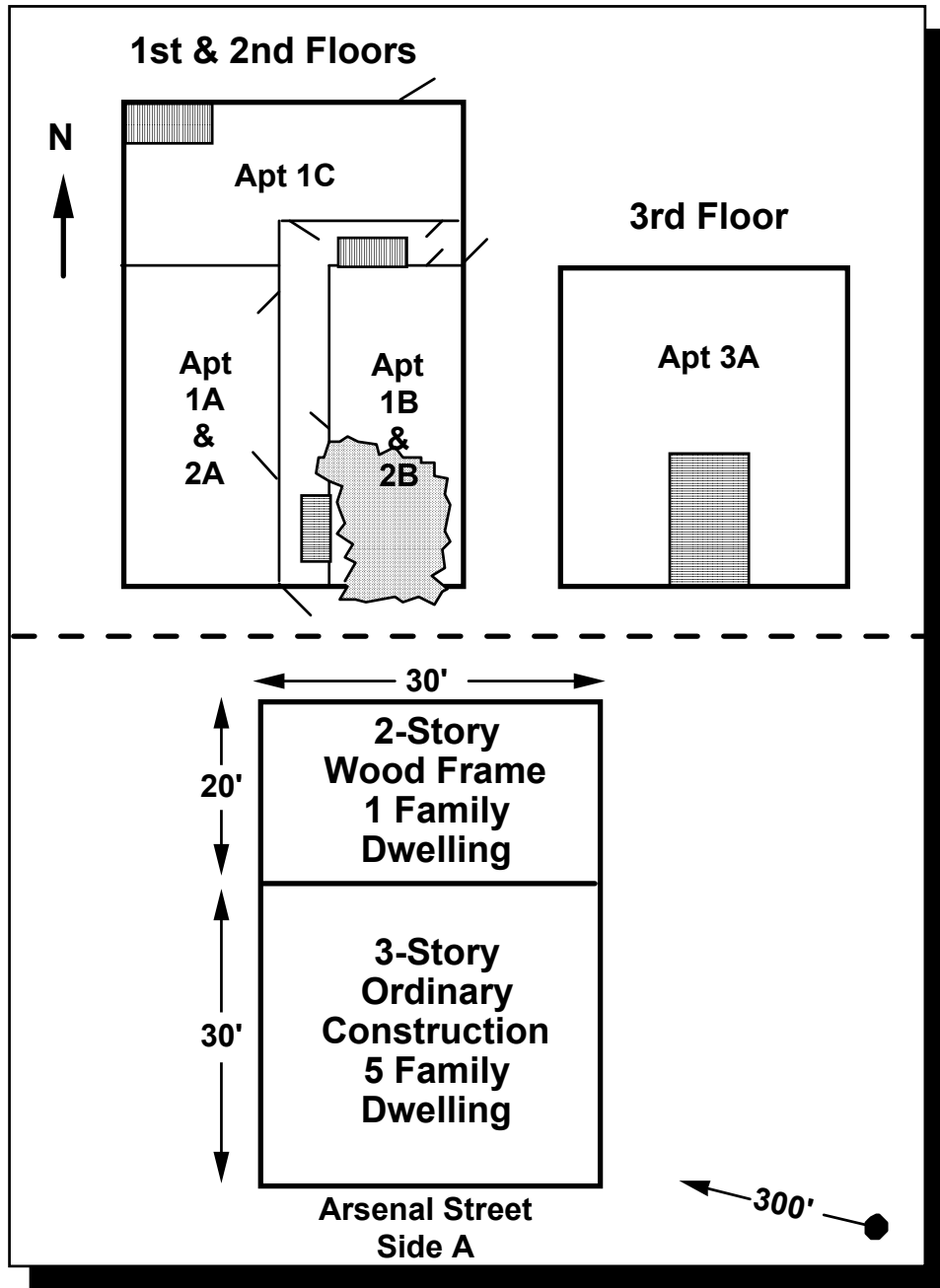
1. Extinguish the fire on the first floor.
2. Extinguish the fire that has extended into the third floor studio apartment.

Other tactical assignments include a primary search of the second floor by the rescue company. The other engine company will provide fire confinement for the rescue team in addition to the other tactical assignment above. The ladder company will be conducting the tactical assignment of horizontal ventilation of the first and second floors along with vertical ventilation of the third floor.

ACTIVITY 3.2 (cont'd)

SCENARIO 2

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.2 (cont'd)
SCENARIO 2
QUICK ACCESS PREFIRE PLAN

Building Address: *19 Arsenal Street*

Building Description: *50' x 30'; front - three-story, ordinary construction.
 Rear - two-story, wood frame, platform construction
 Basement - common to both front and rear sections*

Roof Construction: *Ridgepole and rafters, 1" x 8" sheathing, tar roof*

Floor Construction: *2" x 8" floor joists, 1" x 8" sheathing*

Occupancy Type:
Six-family dwelling

Initial Resources Required:
1 heavy rescue, 2 engines, 1 ladder truck

Hazards to Personnel:
Limited access/egress to third floor apartment

Location of Water Supply:
15 Arsenal Street

Available Flow:
1,500 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	325	650	975	1,300

**Fire flow based on 3-story 30' x 30' and 2-story 30' x 20' - no exposures*

Fire Behavior Prediction:
*Rapid fire spread through voids and rooms; ceilings on first and second floor section
 lowered 12" will permit rapid spread*

Predicted Strategies:
Rescue, ventilation, confinement, extinguishment

Problems Anticipated:
*Common hallways and corridor for front apartments with only one stairway to third floor
 studio apartment for access/egress*



Standpipe:
No



Sprinklers:
No



Fire Detection:
No

ACTIVITY 3.2 (cont'd)

SCENARIO 3

A fire has been reported in a restaurant located at 5 Taylor Drive. The structure was constructed in 1985 with construction techniques appropriate for that time period. The time is 1230 hours on a Saturday, and the weather is clear with a temperature of 65°F.

The fire is burning in the kitchen area in the rear of the structure with heavy smoke coming from the dining room. It appears that the fire started from grease in the kitchen vent system and has burned for several minutes undetected. The hood extinguishing system did not activate and when pulled manually, nothing happened. The fire is burning in the kitchen and has extended into the truss rafter area above the ceiling over the kitchen and restaurant. The structure is 10% involved with fire. The IC has developed a strategy and issued your engine company **one** of the following assignments (the other assignment has been given to another crew at the fire incident):

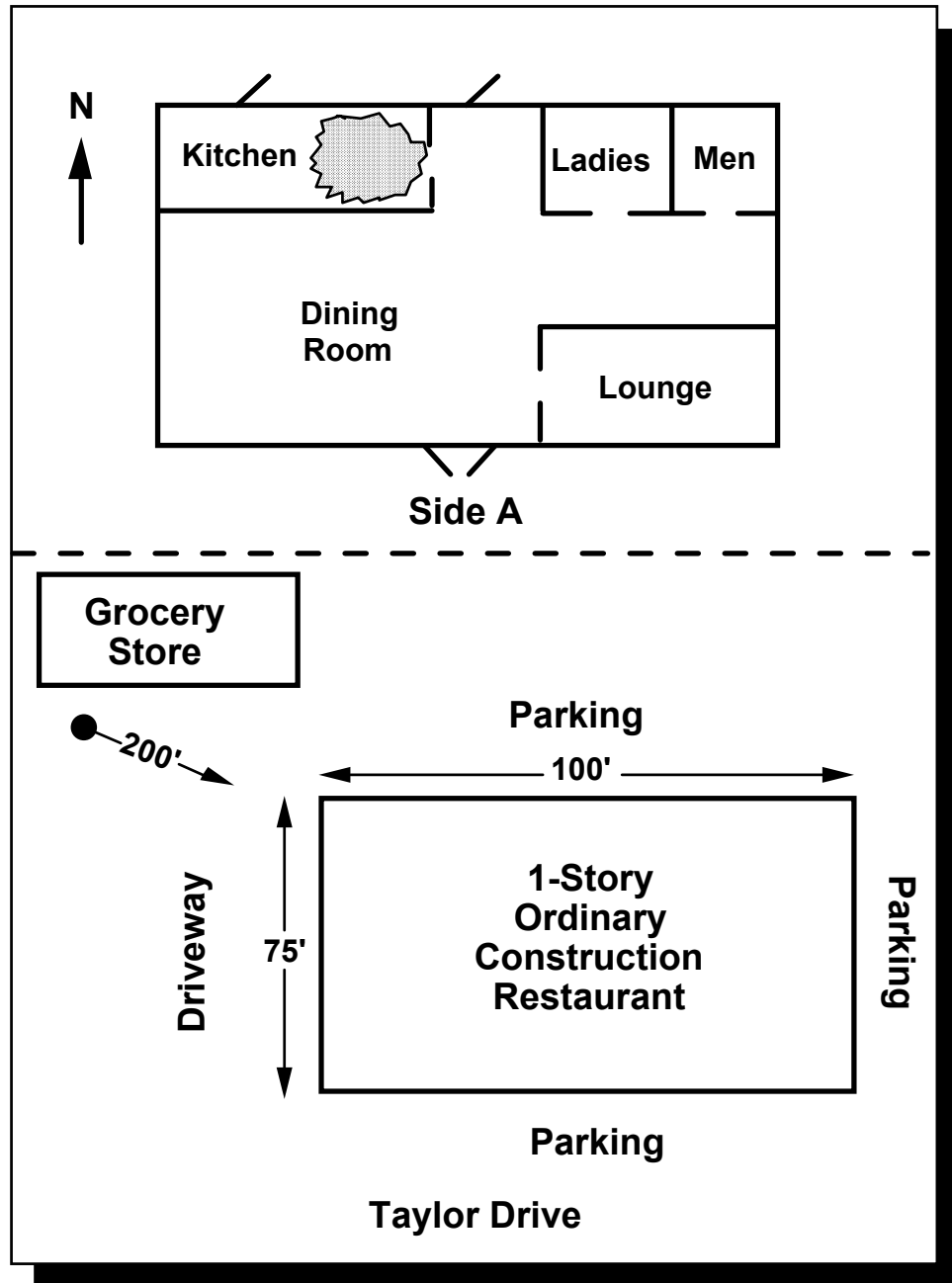
1. Extinguish the fire in the kitchen that is extending into the dining room.
2. Extinguish the fire that has spread to the truss rafter area between the ceiling of the kitchen and the roof.

Other personnel have been assigned primary search and ventilation. Your engine company developed a water supply line to the hydrant in front of the grocery store. The other engine company has been given the tactical assignment of providing fire confinement for the search team and the tactical assignment above that you were not assigned.

ACTIVITY 3.2 (CONT'D)

SCENARIO 3

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.2 (cont'd)
SCENARIO 3
QUICK ACCESS PREFIRE PLAN

Building Address: *5 Taylor Drive*

Building Description: *75' x 100'; one-story, ordinary construction, no basement*

Roof Construction: *Wood truss rafters, plywood sheathing*

Floor Construction: *Concrete slab*

Occupancy Type:
Restaurant/Lounge

Initial Resources Required:
1 heavy rescue, 2 engines, 1 ladder truck

Hazards to Personnel:
Heavy roof load of air conditioners and refrigeration units; natural gas-fired grills, oven, and stove; wood truss roof

Location of Water Supply:
In front of grocery story (Side C of restaurant)

Available Flow:
2,000 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	625	1,250	1,875	2,500

**Fire flow based on 1 story - no exposures*

Fire Behavior Prediction:
Rapid horizontal fire spread

Predicted Strategies:
Rescue, ventilation, confinement, extinguishment

Problems Anticipated:
Limited access/egress at doors - may need to open windows for additional access/egress; large open floor plan restaurant with kitchen doors normally blocked open



Standpipe:
No



Sprinklers:
No



Fire Detection:

ACTIVITY 3.3

CONFINEMENT, EXTINGUISHMENT, AND COORDINATION

Purpose:

To give you the opportunity to demonstrate the ability to implement the combined tactical assignments of fire confinement, fire extinguishment, and support or use of fixed fire protection equipment with necessary coordination and other tactical assignments.

Directions:

The instructor will assign your group **one** of the six scenarios.

After reviewing the materials provided (Scenario, Plot/Floor Plan, and QAP), reach group consensus on a response to each of the questions. Use the worksheet on the following pages to document final group decisions. Particular attention should be given to the need for coordination with other tactical assignments outlined in the scenario.

Select a spokesperson to present group responses to the class.

ACTIVITY 3.3 (cont'd)

1. Is your assignment clear? If not, ask the Incident Commander (instructor) for clarification.

2. What are the critical sizeup factors for fire confinement, fire extinguishment, and coordination?

3. What hoseline and nozzle will you use for fire confinement? If more than one line will be deployed, how many lines will you deploy?

4. What are the fire flow requirements to extinguish the fire given the area of the structure that is involved?

5. What hoseline and nozzle will you use for fire extinguishment? If more than one line will be deployed, how many will you deploy?

6. If your structure has an automatic sprinkler system, what action will you take?

7. If your structure has a standpipe system, what action will you take?

8. With what other tactical assignments will you need to coordinate?

9. What concerns do you have for the safety of your personnel?

ACTIVITY 3.3 (cont'd)

SCENARIO 1

A fire has been reported in a two-story, single-family dwelling located at 14 Berry Patch Lane. The time is 1130 hours on a Saturday and the weather is clear with a temperature of 0°F. The structure was constructed in 1987 and equipped with a residential sprinkler system. For the past two months the home has been fully furnished, but the owners have been on an extended vacation. During the past two days a maintenance worker has been trying to thaw frozen pipes, including the sprinkler system, that froze when the heating system broke.

A maintenance worker was using a torch to thaw some pipes that were frozen. While he was working in one part of the dwelling a fire started in another area where he had been working fifteen minutes before. A neighbor observed both smoke and fire coming from the structure, called the fire department, and alerted the maintenance worker. The neighbor reported that the maintenance worker then tried to extinguish the fire and has not come back out of the structure. The structure is 10% involved with fire. The IC has developed a strategy and has given your engine company the following tactical assignment:

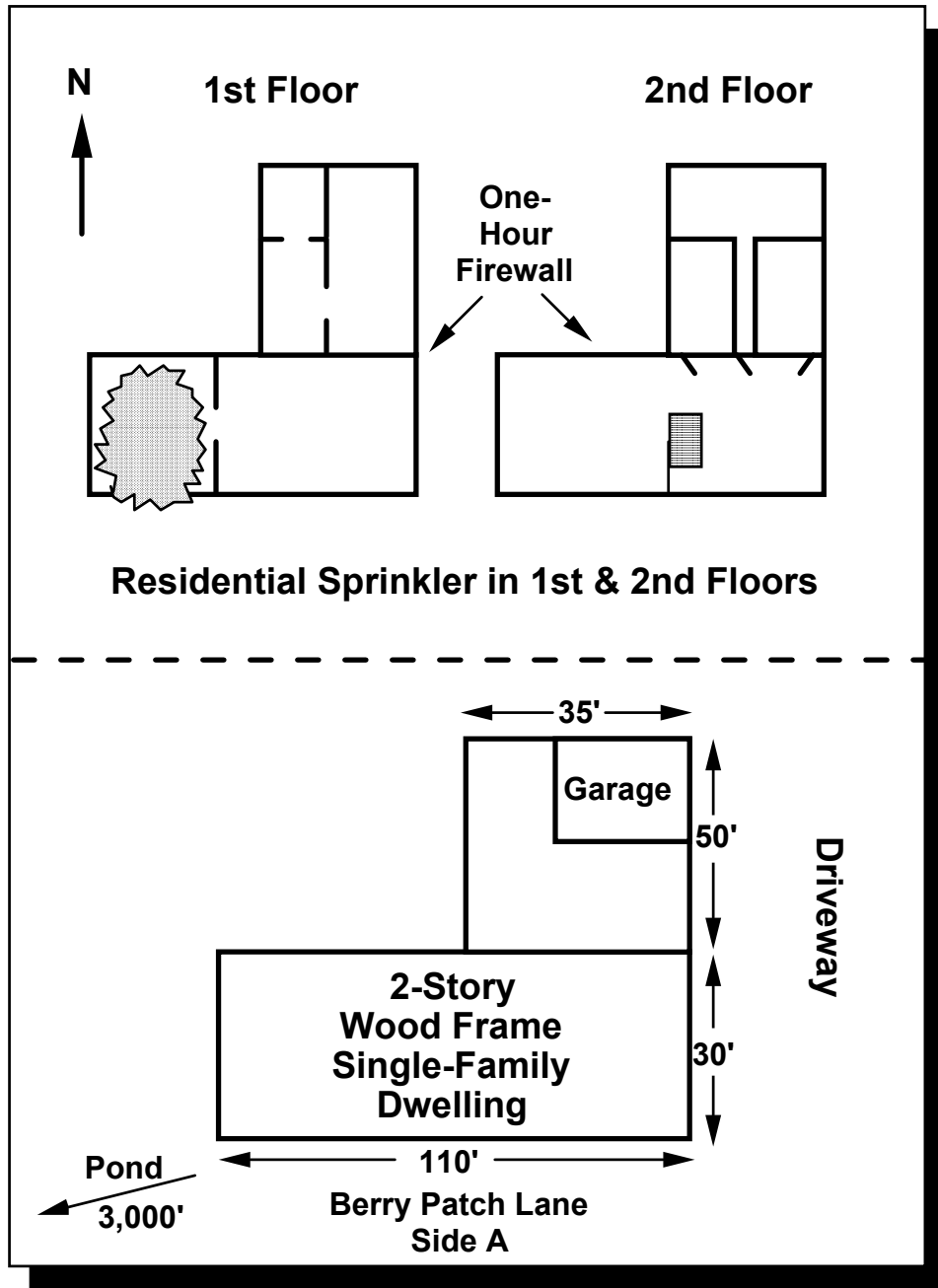
Provide fire confinement protection for the primary search team from the rescue company. As soon as the search is completed you are then to extinguish the fire. If needed, a second hoseline is available from the second engine company. Should other resources be needed in order to accomplish your assignment, you will need to inform the IC.

Other tactical assignments issued by the IC include the primary search operation to the rescue company, water supply to the two tanker/tenders, and for the second engine to provide a water supply for your engine from draft at the portable pond, with the crew reporting to you for a backup line assignment if you request it.

ACTIVITY 3.3 (cont'd)

SCENARIO 1

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.3 (cont'd)
SCENARIO 1
QUICK ACCESS PREFIRE PLAN

Building Address: *14 Berry Patch Lane*

Building Description: *110' x 30'; two-story, wood frame, platform construction, with a basement; firewall between front and rear of structure*

Roof Construction: *Truss rafters covered with cedar shakes, plywood sheathing*

Floor Construction: *2" x 8" floor joists, particle board sheathing*

Occupancy Type:
Single-family dwelling

Initial Resources Required:
*1 heavy rescue, 2 engines,
 2 tanker/tenders*

Hazards to Personnel:
No special hazards

Location of Water Supply:
Ice House Pond - 3,000 feet north

Available Flow:
Dry hydrant - accessible all year

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	675	1,350	2,025	2,700

**Fire flow based on 110' x 30' 2-story - 1 exposure - 3/4 of water is for extinguishment at any involvement*

Fire Behavior Prediction:
Slow horizontal and vertical fire spread

Predicted Strategies:
Rescue, ventilation, exposures, confinement, extinguishment. Residential sprinkler system in occupied areas of structure should confine or extinguish fire

Problems Anticipated:
Very large structure will require additional resources to develop water supply if more than 10% involved



Standpipe:
No



Sprinklers:
*Storage tank in
 basement*



Fire Detection:
No

ACTIVITY 3.3 (cont'd)

SCENARIO 2

A fire has been reported in a one-story commercial occupancy located at 12 Industrial Avenue. The time is 1030 hours on a Wednesday and the weather is clear with a temperature of 40°F. The occupancy sells welding supplies, manufactures acetylene gas, and stores cylinders of other gases such as oxygen and argon. The structure is sprinklered, except for the section of the structure that houses the acetylene production equipment and storage of the raw materials to produce the acetylene. The normal inventory of calcium carbide (makes acetylene when mixed with water) is about 5,000 pounds.

The fire is burning in the sales and storage areas of the structure and has been burning about five minutes prior to your arrival. The acetylene mixing and production equipment room has a two-hour firewall; however, a worker reports that a forklift was left in the opening for the fire door. The manager reports that all workers are out of the sales and storage areas, but he has not seen two secretaries from the office and is not sure if they were out on a break or were in the office when the explosion and fire occurred. The structure is 25% involved in fire.

The IC has developed a defensive strategy for the sales and storage areas while initiating an offensive attack for the office. The sizeup revealed that the firewall between the office and the remainder of the structure was intact and the fire door was closed. The IC has given your engine company the following assignment:

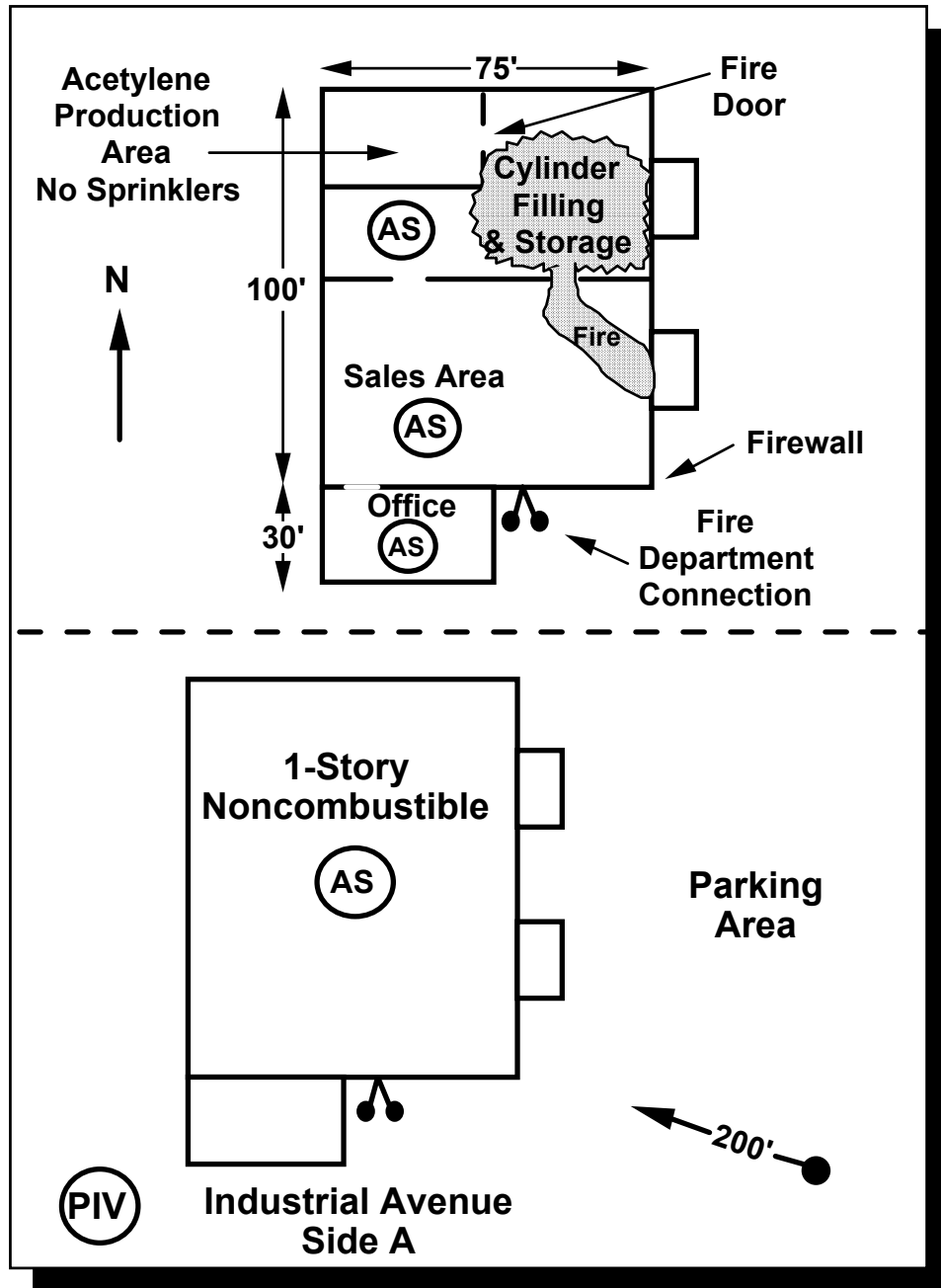
Provide fire confinement protection for the primary search operation in the office with a continued fire confinement effort for the office part of the structure. A second engine company has been assigned to assist you and will be awaiting your assignment.

Other tactical assignments include the third engine company being given the water supply assignment and the ladder company being assigned forcible entry and utility control.

ACTIVITY 3.3 (cont'd)

SCENARIO 2

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.3 (cont'd)
SCENARIO 2
QUICK ACCESS PREFIRE PLAN

Building Address: *12 Industrial Avenue*

Building Description: *130' x 75' one-story, noncombustible construction, no basement; two-hour firewall between office and sales area*

Roof Construction: *Steel bar joists, metal decking, built-up tar roof*

Floor Construction: *Concrete slab*

Occupancy Type:
Welders' supply office, sales area, and cylinder filling/storage area

Initial Resources Required:
1 heavy rescue, 3 engines, 1 ladder truck

Hazards to Personnel:
Compressed gas filling and storage area, acetylene production equipment in corner (B/C) with normal storage of 5,000 pounds of calcium carbide to produce acetylene gas

Location of Water Supply:
10 Industrial Road

Available Flow:
3,000 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	750	1,500	2,250	3,000

**Fire flow based on 1 story with 1 exposure - 3/4 of water for extinguishment at any involvement*

Fire Behavior Prediction:
Slow horizontal fire spread

Predicted Strategies:
Rescue, ventilation, exposures, confinement, extinguishment - any fire of consequence, consider defensive operation in sales, storage, and acetylene filling areas

Problems Anticipated:
Storage of calcium carbide in acetylene production room (stored in fifty pound bags in metal locker) which is water reactive



Standpipe:
No



Sprinklers:



Fire Detection:
No

ACTIVITY 3.3 (cont'd)

SCENARIO 3

A fire has been reported from apartment 1G of Lakeside Acres apartment complex. The Lakeside Acres apartment building is a two-story wood-frame building housing sixteen apartments. The time is 0530 hours on a Sunday morning and the weather is clear with a temperature of 65°F. The structure is one of five identical units and was constructed in 1984 with lightweight construction methods. A previous fire at the complex resulted in a rapid fire spread between the firewalls, quickly involving eight apartments.

The fire is burning in the first floor apartment and people are exiting the building upon your arrival. The structure is 10% involved with fire. The IC has developed a strategy and has given your engine company the following assignment:

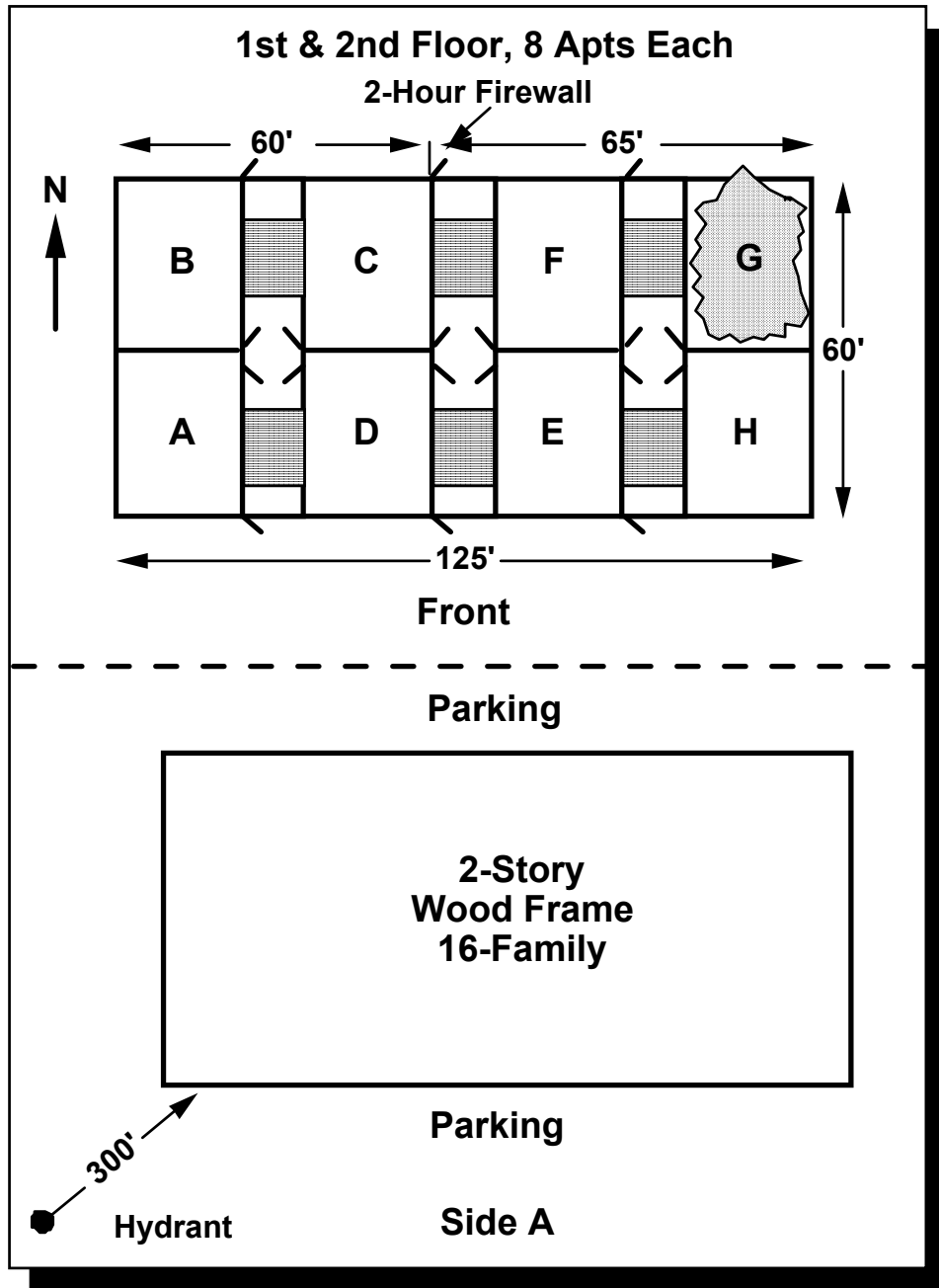
Provide fire confinement protection for the primary search team from the rescue company, which will be divided into two search teams to check all apartments between the firewalls. Once the primary search is completed you must check for fire extension above the fire and extinguish fires that may be discovered.

Other tactical assignments include fire confinement and extinguishment in the apartment of fire origin by the second engine company, along with the establishment of a water supply. The ladder company will provide horizontal ventilation of both the first and second floors, along with utility control. If you find fire extension in the attic, the ladder company will evaluate the possibility of getting on the roof to ventilate vertically.

ACTIVITY 3.3 (cont'd)

SCENARIO 3

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.3 (cont'd)
SCENARIO 3
QUICK ACCESS PREFIRE PLAN

Building Address: *Lakeside Acres apartment complex*

Building Description: *65' x 60', 60' x 60', two-story, wood frame, platform construction, no basement; apartments are 30' x 25'*

Roof Construction: *Wood truss rafters, plywood sheathing*

Floor Construction: *Wooden "I" beams (5/8" plywood sandwich beam between 2" x 4" top and bottom chords), plywood sheathing*

Occupancy Type:
Sixteen-family dwelling:
Eight units on first floor
Eight units on second floor

Initial Resources Required:
1 heavy rescue, 2 engines, 1 ladder truck

Hazards to Personnel:
Roof and floor assemblies

Location of Water Supply:
Front entrance to Lakeside Acres

Available Flow:
3,000 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	800	1,600	2,400	3,200

**Fire flow based on 65' x 60' 2-story, 1 exposure - 3/4 of water for extinguishment at any involvement*

Fire Behavior Prediction:
Rapid fire spread through roof and floor joist areas with one two-hour firewall in center of structure

Predicted Strategies:
Rescue, ventilation, exposures, confinement, extinguishment

Problems Anticipated:
Floor joist and roof assemblies have potential for early collapse



Standpipe:
No



Sprinklers:
No



Fire Detection:
No

ACTIVITY 3.3 (cont'd)

SCENARIO 4

A fire has been reported in a three-story ordinary construction, fifteen-unit dwelling located at 28 Briarwood Road. The time is 0600 hours on a Saturday morning and the weather is clear with a temperature of 35°F. The structure was constructed in 1934 as a three-family apartment house and in 1984 was extensively renovated while being converted into fifteen studio apartments. The structure now houses five dwelling units on each of the three floors.

The fire is burning in apartment 2A and has already ventilated prior to your arrival. Residents are reported to be out of the structure upon your arrival. The structure is 10% involved with fire. The IC has developed a strategy and issued your engine company the following assignment:

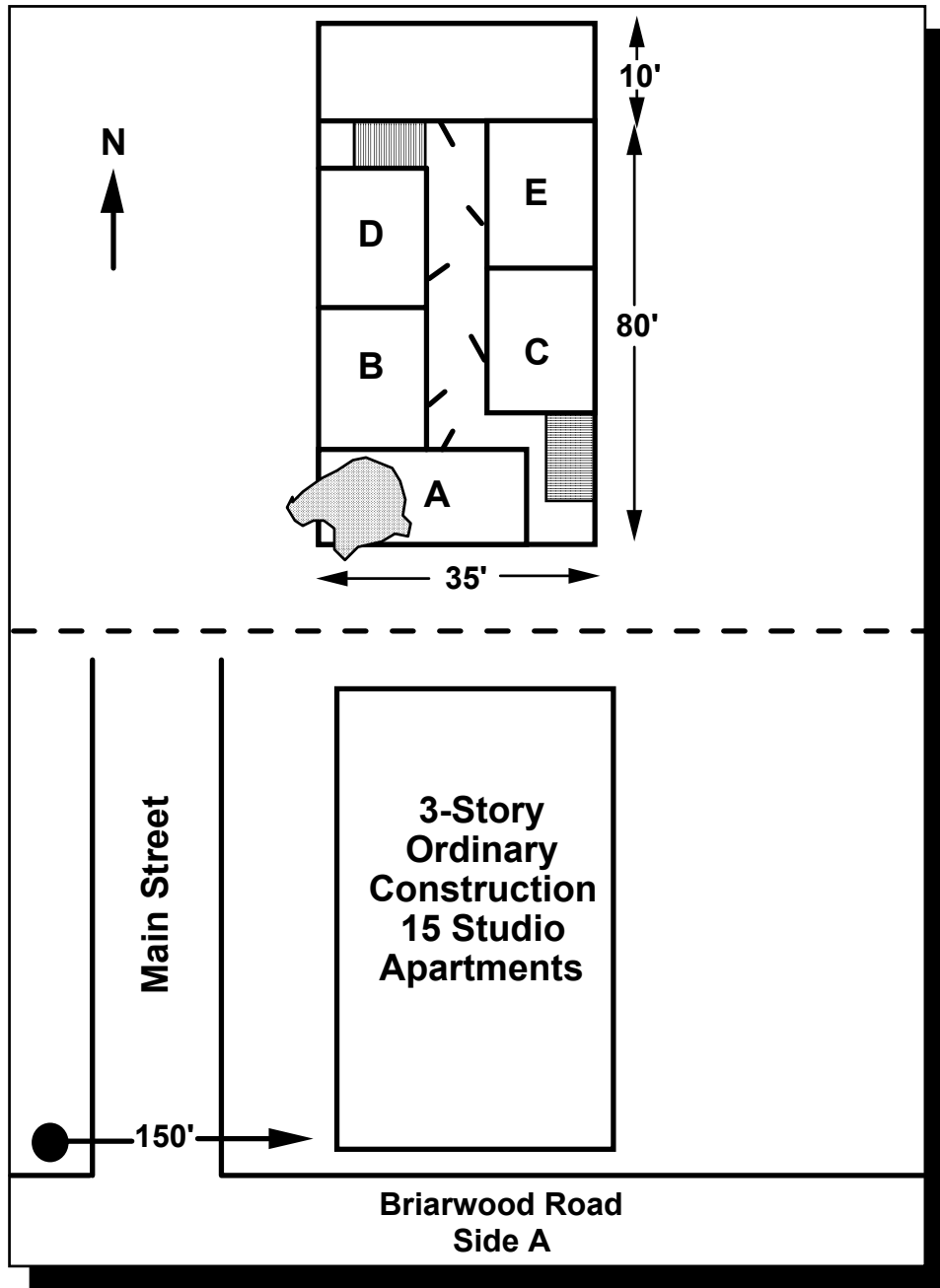
Provide fire confinement protection for the rescue company to conduct a primary search of the second and third floors. In addition, you have been assigned fire extinguishment in the apartment of fire origin (2A). The third engine company has been assigned to you and will be awaiting your assignment.

Other tactical assignments include primary search of the second and third floors by the rescue company, and both horizontal and vertical ventilation by the ladder company as well as laddering. The second engine company has been assigned water supply and to check for fire extension as well as primary search of the first floor.

ACTIVITY 3.3 (cont'd)

SCENARIO 4

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.3 (cont'd)
SCENARIO 4
QUICK ACCESS PREFIRE PLAN

Building Address: *28 Briarwood Road*

Building Description: *90' x 35', three-story, ordinary construction, with a basement*

Roof Construction: *2" x 12" rafters, 1" x 6" sheathing*

Floor Construction: *2" x 8" floor joists, 1" x 6" sheathing*

Occupancy Type:
*Fifteen-family dwelling: five apartments
on each floor*

Initial Resources Required:
*One heavy rescue, three engines, one ladder
truck*

Hazards to Personnel:
*Building has been remodeled several times with many void areas created both vertically
and horizontally*

Location of Water Supply:
Briarwood Road and Main Street

Available Flow:
3,500 gpm

	Estimated Fire Flow*			
Level of Involvement	25%	50%	75%	100%
Estimated Fire Flow	800	1,600	2,400	3,200

**Fire flow based on 3 stories - no exposures*

Fire Behavior Prediction:
*Fire will travel through false ceilings and other voids created during the renovation from
a three-family structure to a fifteen-family structure*

Predicted Strategies:
Rescue, ventilation, confinement, extinguishment

Problems Anticipated:
Rapid fire spread due to age and condition of the structure



Standpipe:
No



Sprinklers:
No



Fire Detection:
No

ACTIVITY 3.3 (cont'd)

SCENARIO 5

A fire has been reported at 50 Commerce Road, a modern three-story office building. The time is 1500 hours on a Thursday and the weather is clear with a temperature of 45°F. The structure is a modern, open floorspace office building constructed in 1991. Each of the stairwells is equipped with a Class III standpipe system with hose cabinets recessed into the wall. The structure is fire resistant and has a two-hour firewall with protected openings between the front and rear portions of the structure. The front entrance area is the only portion of the structure that is protected with automatic sprinklers. The windows have been covered with a vinyl (combustible) sun shield which is attached to the inside of the glass.

The fire is on the third floor of Side A (front) and has already ventilated prior to your arrival. The structure is 10% involved with fire. The IC has developed a strategy and issued your engine company the following assignment:

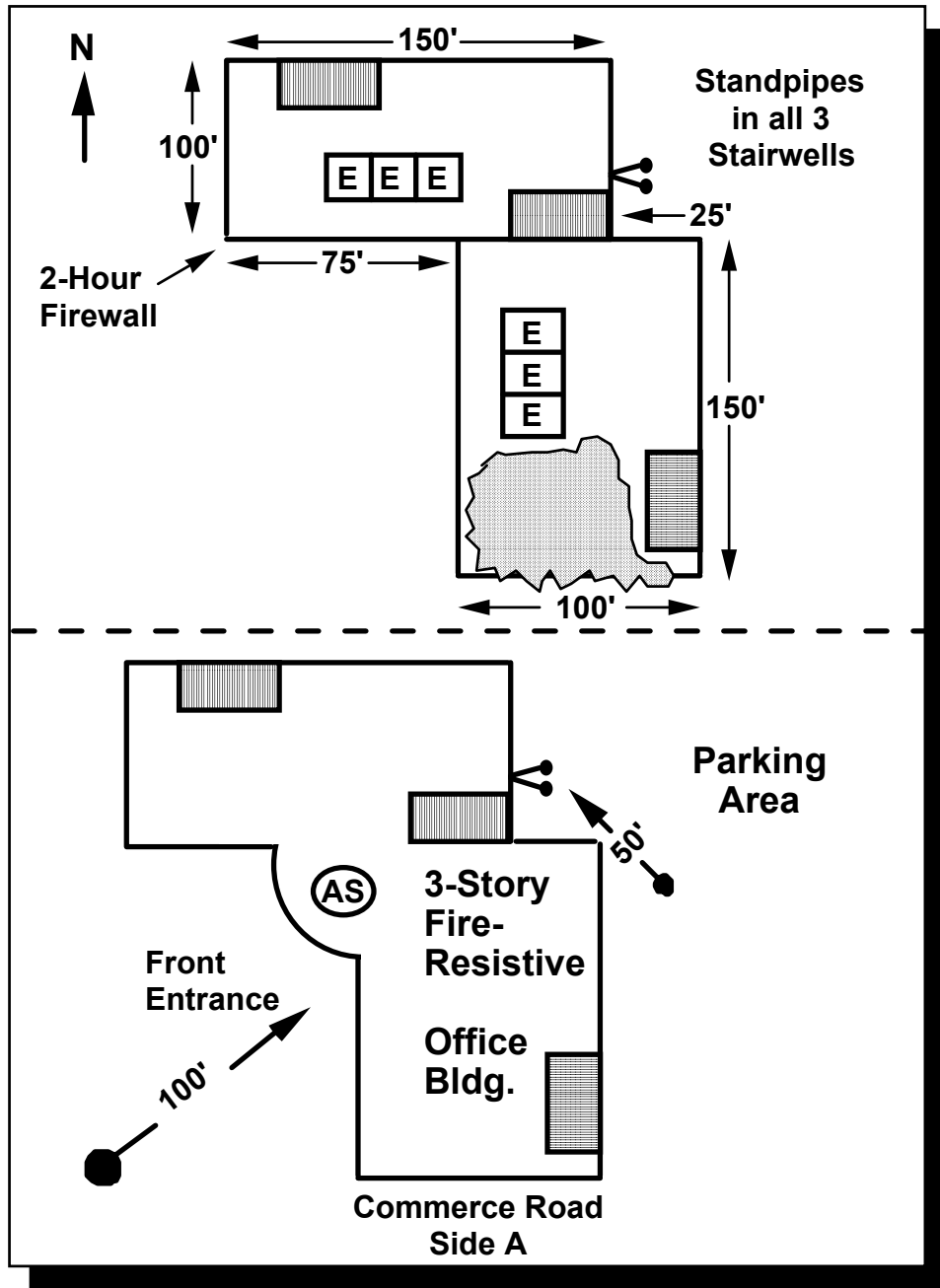
Provide fire confinement protection to the primary search team and extinguish the fire. The second engine company has been assigned to assist you and will be awaiting your instructions. In addition, you are to provide the water supply to the fire department connection for the standpipe system. The third engine company will be available to assist you in ten minutes after they complete a primary search of the first and second floors.

Other tactical assignments include primary search of the third floor by the rescue company; ventilation and elevator control plus auxiliary lighting by the ladder company; and primary search of the first and second floors by the third engine company. A second assignment has been summoned to provide backup lines, air supply, and additional water supply.

ACTIVITY 3.3 (cont'd)

SCENARIO 5

PLOT PLAN/FLOOR PLAN



ACTIVITY 3.3 (cont'd) SCENARIO 5 QUICK ACCESS PREFIRE PLAN																			
Building Address: <i>50 Commerce Road</i>																			
Building Description: <i>150' x 100'; three-story, fire-resistive construction, no basement, two-hour firewall separates front and rear portion of structure (has protected openings)</i> Roof Construction: <i>Concrete slab with vinyl covering - access from all three stairwells</i> Floor Construction: <i>Concrete slab</i>																			
Occupancy Type: <i>Office building with normal census of 100 persons per floor</i>			Initial Resources Required: <i>1 heavy rescue, 2 engines, 1 ladder truck</i>																
Hazards to Personnel: <i>Open floor office plan will allow rapid fire spread</i>																			
Location of Water Supply: <i>Both front and rear of structure</i>			Available Flow: <i>5,000 gpm</i>																
<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td></td> <th align="center" colspan="4">Estimated Fire Flow*</th> </tr> <tr> <th align="center">Level of Involvement</th> <th align="center">25%</th> <th align="center">50%</th> <th align="center">75%</th> <th align="center">100%</th> </tr> <tr> <th align="center">Estimated Fire Flow</th> <th align="center">1,500</th> <th align="center">3,000</th> <th align="center">4,500</th> <th align="center">6,000</th> </tr> </table>						Estimated Fire Flow*				Level of Involvement	25%	50%	75%	100%	Estimated Fire Flow	1,500	3,000	4,500	6,000
	Estimated Fire Flow*																		
Level of Involvement	25%	50%	75%	100%															
Estimated Fire Flow	1,500	3,000	4,500	6,000															
<i>*Fire flow calculation does not include exposure for floors above fire</i>																			
Fire Behavior Prediction: <i>Rapid fire spread on each floor due to open area, sun shield on window glass (interior side of glass) is combustible, two air handling systems have manual reverse-controls at lobby panel</i>																			
Predicted Strategies: <i>Rescue, ventilation, exposures, confinement, extinguishment</i>																			
Problems Anticipated: <i>Large rescue problem with average of 300 occupants</i>																			
<input checked="" type="checkbox"/> Standpipe: <i>Electric fire pump, automatic start on pressure switch</i>		<input checked="" type="checkbox"/> Sprinklers: <i>First floor - front lobby only</i>		<input checked="" type="checkbox"/> Fire Detection: <i>Heat and smoke supervised system 555-221-4479</i>															

MODULE 4: WATER SUPPLY AND EXPOSURE PROTECTION

OBJECTIVES

The students will:

1. *Identify the principles of water supply and tactics for establishing water supplies using municipal sources, static sources, and portable sources.*
 2. *Identify tactical sizeup considerations for providing water supplies to meet needed fire flows at specific fire incidents.*
 3. *Identify the principles and tactics for protecting exposed property and areas near the fire from becoming involved.*
 4. *Identify tactical sizeup considerations for providing exposure control at specific fire incidents.*
-

NOTE-TAKING GUIDE

I. WATER SUPPLY

- A. Definition: The tactical operation of providing sufficient water to meet needed fire flows at fire incidents.

- B. Principle of water supply: develop water supply adequate to support all fireground operations.

- C. Establishing water supply using municipal systems.
 - 1. Identify the source/supply of water.

 - 2. Know quantity of water available.

 - 3. Learn how the water is distributed.

 - 4. Select size and number of supply lines.

NOTE-TAKING GUIDE

- D. Establishing water supply using static systems.
 - 1. Preplan to locate static sources.
 - 2. Use relay pumping.
- E. Establishing water supply using portable systems.
 - 1. Tanker/tender effectiveness.
 - 2. Figuring tanker delivery rate.
 - 3. Setting up fill and dump sites.
 - 4. Determine whether enough water can be supplied.
- F. Tactical sizeup considerations.

NOTE-TAKING GUIDE

- G. Water supply coordination.
- H. Develop a Water Supply Tactical Action Plan.

II. EXPOSURE PROTECTION

- A. Definition: Tactical operations performed to protect exposed property and areas near the fire from becoming involved.
- B. Principles of exposure protection.
 - 1. Protect areas and property near the fire building from becoming involved (external exposures).
 - 2. Protect areas in the fire building from becoming involved (internal exposures).
 - 3. Protect the areas downwind from the fire from the dangers of flying brands.

NOTE-TAKING GUIDE

- C. Protect vulnerable and valuable exposures.
 - 1. CO's responsibility.
 - 2. Preplanning is essential.
 - 3. Prioritize based on amount of radiant heat.
 - 4. Protect interior exposures.
 - 5. Protect exterior exposures.
- D. Tactics for protecting exposures.
 - 1. Coordinated attack on fire with adequate flow is best way to protect exposures.
 - 2. Wash the face of exposed buildings with water to prevent ignition of exposed surface areas by reducing amount of heat absorbed.

NOTE-TAKING GUIDE

3. Push fire back into original fire building to prevent extension to exposures.
 4. Reduce intensity or extinguish fire at points where heat transfer is threatening exposures.
 5. Place ventilation holes where the change in convection currents will draw fire away from exposures.
 6. Stretch lines to inside of exposure to cover possible internal outbreak of fire.
 7. Charge exposure sprinkler system, if available, so that system is not overwhelmed if fire extends into exposure.
- E. Initiate brand control to search and monitor the flow of hot brands.
- F. Provide support for exposure operations.

NOTE-TAKING GUIDE

- G. Tactical sizeup considerations.

- H. Coordination.

- I. Develop an Exposure Protection Tactical Action Plan.

Activity 4.1: (See SM p. 4-19)

III. SUMMARY

WATER SUPPLY

One of the most essential tactics initiated on the fireground is that of providing sufficient water to meet needed fire flows. Without adequate water, no other tactics can be completed safely. For this reason the Company Officer (CO) assigned to water supply must be knowledgeable as well as skillful in initiating and implementing water supply tactics. The basic principle of water supply is to develop a supply adequate to support all fireground operations.

Establishing Water Supply Using Municipal Systems

When working with a municipal system the CO must have a clear understanding of the **source and supply** of water. Municipal systems have a history of being very dependable and they are the most common water source used in urban settings. However, major fire operations will put large demands on the system, creating critical limitations.

Water in municipal systems is provided in one of three ways. In **gravity systems** the water is stored in large tanks on top of hills, or stored in reservoirs elevated on top of towers. Water is delivered by gravity. The amount of pressure and water available at a hydrant will depend on several factors, such as the height of the water tower or tank, the size of the tank, and the condition of the delivery system. Generally, the higher the tank, the higher the pressure available. When using gravity systems, the CO must remember that the tank can run out of water, and it takes time to fill the tank.

The second type of municipal system is a **pump system**. In this system static water is stored in lakes, dams, or water tanks and is distributed by pumping. In pump systems the amount of water available depends on the size of the pump and the condition of the delivery system. In some systems booster pumps, which increase pressure, must be manually turned on to meet fire flow needs.

The third type of municipal system uses a **combination** of gravity and pumps to move water. When using any type of municipal system, backup sources should be identified in the event the primary source fails or is inadequate.

The **quantity of water** available in a given water system is based on the amount of water stored, the size and condition of mains, and the type of hydrants. The CO must know the limitations on the amount of water available. Water tanks can be emptied, and the amount of water stored may not be the same as the size of the tank. The **amount of water stored**

may depend on time of day and needs anticipated by the water department. The **size and condition of mains** play an important role in the amount of water that is delivered in a system. A minimum of six-inch lines should be used in residential areas and eight inches or greater in commercial. The CO must locate and identify the size of mains in each district or jurisdiction in order to make sound decisions for developing water supply at fire incidents. In regard to fire hydrants, the size of the barrel and the number and size of discharges affect the amount of water that can be discharged. The annual or semiannual flow testing of hydrants will give the CO necessary information on the amount of water available. Hydrant flow rates vary and are dependent on time of day. Flow is often determined at "low-demand" times.

Water is distributed throughout the system by mains. Properly engineered systems are designed as **grid or loop systems**. This type of system connects all the mains together and allows water to flow in several directions. Mains not connected in a loop system are called **dead-end mains**. These mains generally have limited flow during high demand times such as a fire, and should be avoided when possible. A department must review the water distribution maps from the utility department. This is the only effective way of knowing which mains are "dead-ends." As mentioned, dead-end mains typically have very low fire flows compared to looped mains; however, this is not always true. Without maps, the fire officer cannot tell which systems are dead-ends and which looped mains are just poor water suppliers. In addition, there may be valves that normally are closed in a looped system that could be opened during a fire situation. It may be necessary to lay supply lines from a better system to the incident scene or to connect a poor system to a better system by laying lines between two convenient hydrants and placing a pumper in that system to increase flow and pressure--be careful not to over-pressurize a poor, older system's mains. Some main systems are **high pressure** and some systems are **low pressure**.

A **good working relationship with the water department** is essential for a continuous, reliable water system. The CO must be aware of any water system deficiencies. Poor condition of mains, inoperable pumps, closed valves, and poorly engineered systems often lead to system failure. The CO must be prepared and have a backup plan should a system fail.

In establishing **water supply tactics**, it is also the responsibility of the CO to determine how the water will be delivered from the hydrant to the fire. Proper selection of **size and number of supply lines** is essential. The amount of water supplied depends upon the pressure and volume available from the hydrant or supply pumper, the size of hose laid, and the number of lines laid. Fire departments must take a proactive look at large diameter hose.

An example of the value of increasing hose diameter is shown in the following table. For a straight lay with 65 psi at the hydrant, when flowing water and with the pumper 600 feet from the hydrant with 10 psi residual:

Hose size	gpm at 600 feet
2-1/2"	210 gpm
3"	330 gpm
3-1/2"	520 gpm
4"	670 gpm
5"	1,250 gpm

Establishing Water Supply Using Static Systems

In areas not covered by municipal systems, alternate sources must be used. Rural fire operations are often dependent on static sources. Company Officers must locate and identify all usable static sources. Lakes, ponds, rivers, pools, and other bodies of water all provide good sources of water for firefighting operations.

When **preplanning static sources** the CO must determine whether the source is accessible and the condition of the water. Is water available year round or only in the summer or winter? Is the apparatus being used designed for static operations? How much total water is available? The answers to these questions, along with a good training program, will lead to good static operations.

In many areas, departments are identifying static sources and installing **dry hydrants**. Dry hydrants generally allow for year-round operations and greatly improve the efficiency of rural water supply tactics.

Often the delivery method used to move water from static sources to the fire includes **relay pumping**. If relay pumping is used, the CO must have a good understanding of hydraulics and plan carefully. Certain rules of relay pumping must be followed for effective operations. The largest pump should be placed at the static source and the smallest pump at the fire. If using 2-1/2 inch hose, the recommended distance between pumps is approximately 700 feet. When using large diameter hose, the distance between pumps and the volume flowing can be increased. For five-inch hose the recommended distance between pumps is 1,200 feet. Preplanning and training can assure effective water supply efforts when relay pumping.

Establishing Water Supply Using Portable Systems

Rural firefighting operations have been greatly enhanced by the use of water **tanker/tenders**. Such apparatus can supply large amounts of water to the fire, using either a nursing operation or a shuttle operation. In a nursing operation, the tanker goes directly to the fire and supports the engines onscene. In a shuttle operation, tanker/tenders are used to move water from a municipal or static source to the fire. The concept is to drop the water at the fire, refill at the source, and return to dump again. When dumping water at the fire, the onscene apparatus drafts from portable tanks.

Successful operations greatly depend on **tanker/tender shuttle effectiveness**. Apparatus should be designed to handle the weight of the water, be easily maneuverable, quick filling, and quick dumping. The concept is to dump as fast as possible, travel to the water source, fill as fast as possible, and return to the fire while, at all times, operating safely.

Effectiveness is measured in **tanker delivery rate (TDR)**. This is also a tool used to determine the number of tanker/tenders needed to support an operation. TDR is determined by dividing the capacity of the tanker/tender by the time it takes to make one cycle. Example: if it takes a 2,500 gallon tanker/tender 20 minutes to dump, travel to the water source, and return, the TDR for that tanker/tender is 125 gallons per minute. If the needed fire flow is 750 gallons per minute for the fire, six tankers (of the same size and type) should be sufficient to meet the needed fire flow.

Additional support for effective water shuttle operations includes the setup of **fill and dump sites**. These sites should be located to allow easy access for tanker/tenders to safely get in and out. COs may function as shuttle water officers or as fill site or dump site officers.

Tactical Sizeup Considerations

To complete a water supply sizeup, the following questions must be asked:

1. What are the fire flow needs?
2. What source(s) will supply required flow?
3. What delivery method will be used?
4. What resources (apparatus, personnel, equipment) are needed?

5. How long will it take to develop the water supply?
6. How reliable is the water supply?
7. Is there a backup supply available?
8. Is any support required?
9. What coordination with other tactics is needed?
10. What safety concerns exist?
11. How effective is the water supply system?

Coordination

The water supply requirements must be coordinated with the IC and with each end user to assure adequate water supply for all tactical operations.

Develop a Water Supply Tactical Action Plan

After completing the water supply sizeup the CO can develop a Water Supply Tactical Action Plan including the following:

1. Determine critical sizeup factors.
2. Select water source(s).
3. Select delivery method.
4. Identify needed resources, including apparatus, personnel, equipment.
5. Determine needed support.
6. Determine needed coordination.
7. Identify safety concerns.

EXPOSURE PROTECTION

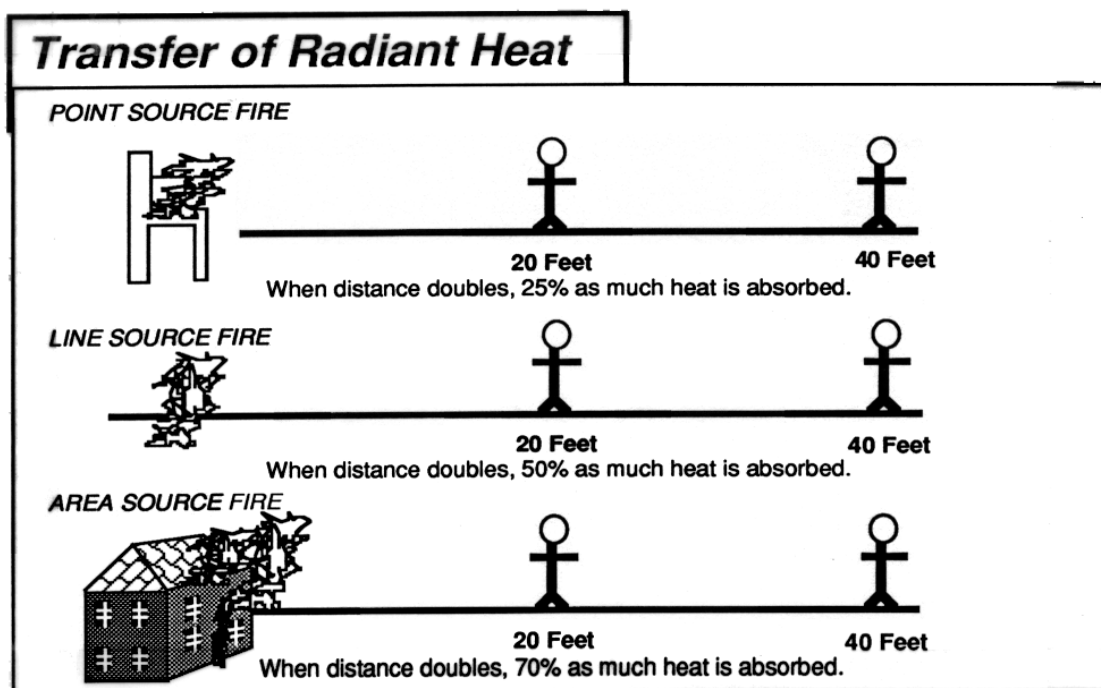
Exposure protection tactics must be performed to keep any property not involved in fire from becoming involved. Exposures can be classified as buildings near the fire building, buildings attached to the fire building, areas near the fire but protected by firewalls or divisions, and areas downwind that may be threatened by flying brands.

Protect Vulnerable and Valuable Exposures

Officers often must **prioritize** which exposure should be protected first. **Prefire planning** is essential to assist in determining vulnerable and valuable property. The CO must keep in mind that the values of each individual at the scene may vary. When prioritizing, the CO must determine which tactics will have the most favorable outcome regarding what can be saved.

One of the factors used in prioritizing potential exposures is the **amount of radiant heat** being produced and distributed. The amount of heat is proportional to the type of fire. There are three types of fires: 1) point source, 2) line source, and 3) area source. Point source fires are very small, localized fires, such as an object or a single room and contents. Line source fires involve larger areas, including walls and several rooms, and also include brush fires and running flammable liquids fires. Area source fires include totally involved structures, including exterior walls and major wildland fires with crowning.

The following chart shows the relationship of source and potential exposures:



The concept of **protecting interior exposures** is to keep areas away from the fire (but in the fire building) from becoming involved with fire. These areas are generally divided from the fire by walls. The greater the fire rating, the more protection the exposure has from becoming involved. Just because an area is separated from the fire by walls does not mean it cannot become involved. The CO must take a proactive approach to exposure protection. Protecting valuables such as computers, important records, stock, and machinery will have a very favorable outcome. Uninvolved areas must be protected.

Separate buildings, whether attached to the fire building or not, are classified as **exterior exposures**. When assigned to exposure tactics the CO must determine if such buildings are a threat. Generally, a building up to thirty feet from the fire is classified as an exposure. A building thirty to 100 feet from the fire may be an exposure, and a building more than 100 feet from the fire is not an exposure. The CO cannot base all decisions on this rule of thumb; careful consideration also must be given to what is burning, the amount of radiant heat being produced based on the source of fire, and weather conditions. Wind also is an important factor in determining potential exterior exposures.

Tactics for Protecting Exposures

Tactics needed to protect exposures include:

1. Coordinated attack on fire with adequate flow is the best way to protect exposures.
2. Wash the face of exposed buildings with water to prevent ignition of exposed surface areas by reducing the amount of heat absorbed.

Water curtains are inefficient in preventing transfer of radiant heat and they should not be used.

3. Push the fire back into the original area to prevent extension to exposures.
4. Reduce the intensity or extinguish fire at the points where heat transfer is threatening exposures.
5. Place ventilation holes where the change in convection currents will draw fire away from exposures.
6. Stretch lines to inside of exposures to cover possible internal outbreak of fire.

7. Charge sprinkler system of exposure, if available, so that the system is not overwhelmed if fire extends into the exposure.

Brand Control

Fire involving wildlands, resulting from the combustion of grass/wood materials generally produce small particles of burning material called brands. Building fires also may produce many flying brands, e.g., tobacco and hay barns, or large wooden structures that are well involved. One of the most probable brand producers always has been wood-shingle roofs.

These brands are carried by air currents to places downwind of the original fire. When they land, they can ignite other combustibles, thereby spreading the fire. If the fire is producing brands, exposure tactics are initiated to prevent the external exposures downwind from becoming involved. Based on the size of brands and weather conditions, several exposures may be threatened. Personnel must be assigned to monitor rooftops near the fire and as far downwind as needed. Personnel assigned must report conditions found to the IC, and must be prepared to extinguish any brands encountered.

Support

In addition to implementing exposure tactics, other supporting tasks must be addressed. Fire crews must gain entry to exposure areas and buildings; crews may have accessibility problems, both internal and external; and buildings may have to be laddered to gain access to the roof. Not all areas or buildings are easily accessible. The CO must consider how personnel and equipment will be moved and set up to best protect the equipment.

Tactical Sizeup Considerations

When completing a tactical sizeup for exposure protection, the CO must ask the following questions:

1. Is the operating position outside the collapse zone?
 - a. All operations must be set up outside the collapse zone.
 - b. A distance at least equal to the height of the building measured on the ground horizontally out from the base of the wall.

2. What fire flow is available for exposure protection?

If water supply is not adequate, streams can be directed on the fire and on the exposure alternately, but too much attention should not be directed at the fire and too little at the exposure.

3. What tactics are most appropriate to accomplish exposure protection?
4. What number and size of hoselines or appliances are required for exposure protection?
5. Where should lines or appliances be placed?
6. Is any support required?
7. What coordination with other tactics is needed?
8. What safety concerns exist?
9. How effective is the exposure protection effort?

Coordination

There must be considerable coordination between exposure tactics and other tactics being implemented at the fire. Proper **ventilation** can have a major impact on exposure protection by channeling heat, smoke, and fire away from exposures. On the negative side, ventilation openings often threaten potential exposures. Coordination between ventilation crews and exposure crews reduces the chance of tactical errors.

There must be coordination in the **use of water** so that adequate water is available for both exposure protection and fire confinement and extinguishment.

Often, protecting external exposures calls for the use of high water flows and master streams. Coordination must be maintained to assure there are **no opposing hoselines** and that the streams being used **do not endanger firefighters** by pushing objects on them.

Develop an Exposure Protection Tactical Action Plan

After completing the exposure protection sizeup, the CO can develop an Exposure Protection Tactical Action Plan including the following:

1. Determine critical sizeup factors.
2. Identify and prioritize interior and exterior exposures.
3. Determine quantity of water available for exposure protection.
4. Select exposure protection tactics.
5. Identify needed resources, including apparatus, personnel, and equipment.
6. Determine needed support.
7. Determine needed coordination.
8. Identify safety concerns.

SUMMARY

Water supply tactics must be initiated to support needed fire flows. These tactics include the use of municipal sources, static sources, portable sources, or a combination of sources. COs may be assigned to fill many functions in water supply tactics, including water supply officer, or fill or dump site officer.

Exposure protection tactics are designed to protect vulnerable and valuable property from becoming involved with fire. The CO has a responsibility to identify and prioritize exposures and initiate appropriate tactics to protect the exposures.

ACTIVITY 4.1

WATER SUPPLY AND EXPOSURE PROTECTION

Purpose:

To provide an opportunity to apply water supply and exposure protection principles and to formulate the water supply and exposure protection components of an action plan for a simulated structure fire.

Directions:

Using the appropriate part of the activity worksheet for the assigned scenario, each group should answer the questions relating to either the Water Supply Action Plan or the Exposure Protection Action Plan. Assume that you are developing your action plan and making assignments independently. Overlapping assignments will be discussed in the activity debriefing.

Select a spokesperson to present the group's responses to the questions on the worksheet.

ACTIVITY 4.1 (cont'd)

WATER SUPPLY ACTION PLAN

1. What tactical sizeup factors are critical to the Water Supply Action Plan?

2. What is the total needed fire flow?

3. What source(s) will supply the needed flow?

4. What delivery method will be used?

5. If water is transported by hose:
 - a. What apparatus is needed?

 - b. What number and size hoselines will be used?

6. If water is transported by shuttle:
 - a. How many tanker/tenders will be needed?
 - b. What route(s) will be used?
7. What support must be provided for water supply efforts?
8. What other tactical assignments require coordination with water supply?
9. What safety concerns relate to personnel assigned to water supply?

ACTIVITY 4.1 (cont'd)

EXPOSURE PROTECTION ACTION PLAN

1. What tactical sizeup factors are critical to the Exposure Protection Action Plan?
2. What interior and exterior exposures require protection and in what priority order?
3. What fire flow is available for exposure protection?
4. What exposure protection tactics are appropriate?
5. Where and what size hoselines or appliances will be used for exposure protection?
6. What support must be provided for exposure protection?
7. What other tactical assignments require coordination with exposure protection?
8. What safety concerns relate to personnel assigned to exposure protection?

ACTIVITY 4.1 (cont'd)

SCENARIO 1

A fire has been reported in a two-story restaurant. Heavy fire and smoke are issuing from the second floor, Sides A and B. Heavy smoke occupies the entire building. The building appears to be unoccupied. The time is 0900 hours, Sunday.

Water supply assignment:

Establish a water supply operation that will supply 1,400 gpm for firefighting and 600 gpm for exposure protection.

Exposure protection assignment:

Provide exposure protection utilizing no more than the initial quantity of 600 gpm being presently supplied for this operation. Determine how much more water will be required.

Other tactical operations assigned:

One engine company is deploying a master stream to begin to confine and extinguish the fire.

ACTIVITY 4.1 (cont'd)

SCENARIO 1

FACTSHEET

DESCRIPTION

Construction:

1- and 2-story wood-frame approximately 50' x 75'
Full basement, balloon frame
Multiple renovations

Exposures:

Side B - 30' x 30' 2-story wood-frame used clothing store
25' to west of fire building

Side D - 25' x 40' 3-story wood-frame hairdresser shop
with 30' x 50' 1-story attached garage to rear
2' to east of fire building

Water Supply:

Hydrants 1,200 gpm 700' east on Lancaster Ave.
1,000 gpm 1,000' west on Lancaster Ave.
800 gpm 300' south on North Ave.

Weather:

Temperature 75°F
Wind 10 mph from east

Resources:

2E, 1T, 1C
Duplicated on second alarm

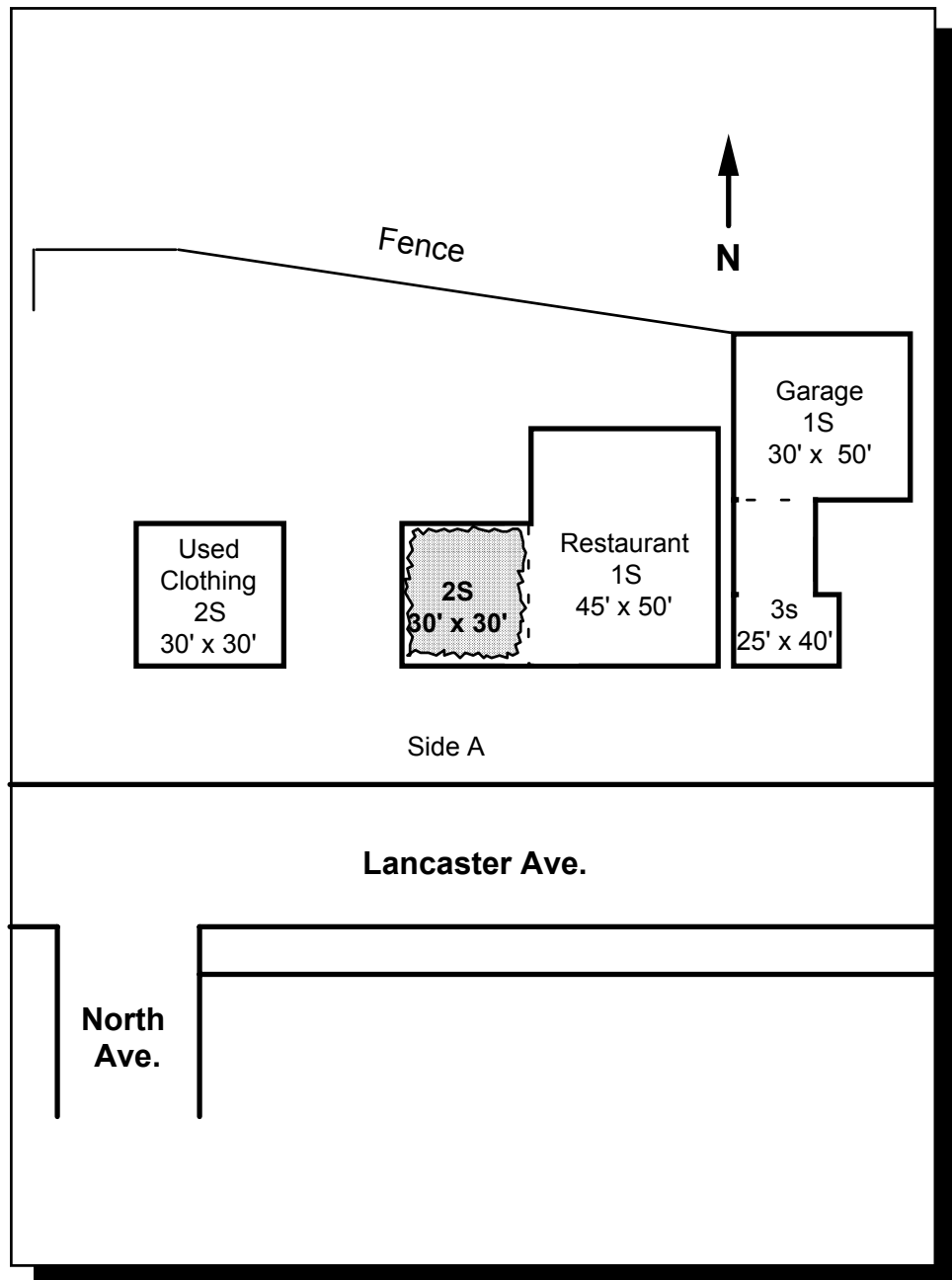
Fire Conditions:

0900 hours on Sunday
Building apparently unoccupied
Heavy fire from second floor, Sides A and B
Heavy smoke from entire building

ACTIVITY 4.1 (cont'd)

SCENARIO 1

PLOT PLAN/FLOOR PLAN



ACTIVITY 4.1 (cont'd) SCENARIO 1 QUICK ACCESS PREFIRE PLAN																			
Building Address: <i>384 West Lancaster Ave.</i> <i>Ristorante Primavera</i>																			
Building Description: <i>1- and 2-story wood-frame, 50' x 75', full basement. 2-story section, balloon frame. Numerous renovations</i> Roof Construction: <i>Ridgepole and rafter, 1" x 6" wood sheathing</i> Floor Construction: <i>2" x 10" joists, plywood sheathing</i>																			
Occupancy Type: <i>Restaurant</i>		Initial Resources Required: <i>2E, 1T, 1C</i>																	
Hazards to Personnel: <i>No unusual hazards</i>																			
Location of Water Supply: <i>700' east on Lancaster Ave.</i> <i>1,000' west on Lancaster Ave.</i> <i>300' south on North Ave.</i>		Available Flow: <i>1,200 gpm</i> <i>1,000 gpm</i> <i>800 gpm</i>																	
<table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td></td> <th align="center" colspan="4">Estimated Fire Flow*</th> </tr> <tr> <td align="center">Level of Involvement</td> <td align="center">25%</td> <td align="center">50%</td> <td align="center">75%</td> <td align="center">100%</td> </tr> <tr> <td align="center">Estimated Fire Flow</td> <td align="center">500</td> <td align="center">1,000</td> <td align="center">1,500</td> <td align="center">2,000</td> </tr> </table>						Estimated Fire Flow*				Level of Involvement	25%	50%	75%	100%	Estimated Fire Flow	500	1,000	1,500	2,000
	Estimated Fire Flow*																		
Level of Involvement	25%	50%	75%	100%															
Estimated Fire Flow	500	1,000	1,500	2,000															
<i>*Fire flow based on 50' x 75' 2-story with 2 exposures. 2/3 of water for fire extinguishment at any involvement</i>																			
Fire Behavior Prediction: <i>Rapid horizontal and vertical spread</i>																			
Predicted Strategies: <i>Rescue, exposure protection, confinement, extinguishment, ventilation</i>																			
Problems Anticipated: <i>Concealed spaces, multiple renovations, proximity of Exposure D</i>																			
<input type="checkbox"/> Standpipe: <i>No</i>	<input type="checkbox"/> Sprinklers: <i>No</i>	<input type="checkbox"/> Fire Detection: <i>No</i>																	

ACTIVITY 4.1 (cont'd)

SCENARIO 2

A fire has been reported at Riley Tree Service. The time is 1330 hours, Saturday. Upon arrival, heavy fire is visible from one overhead door on Side A and from three windows on Side D. Heavy smoke occupies the entire building.

Water supply assignment:

Establish a water supply operation that will supply 1,400 gpm for firefighting and 700 gpm for exposure protection.

Exposure protection assignment:

Provide exposure protection utilizing no more than the initial quantity of 700 gpm being presently supplied for this operation. Determine how much more water will be required.

Other tactical operations assigned:

One engine company is deploying a master stream to begin to confine and extinguish the fire.

ACTIVITY 4.1 (cont'd)

SCENARIO 2

FACTSHEET

DESCRIPTION

Construction:

1-story garage, 30' x 140' irregular, ordinary construction.
Roof is built-up with steel bar joists

Exposures:

Side C - Department store with solid wall facing fire building

Side D - 3-story office 70 feet from fire building

Side D - 3-story frame - 4 stores on first floor, 7 apartments on second floor Third floor vacant - basement protected with sprinklers

Water Supply:

300' south on Chestnut St. - 600 gpm

200' west on Main St. - 1,800 gpm

300' east on Main St. - 1,000 gpm

Weather:

Temperature 50°F

Wind 15 mph from south

Resources:

2E, 1T, 1C

Fire Conditions:

1330 hours on Saturday

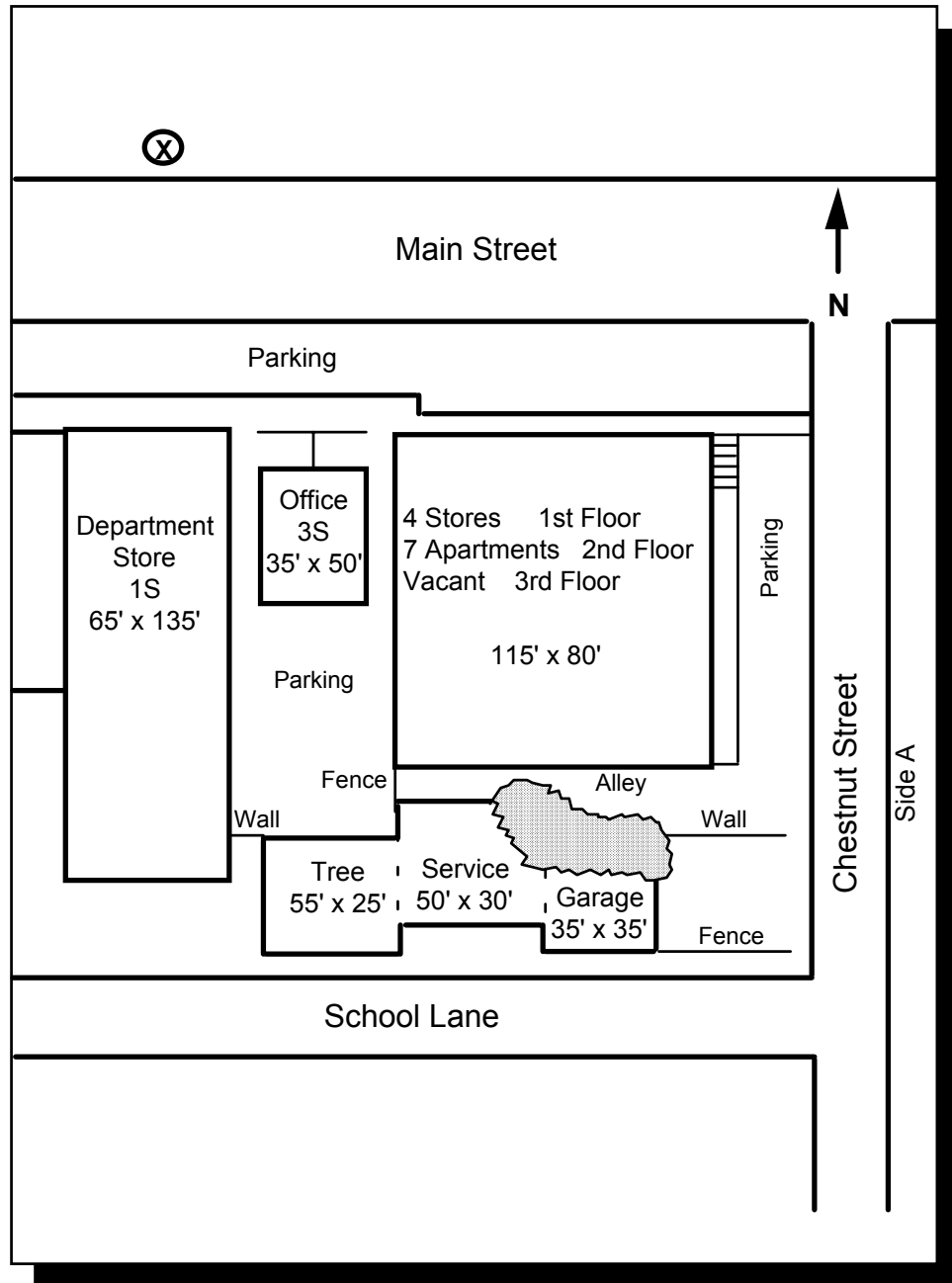
Heavy fire from 1 overhead door on Side A and 3 windows on Side D

Heavy smoke from entire building

ACTIVITY 4.1 (cont'd)

SCENARIO 2

PLOT PLAN/FLOOR PLAN



ACTIVITY 4.1 (cont'd) SCENARIO 2 QUICK ACCESS PREFIRE PLAN																			
Building Address: <i>106 Chestnut St</i> <i>Riley Tree Service</i>																			
Building Description: <i>30' x 140' irregular, 1-story garage, ordinary construction</i> Roof Construction: <i>Steel bar joists with built-up roof</i> Floor Construction: <i>Concrete</i>																			
Occupancy Type: <i>Garage and storage</i>		Initial Resources Required: <i>2E, 1T, 1C</i>																	
Hazards to Personnel: <i>Unknown hazardous chemicals associated with tree spraying - lightweight roof</i>																			
Location of Water Supply: <i>300' south on Chestnut St.</i> <i>200' west on Main St.</i> <i>300' east on Main St.</i>		Available Flow: <i>600 gpm</i> <i>1,800 gpm</i> <i>1,000 gpm</i>																	
		<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <tr> <td></td> <td colspan="4">Estimated Fire Flow*</td> </tr> <tr> <td>Level of Involvement</td> <td>25%</td> <td>50%</td> <td>75%</td> <td>100%</td> </tr> <tr> <td>Estimated Fire Flow</td> <td>525</td> <td>1,050</td> <td>1,575</td> <td>2,100</td> </tr> </table>				Estimated Fire Flow*				Level of Involvement	25%	50%	75%	100%	Estimated Fire Flow	525	1,050	1,575	2,100
	Estimated Fire Flow*																		
Level of Involvement	25%	50%	75%	100%															
Estimated Fire Flow	525	1,050	1,575	2,100															
<i>*Fire flow based on a 30' x 140' 1-story with 2 exposures. 2/3 of water is for extinguishment at any involvement</i>																			
Fire Behavior Prediction: <i>Rapid horizontal spread</i>																			
Predicted Strategies: <i>Exposure protection, confinement, extinguishment, ventilation</i>																			
Problems Anticipated: <i>Vertical ventilation - protection of exposure on Side D</i>																			
<input type="checkbox"/> Standpipe: <i>No</i>		<input type="checkbox"/> Sprinklers: <i>No</i>		<input type="checkbox"/> Fire Detection: <i>No</i>															

ACTIVITY 4.1 (cont'd)

SCENARIO 3

A fire has been reported at a warehouse on Industry Drive. The time is 1230 hours, Thursday. Upon arrival, the warehouse is 25% involved. Since the building is sprinklered, the fire should not have gotten to this stage. Upon checking, you find that the west Post Indicator Valve (PIV) has been shut down.

Water supply assignment:

Establish a water supply operation that will supply 2,100 gpm for firefighting and 700 gpm for exposure protection.

Exposure protection assignment:

Provide exposure protection utilizing no more than the initial quantity of 700 gpm being presently supplied for this operation. Determine how much more water will be required.

Other tactical operations assigned:

One engine company is deploying a master stream to begin to confine and extinguish the fire.

ACTIVITY 4.1 (cont'd)

SCENARIO 3

FACTSHEET

DESCRIPTION

Construction:

2-story office 40' x 40' with 1-story attached warehouse 200' x 90'. Fire-resistive construction with rated wall between office and warehouse.

Exposures:

Office building is exposure to warehouse

Water Supply:

5 hydrants in complex, each supplying 1,000 gpm

Weather:

Clear, 55°F
5 mph wind from west

Resources:

2E, 1T, 1C
Duplicated on 2nd alarm

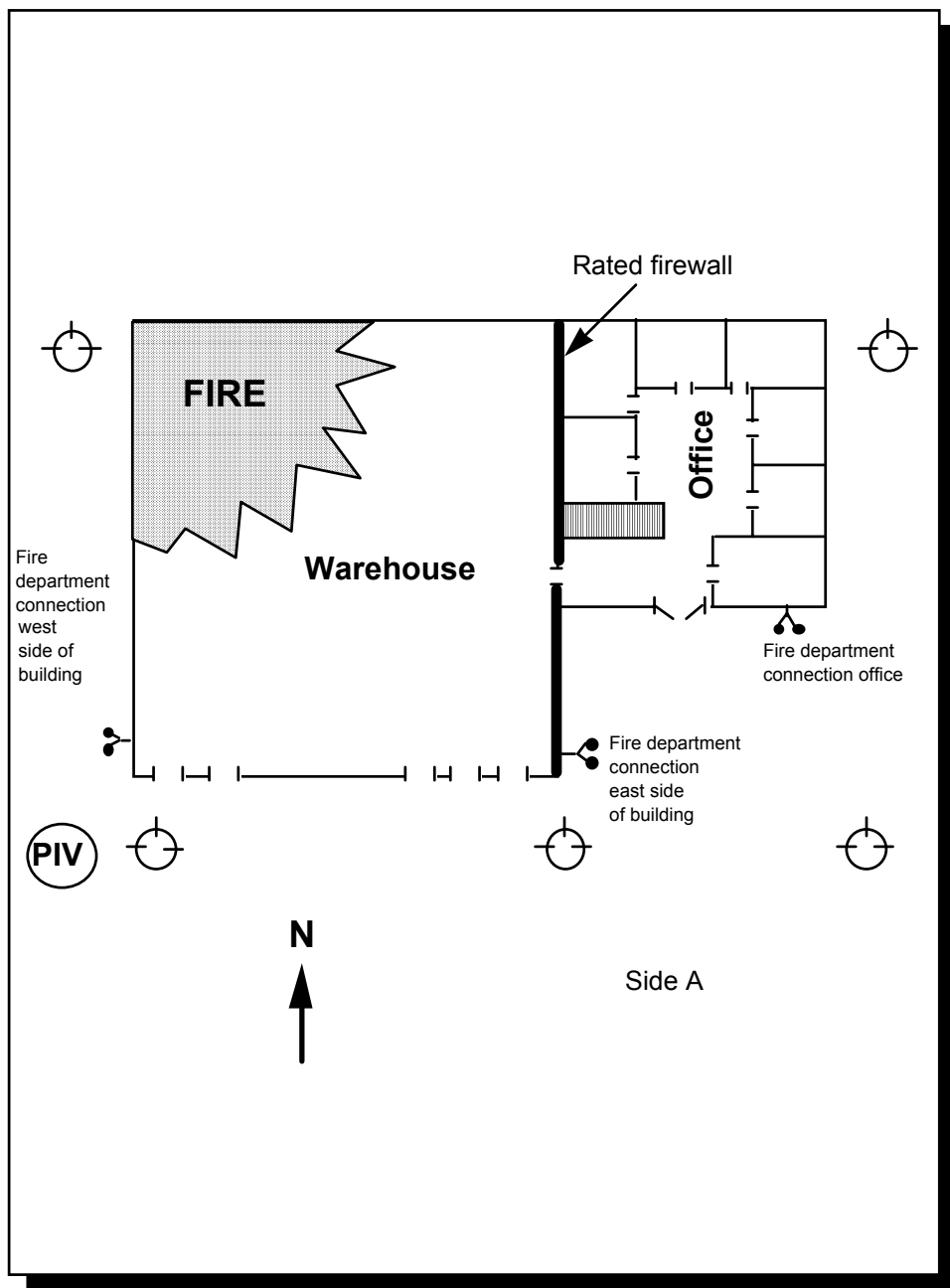
Fire Conditions:

1230 hours, Thursday
Warehouse 25% involved in B/C corner
Sprinkler system out of service

ACTIVITY 4.1 (cont'd)

SCENARIO 3

PLOT PLAN/FLOOR PLAN



ACTIVITY 4.1 (cont'd) SCENARIO 3 QUICK ACCESS PREFIRE PLAN																	
Building Address: <i>7400 Industry Drive</i>																	
Building Description: <i>2-story office with 1-story attached warehouse, ordinary construction</i> <div style="float: right; text-align: right;"> <i>Office - 40' x 40'</i> <i>Warehouse - 200' x 90'</i> </div>																	
Roof Construction: <i>Steel bar joists, flat with tar and gravel</i>																	
Floor Construction: <i>Concrete</i>																	
Occupancy Type: <i>Office/Warehouse</i>	Initial Resources Required: <i>2E, 1T, 1C</i>																
Hazards to Personnel: <i>Possible hazards - Material in warehouse, early roof collapse</i>																	
Location of Water Supply: <i>5 hydrants throughout parking lot</i>	Available Flow: <i>1,000 gpm per hydrant</i>																
<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td></td> <th align="center" colspan="4">Estimated Fire Flow*</th> </tr> <tr> <th align="center">Level of Involvement</th> <th align="center">25%</th> <th align="center">50%</th> <th align="center">75%</th> <th align="center">100%</th> </tr> <tr> <th align="center">Estimated Fire Flow</th> <th align="center">1,900</th> <th align="center">3,800</th> <th align="center">5,700</th> <th align="center">7,600</th> </tr> </table>				Estimated Fire Flow*				Level of Involvement	25%	50%	75%	100%	Estimated Fire Flow	1,900	3,800	5,700	7,600
	Estimated Fire Flow*																
Level of Involvement	25%	50%	75%	100%													
Estimated Fire Flow	1,900	3,800	5,700	7,600													
<i>*Fire flow based on a 200' x 90', 1 exposure. 3/4 of water for extinguishment at any involvement</i>																	
Fire Behavior Prediction: <i>Rapid fire spread due to fire load</i>																	
Predicted Strategies: <i>Exposures, confinement, ventilation</i>																	
Problems Anticipated: <i>Access to sides B and C, horizontal ventilation</i>																	
<input checked="" type="checkbox"/> Standpipe:	<input checked="" type="checkbox"/> Sprinklers:	<input checked="" type="checkbox"/> Fire Detection:															

ACTIVITY 4.1 (cont'd)

SCENARIO 4

A fire has been reported in a large barn at the King Farm. The time is 1500 hours, Tuesday. Upon arrival, you find the dairy barn is 20% involved. The farmer is removing his cattle from the barn.

Water supply assignment:

Establish a water supply operation that will supply 750 gpm.

Exposure protection assignment:

Provide exposure protection utilizing no more than the initial quantity of 300 gpm being presently supplied for this operation. Determine how much more water will be required.

Other tactical operations assigned:

One engine company is deploying a 500-gpm master stream from the front of the barn (north side) to begin to confine and extinguish the fire.

ACTIVITY 4.1 (cont'd)

SCENARIO 4

FACTSHEET

DESCRIPTION

Construction:

50' x 90' post and beam dairy barn

Exposures:

Side A 2-story machinery shed (high value)

Side B corn crib and silo

Side D storage building

Water Supply:

See water supply map

Weather:

Cloudy, 80°F

Wind at 10 mph from south

Resources:

2E, 1 Tanker/tender, 1C

Duplicated on second alarm

Tanker/tender task force - 2 - 2,500 gal, 2 - 5,000 gal

Fire Conditions:

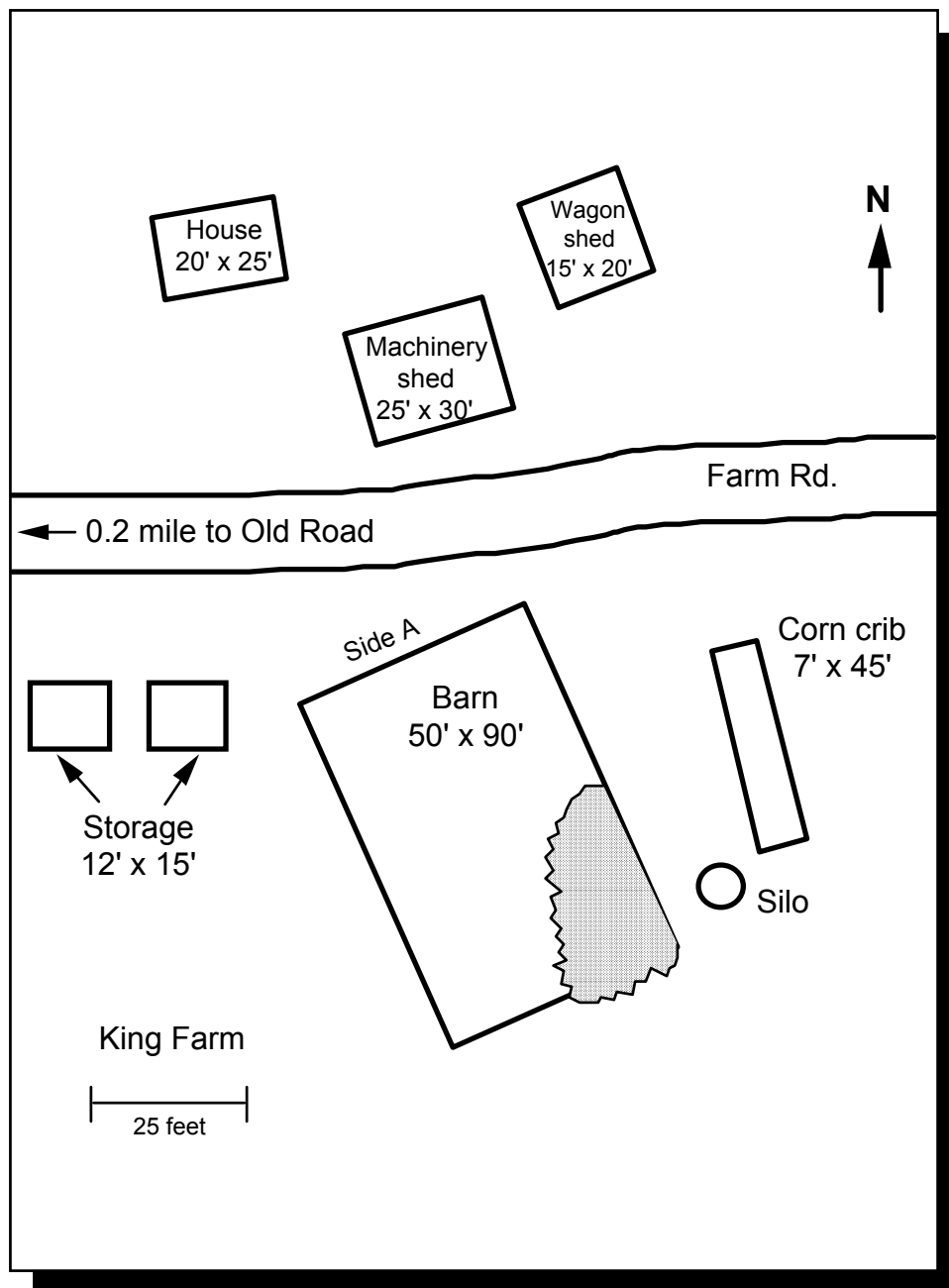
1500 hours on Tuesday

B/C corner of barn involved in fire

ACTIVITY 4.1 (cont'd)

SCENARIO 4

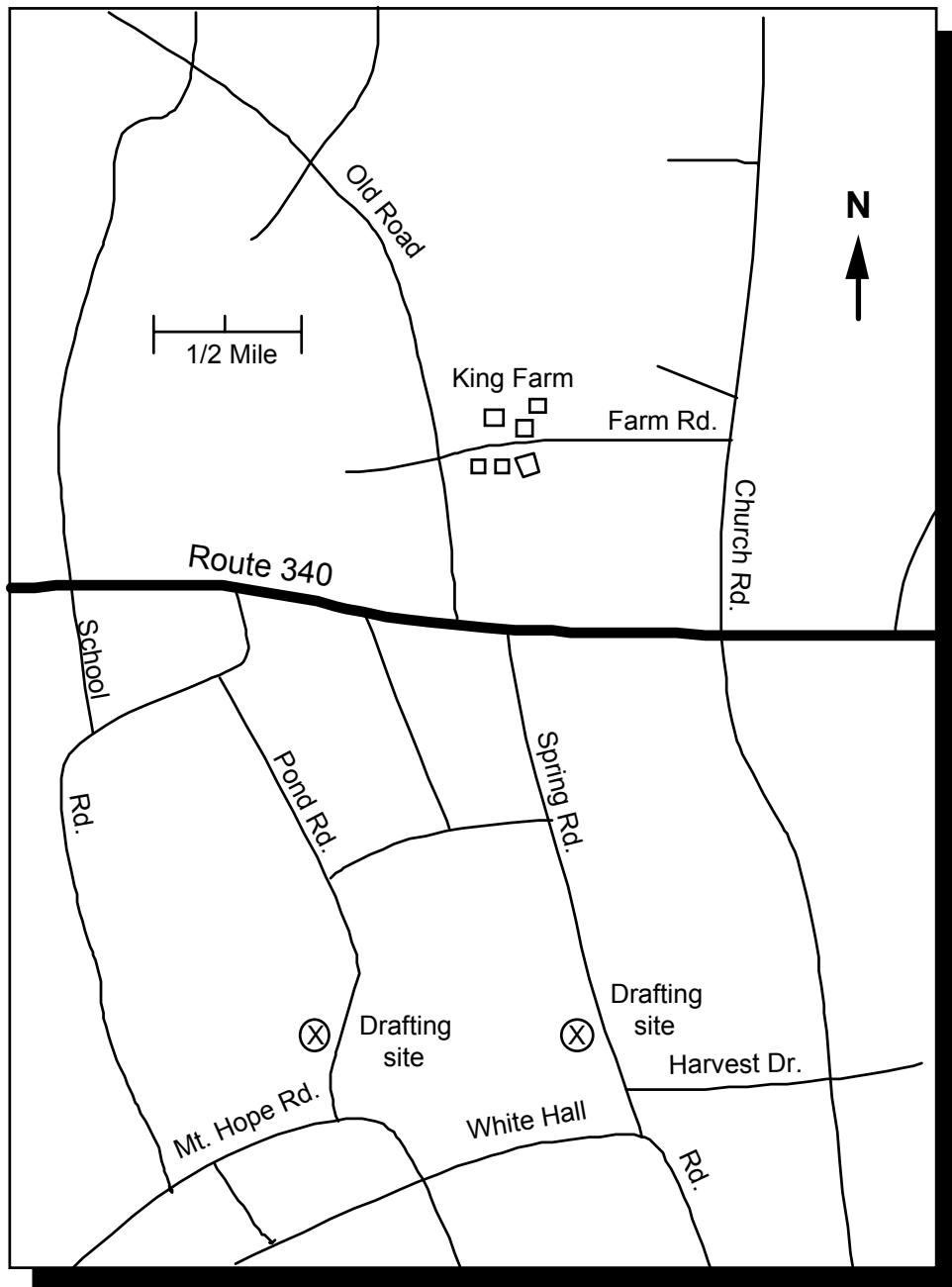
PLOT PLAN/FLOOR PLAN



ACTIVITY 4.1 (cont'd)

SCENARIO 4

WATER SUPPLY MAP



ACTIVITY 4.1 (cont'd) SCENARIO 4 QUICK ACCESS PREFIRE PLAN																			
Building Address: <i>Farm Road</i> <i>King Farm</i>																			
Building Description: <i>50' x 90' post and beam dairy barn</i> Roof Construction: <i>2" x 6" frame, covered with tin</i> Floor Construction: <i>2" x 10" joists, 2" x 8" sheathing</i>																			
Occupancy Type: <i>Dairy Barn</i>		Initial Resources Required: <i>2E, 1 Tanker/tender, 1C</i>																	
Hazards to Personnel: <i>Early collapse, high radiant heat level</i>																			
Location of Water Supply: <i>See water supply map</i>		Available Flow: <i>Variable</i>																	
<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td></td> <th align="center" colspan="4">Estimated Fire Flow*</th> </tr> <tr> <th align="center">Level of Involvement</th> <th align="center">25%</th> <th align="center">50%</th> <th align="center">75%</th> <th align="center">100%</th> </tr> <tr> <th align="center">Estimated Fire Flow</th> <th align="center">750</th> <th align="center">1,500</th> <th align="center">2,250</th> <th align="center">3,000</th> </tr> </table> <p><i>*Fire flow based on a 50' x 90' with 3 exposures, 60% of water for extinguishment at any involvement</i></p>						Estimated Fire Flow*				Level of Involvement	25%	50%	75%	100%	Estimated Fire Flow	750	1,500	2,250	3,000
	Estimated Fire Flow*																		
Level of Involvement	25%	50%	75%	100%															
Estimated Fire Flow	750	1,500	2,250	3,000															
Fire Behavior Prediction: <i>Rapid horizontal and vertical travel</i>																			
Predicted Strategies: <i>Protect machinery shed and other exposures, brand control, confinement, extinguishment</i>																			
Problems Anticipated: <i>Setting up water supply</i>																			
<input type="checkbox"/> Standpipe: <i>No</i>	<input type="checkbox"/> Sprinklers: <i>No</i>	<input type="checkbox"/> Fire Detection: <i>No</i>																	

MODULE 5: SALVAGE, OVERHAUL, AND SUPPORT ACTIVITIES

OBJECTIVES

The students will:

- 1. Identify the principles and tactics to achieve salvage.*
 - 2. Identify the principles and tactics to achieve overhaul.*
 - 3. Identify and explain the activities required to support incident operations.*
-

NOTE-TAKING GUIDE

I. SALVAGE OPERATIONS

- A. Definition: The tactical operation of protecting property from damage.
- B. Principles of salvage.
- C. Select appropriate salvage tactics.
- D. Tactical sizeup for salvage.
- E. Coordination and planning.
- F. Develop a Salvage Tactical Action Plan.

II. OVERHAUL OPERATIONS

- A. Definition: Overhaul is the action taken to expose hidden fire and to assure complete extinguishment.

NOTE-TAKING GUIDE

- B. Principles of overhaul.
- C. Select overhaul tactics.
- D. Tactical sizeup for overhaul.
- E. Overhaul coordination.
- F. Develop an Overhaul Tactical Action Plan.

III. SUPPORT ACTIVITIES

- A. Definition: Support activities are tasks carried out at fire incidents to support all ongoing tactical operations.
- B. Principles of support activities.

NOTE-TAKING GUIDE

- C. Control all utilities.

- D. Provide other support.
 - 1. Air.

 - 2. Lights/Electricity.

 - 3. Firefighter rehabilitation and rehydration.

 - 4. Medical monitoring and treatment.

 - 5. Animal control.

IV. SUMMARY

SALVAGE OPERATIONS

Salvage is a tactical operation that creates a very positive image with the public. Fire departments providing good salvage operations are well respected and provide a service not soon forgotten by citizens. Such tactics also are a major part of a fire department's mission to reduce property damage/loss.

Salvage is the tactical operation of protecting property from damage.

Basic salvage principles include minimizing damage to building and contents caused by fire, smoke, and water and protecting building from structural damage due to the weight of water.

Select Appropriate Salvage Tactics

One of the main salvage tactics is **protecting in-place** by covering or moving items. Generally this can be completed with minimal crews. In most cases property is placed in the center of a room and then covered with salvage covers; not all items need to be moved, but grouping property together allows crews to protect more property with fewer salvage covers.

Another salvage tactic is **removing** items from the fire area. This is a fairly simple tactic for small items but removal of many and/or large items takes significant resources and time. Whenever a CO makes a decision to remove property, he/she must also assume responsibility for protecting the removed property.

Since firefighting uses large amounts of water, COs assigned to salvage tactics have the responsibility to manage **water flow within the building and water removal from the building**. Water is a major cause of damage and contributes to collapse situations. Removing water from a building has a positive impact on public relations, as well as reducing property damage. Water can be removed from structures using water chutes, catchalls, water-vacs, and tools such as scuppers, mops, buckets, and squeegees. Company Officers must locate drains or scuppers to facilitate removal of water.

Other salvage tactics include **ventilating** to remove smoke and heat, and **removal of debris** from the building.

The last effort of salvage operations provided by proactive departments is protecting the property as much as possible from the elements. It is a good practice **to cover any openings** such as ventilation holes, and broken or missing windows and doors.

Tactical Sizeup for Salvage

When completing a tactical assignment for salvage, the CO must ask the following questions:

1. What is most important to save?
2. How can we protect items being removed from the building?
3. What salvage tactics are most appropriate?
4. Is any support required?
5. What coordination with other tactics is needed?
6. What safety concerns exist?
7. How effective is the salvage effort?

Coordination and Planning

Salvage operations must be coordinated with all other tactics. Fire control efforts, such as rapid extinguishment and early ventilation, reduce fire loss. Conservation of water from hoselines also contributes to salvage efforts.

Develop a Salvage Tactical Action Plan

After completing the salvage sizeup, the CO can develop the Salvage Tactical Action Plan, including the following:

1. Determine critical sizeup factors.
2. Identify and prioritize property to be protected.
3. Select appropriate salvage tactics.
4. Identify needed resources.
5. Identify needed support.
6. Determine need for coordination.
7. Identify safety concerns.

OVERHAUL OPERATIONS

Overhaul is the action taken to expose hidden fire and to assure complete extinguishment. The principles of overhaul include total extinguishment of all smoldering fires and checking for and extinguishing all hidden fires and extension.

Overhaul Tactics

Overhaul tactics include searching for any **hidden fires** that may have extended into walls, ceilings, lofts, or voids. A thorough search for any signs of **extension** must be made. Hot walls, discoloration of paint, noticeable smoke coming from the void, or sounds of burning must be inspected for possible extension. **If hot open it up.** Small inspection holes can be made; then, if the CO finds any possibility of extension or fire in these void spaces, they must be opened up.

Many departments have terminated an incident only to be recalled later for a "**rekindle**." Rekindles are very embarrassing to a department's image. By returning to a rekindle, the department is returning to a fire that was never extinguished.

Finally, when completing overhaul operations, consideration must be given to **safety**. All salvage operations must be completed in full turnout with SCBA. Many fire officers assume that once the fire is extinguished the air is safe to breathe. Studies show the highest levels of toxic gases, including carbon monoxide, are present just after extinguishment and during overhaul. If the fire is still smoldering or if there is hidden fire, many dangers exist which support the use of full protective equipment, including SCBA. The CO also must ensure that the area in which personnel are working is safe. Conditions such as unstable roofs, walls, or floors present major hazards. Additionally, burned out stairwells, holes in floors, and unprotected vertical openings may be present. The CO must do everything possible to assure the area is safe for overhaul operations.

Tactical Sizeup for Overhaul

When completing a tactical assignment for overhaul, the CO must ask the following questions:

1. What is the condition of the building?
2. Is the area safe for overhaul?

3. What hidden areas have been exposed to fire or heat?
4. Are there any spot fires?
5. What provision has been made for relief crews?
6. Will overhaul interfere with origin/cause investigation?

Coordination

Overhaul is often coordinated with salvage tactics. Overhaul operations provide a good opportunity for crews to separate undamaged from damaged property. While performing overhaul tactics, it is necessary to coordinate with origin/cause investigators so that evidence is identified and protected.

Develop an Overhaul Tactical Action Plan

After completing the overhaul sizeup, the CO can develop the Overhaul Tactical Action Plan, including the following:

1. Determine critical sizeup factors.
2. Identify location of smoldering and potential hidden fire areas.
3. Select appropriate overhaul tactics.
4. Identify needed resources.
5. Determine needed support.
6. Determine needed coordination.
7. Identify safety concerns.
8. Evaluate effectiveness of overhaul operations.

SUPPORT ACTIVITIES

Support activities are special tasks carried out to support ongoing tactical operations. This is a "tool box" concept. There are many support functions but not all of them are indicated at every fire. The CO must know what is available and what is needed.

The principles of support activities include controlling all utilities, providing compressed breathing air, lighting the emergency incident, providing electricity to operate tools, and providing for firefighter rehabilitation, rehydration, medical monitoring, and treatment. All of these activities enhance firefighter safety.

Utility Control

Before risking the safety of firefighters, the CO must assure that personnel are not exposed to the dangers of electrical injury or gas explosion. Even though the pressure to make an attack on the fire may be great, do not overlook the need to control utilities first.

As a CO on the fireground, one responsibility is to attend to the special problems and hazards posed by electrical, natural gas, and water utilities. Control of the utilities leading into the fireground is a serious command responsibility and usually requires prompt attention during initial fire-control activities. The CO must consider the effect of fire damage to various buildings and utility systems from both a property conservation and a safety point of view.

The utilities most often involved at a fire scene are: electric service, natural or LP gas, water, and fuel oil storage.

When these utilities are threatened or damaged by the development of the fire, they should be shut down at the point of entry into the fireground by building maintenance personnel or utility employees. If fire department personnel must shut off utilities they should not turn them back on. This requires that the fire department maintain a close working relationship with the utility companies and have a working knowledge of the methods of controlling utility shutdown in its fire district.

The CO's role in utility control is to evaluate the problem and develop a plan. A good plan should be developed as soon as possible, often as soon as the laying of the first hoseline from a hydrant. A good prefire plan for utility control should address electrical shutoff, LP or natural gas shutoff, fuel oil storage location and shutoff, water control locations, and other considerations.

Components of the plan should include:

- Types of utilities involved and their control.
- Potential for utility damage.
- Type of building.

- Utility requirements to support fire operations.
- Occupancy.
- Resource requirements.

The complexity of the utility problem will be proportional to the complexity of the occupancy. Before the arrival of utility company representatives the CO must consider the effect of utility shutdown on both the occupants of the building and on further fire control operations. Shutdown of electrical power to a high-rise apartment building prior to the completion of search and rescue or evacuation operations can cause confusion and panic. Shutdown also will eliminate the use of elevators for the transport of fire personnel and equipment to the vicinity of the fire.

The CO assigned to utility control must coordinate with the IC and other working divisions before action is taken. Upon arrival on the fire scene, utility representatives should be directed to report to the IC prior to taking any action. Access for utility vehicles must be part of the overall apparatus placement plan.

This support activity usually requires only one or two fire personnel to implement. It is generally of short duration, has been completed when the utilities are located, shut off, and secured. At the conclusion of the utility shutdown, the CO should report to the IC and be prepared to assume another assignment. However, the utility shutdown is not accomplished until it is actually done. Until that moment, the CO must observe the development of the fire operation and adjust the utility plan accordingly.

Air Supply

Air supply at fire incidents is a major concern. For every SCBA placed in service at least one spare bottle should be provided. Special incidents such as large fires, hazardous material incidents, and confined space rescues may require several bottle changes. Air may be supplied by filling at the station, filling onscene, or use of private companies such as dive shops. Whichever system is being used, the department must have 24-hour access; preplanning is essential.

When using compressors on the scene, special care must be taken to assure that the compressor system is not located near contaminated air sources. Often air filling and charging stations can be located and coordinated with firefighting rehabilitation and medical treatment areas.

Electricity

Another function of support is the provision of lights and electricity on the scene. Any time crews must work in the dark, the risk of injuries increases. Every effort possible must be made to provide lights for night-time operations and for crews in dark areas.

Responder Rehabilitation

Responder rehab should be considered by the Incident Commander (IC) during the initial planning stages of an emergency response. However, the climatic or environmental conditions of the emergency scene should not be the sole justification for establishing responder rehab. Any activity/incident that is large in size, long in duration, and/or labor intensive will deplete the energy and strength of personnel rapidly, and therefore merits consideration for responder rehab.

A critical factor in the prevention of heat injury is the maintenance of water and electrolytes. Water must be replaced during exercise periods and at emergency incidents. During heat stress, the member should consume at least 1 quart of water per hour. The rehydration solution should be a 50/50 mixture of water and a commercially prepared activity beverage, administered at about 40°F (4.4°C). Alcohol, caffeine, and carbonated beverages should be avoided, as they interfere with the body's water conservation mechanisms.

Food should be provided at the scene of an extended incident of 3 or more hours' duration. A cup of stew, soup, or broth is highly recommended because it is digested much faster than sandwiches and fast food products. Fatty and/or salty foods should be avoided.

The "two air bottle rule," or 45 minutes of work time, is recommended as an acceptable level prior to mandatory rehabilitation. Members shall rehydrate (at least 8 ounces) while self-contained breathing apparatus (SCBA) cylinders are being changed. Firefighters, having worked for two full 30-minute-rated bottles, or 45 minutes, shall be placed immediately in responder rehab for rest and evaluation. Rest shall not be less than 10 minutes and may exceed an hour as determined by the responder rehab manager. Crews released from rehab shall be available in Staging to ensure that fatigued members are not required to return to duty before they are rested, evaluated, and released by the responder rehab manager.

Members in the rehab area should maintain a high level of hydration. Members should not be moved from a hot environment directly into an air-conditioned area, because the body's cooling system can shut down in response to the external cooling.

Emergency Medical Services (EMS) should be provided and staffed by the most highly trained and qualified EMS personnel on the scene (at a minimum of basic life support (BLS) level). The heart rate should be measured for 30 seconds as early as possible in the rest period. If the member's heart rate exceeds 110 beats per minute, an oral temperature should be taken. If the member's temperature exceeds 100.6°F (38°C), he/she should not be permitted to wear protective equipment. If it is below 100.6°F, and the heart rate remains above 110 beats per minute, **rehabilitation time should be increased.** All medical evaluations shall be recorded on standard forms along with the member's name and complaints; they must be signed, dated, and timed by the responder rehab manager or his/her designee.

Members assigned to responder rehab shall enter and exit as a crew. The crew designation, number of crew members, and the times of entry and exit from the responder rehab area shall be documented on the company's check-in/out sheet. Crews shall not leave the responder rehab area until authorized by the responder rehab manager.

HEAT STRESS INDEX

	Relative Humidity								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
Temperature °F	104	98	104	110	120	132			
	102	97	101	108	117	125			
	100	95	99	105	110	120	132		
	98	93	97	101	106	110	125		
	96	91	95	98	104	108	120	128	
	94	89	93	95	100	105	111	122	
	92	87	90	92	96	100	106	115	122
	90	85	88	90	92	96	100	106	114
	88	82	86	87	89	93	95	100	106
	86	80	84	85	87	90	92	96	100
	84	78	81	83	85	86	89	91	95
	82	77	79	80	81	84	86	89	91
	80	75	77	78	79	81	83	85	86
	78	72	75	77	78	79	80	81	83
	76	70	72	75	76	77	77	77	78
	74	68	70	73	74	75	75	75	76

NOTE: Add 10°F when protective clothing is worn, and add 10°F when in direct sunlight.

Humiture °F	Danger Category	Injury Threat
Below 60°	None	Little or no danger under normal circumstances
80° to 90°	Caution	Fatigue possible if exposure is prolonged and there is physical activity
90° to 105°	Extreme Caution	Heat cramps and heat exhaustion possible if exposure is prolonged and there is physical activity
105° to 130°	Danger	Heat cramps or exhaustion likely, heat stroke possible if exposure is prolonged and there is physical activity
Above 130°	Extreme Danger	Heat stroke is imminent!

WIND CHILL INDEX

		Temperature °F												
		45	40	35	30	25	20	15	10	5	0	-5	-10	-15
Wind Speed (MPH)	5	43	37	32	27	22	16	11	6	0	-5	-10	-15	-21
	10	34	28	22	16	10	3	-3	-9	-15	-22	-27	-34	-40
	15	29	23	16	9	2	-5	-11	-18	-25	-31	-38	-45	-51
	20	26	19	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60
	25	23	16	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66
	30	21	13	6	-2	-10	-18	-25	-33	-41	-49	-56	-64	-71
	35	20	12	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-75
	40	19	11	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76
	45	18	10	2	-6	-14	-22	-30	-38	-46	-54	-62	-70	-78

Wind Temperature °F	Chill	Danger
A	Above -25°F	Little danger for properly clothed person
B	-25°F/-75°F	Increasing danger, flesh may freeze
C	Below -75°F	Great danger, flesh may freeze in 30 seconds

REHAB UNIT

COMPANY CHECK-IN/OUT SHEET

CREWS OPERATING ON THE SCENE: _____

[illegible]

EMERGENCY INCIDENT REHABILITATION REPORT										INCIDENT: _____ DATE: _____	
Name/Unit #	Time(s)	Time/# Bottles	BP	Pulse	Resp.	Temp.	Skin	Taken by	Complaints/Condition	Transport?	

MODULE 6: PRIVATE DWELLING SIMULATIONS

OBJECTIVES

In a simulated single-family dwelling fire situation, the students will:

1. *Identify the special construction factors of single-family dwellings.*
 2. *Recognize the basic problems that should be addressed when single-family dwellings are involved in fire.*
 3. *Use the Communications Model while performing the role of a firefighter, officer, or dispatcher.*
 4. *Use the Command Sequence in decisionmaking.*
 5. *Determine strategy, select tactics, and operate within an appropriate ICS organization.*
 6. *Effectively use the Tactical Action Model and make appropriate risk/benefit decisions.*
-

NOTE-TAKING GUIDE

I. REVIEW OF REQUIRED KNOWLEDGE

Students must be familiar with the concepts presented in *MCTO: Preparation* and *MCTO: Decisionmaking* and the previous modules of this course. **This section is a rapid review only, and may be omitted at the instructor's discretion.**

A. From *Managing Company Tactical Operations: Preparation*, you must understand:

1. The Communications Model.

Example:

"Engine 2 **from** Command."

"Engine 2."

"Engine 2 take a 1-3/4-inch line through the front door and back up Engine 1."

"Engine 2 taking a line through the front to back up Engine 1."

"Command, affirmative."

NOTE-TAKING GUIDE

2. Building construction and fire behavior.
 - a. Ordinary (masonry, wood-joist).
 - b. Frame.
 - c. The dangers of lightweight construction members.
 3. The Quick Access Prefire Plan (QAP).
- B. From *Managing Company Tactical Operations: Decisionmaking*, you must understand:
1. The command sequence.

NOTE-TAKING GUIDE

2. The Incident Command System (ICS).

- C. From *Managing Company Tactical Operations: Tactics*, you must understand:

1. The principles of the various tactical operations.

2. The Tactical Action Model.

3. The coordination of tactical operations.

II. SINGLE-FAMILY DWELLINGS

- A. Definition: A structure designed for occupancy and use as a residence for one family.
- B. Detached dwellings.

NOTE-TAKING GUIDE

- C. Attached dwellings.

III. SPECIAL CONSTRUCTION FACTORS OF SINGLE-FAMILY DWELLINGS

- A. Wall construction.

- 1. Masonry.
- 2. Frame.
- 3. Knee walls.
- 4. Other void spaces.

NOTE-TAKING GUIDE

B. Roof assemblies.

1. Flat.
2. Pitched.
3. Roof covering.
4. Lightweight assemblies.

C. Floor assemblies.

1. Support systems.
2. Floor coverings.

NOTE-TAKING GUIDE

D. Entry.

1. Doors.

2. Windows.

3. Security devices.

IV. COMMON PROBLEMS IN SINGLE-FAMILY DWELLINGS

A. Life hazard and victim location.

B. Extension of fire, heat, and smoke.

NOTE-TAKING GUIDE

- C. Structural deterioration and collapse.

V. BASIC TACTICS

- A. First floor fire.

1. Primary search and rescue.
2. Ventilate to support the primary search, then to support other strategies.
3. Interior fire attack from unburned to burned.
4. Check for extension on all six sides.

NOTE-TAKING GUIDE

- B. Basement fire.
 - 1. Primary search and rescue.
 - 2. Ventilate first floor to maintain control of operating area.
 - 3. Ventilate basement.
 - 4. Fire flow options.
 - 5. Interior stairs act like chimney.
 - 6. Safety issues.

NOTE-TAKING GUIDE

C. Second/Third floor fires.

1. Second floor with third floor above, treat as a first floor fire that often needs ladder support for various tactics.
2. Top floor with attic/attic space above, treat as a second floor fire with possible extension to the attic/attic space.

D. Attic fire.

1. Attack fire from floor below.
2. Pull ceiling from doorway and extinguish fire.
3. Ventilate horizontally.

NOTE-TAKING GUIDE

4. Ventilate vertically **only** on large attic areas or where horizontal ventilation is not possible.

E. Attached garage fire.

1. Keep fire from entering main living area. Attack from unburned side where possible.
2. Provide handlines into the main living area and the garage fire.
3. Pull walls and ceilings where required to ensure that the fire has not entered voids.
4. When truss construction is assumed, do not get on or under the roof assembly if it is well involved.

NOTE-TAKING GUIDE

5. Horizontal ventilation is the most preferred.

F. Support activities.

1. SCBA bottle changes.

2. Electricity and lights.

3. Utility control.

4. Rehab area.

Activity 6.1: (See SM p. 6-27)

REVIEW OF REQUIRED KNOWLEDGE

To perform the necessary functions during simulations, students must understand the skills and techniques taught in all the *Managing Company Tactical Operations* courses.

MCTO: Preparation

From *Managing Company Tactical Operations: Preparation*, you must understand the following critical concepts.

The Communications Model

Effective communication is critical to successful tactical operations. The NFA Communications Model provides easy-to-follow guidelines. (See Module 1 for a detailed explanation.)

Example:

Command: "Engine 2 **from** Command."

Engine 2: "Engine 2."

Command: "Engine 2 take a 1-3/4-inch line through the front door and back up Engine 1."

Engine 2: "Engine 2 taking a line through the front to back up Engine 1."

Command: "Command, affirmative."

Building Construction and Fire Behavior

Ordinary-constructed buildings include masonry exterior walls and wood-framed interior structural members. The normal method of identifying true ordinary buildings is the fact that approximately every sixth row of bricks are turned edgewise to tie the wall together. A brick wall on a wood-framed building where the brick is used only as a siding material will normally have all of the bricks running lengthwise. The floor joists and roof rafters are normally supported on the long walls of the structure, while the front and rear walls are not load-bearing walls. Another method of constructing ordinary buildings is by using concrete block walls and a wooden interior. All ordinary-constructed buildings will have numerous voids, and checking for fire extension must be a critical strategic priority.

Wood-frame dwellings include those constructed by the post and beam method, the balloon method, and the platform method. The **post and beam** method uses large timbers to create a frame which is then covered by a sheathing material such as boards. The **balloon** method uses wall studs that rise from the foundation of the structure all the way to the roof. The voids created by this method, two and three stories high, provide a favorable path of fire extension to all areas of the structure. The **platform** method uses walls that extend only one floor and then have a floor deck applied. This procedure makes it extremely difficult for fire to extend via the exterior walls of the structure. All wood-frame structures will have numerous voids where fire, heat, and smoke can readily travel, and fire extension must be a critical strategic priority. It is nearly impossible to tell the exact construction type by looking at the building exterior. Again, one should prefire plan the structures as a first priority. Should a building involved in fire not be prefire planned, the officer should check those bearing members of a structure that would show construction type, e.g., look at the exterior wall assembly materials and pull some ceiling to check floor or roof construction materials.

The Dangers of Lightweight Construction Members

Wooden I-Beams are 2" x 4" or 2" x 3" boards that are the top and bottom chords for a solid piece of 3/8" plywood. The appearance is that of a metal I-beam. The plywood is glued in a slot in the top and bottom chord. Under fire conditions, the glue fails, the wood burns, and the I-beam fails rapidly.

Pitched Wooden Roof Trusses provide the shape to the typical single-family dwelling pitched roof. They are typically made of 2" x 4" boards. The 2" x 4"s are used as the flat bottom chord, the pitched top chord, and the webbing between the chords. The boards can be toenailed together. The use of gusset plates, wooden or metal, has been a common method of holding the truss pieces together. More recently, the use of a gang-nailer has been used. The gang-nailer is a metal gusset plate with numerous 3/8" spikes; it is pressed into the wooden materials at the joists. While all trusses tend to fail very early in a fire situation, the use of real nails tends to hold a truss together much longer than the gang-nailer does.

Parallel Chord Wood Trusses use a top and bottom chord and webbing of either 2" x 4" or 2" x 3" boards. These assemblies are usually manufactured using the gang-nailer. They are very fragile under fire conditions and tend to fail quickly.

The Quick Access Prefire Plan (QAP)

This tool is designed for the first-in Company Officer. It provides the "must know" information required to make good initial attack decisions.

MCTO: Decisionmaking

From *Managing Company Tactical Operations: Decisionmaking*, you must understand the following critical concepts.

The Command Sequence

Sizeup is the process of remembering, gathering, and analyzing information pertinent to the incident. Sizeup includes the use of prefire plans, resource capability, and fire flow. A proper sizeup ends in the identification of problems. The CO is now ready to provide solutions.

Strategy and Tactics are critical steps in the command sequence. Strategy is the "what" of the solution to the problems identified. Strategy is the overall plan. In general, we use Rescue, Exposure Protection, Confinement, Extinguishment, Overhaul, Ventilation, and Salvage as the broad strategies. **Tactics are the "how"** of the solution. Tactics also includes the **"who, where, and when."**

The implementation phase is the application of the selected tactics. It is the directing of resources to perform tasks. The tasks accomplish the tactics that achieve the strategy.

The Incident Command System (ICS)

From the **NFA Incident Command System**, the student must be fully familiar with the responsibilities of **Command, the Command Staff, Division, and Group Supervisors**.

In the simulations, you will be required to assign Division and Group supervisors immediately, as you make tactical assignments.

MCTO: Tactics

From *Managing Company Tactical Operations: Tactics*, you must understand the following critical concepts.

The Principles of the Various Tactical Operations

These are the basic reasons we perform various operations at structural incidents.

The Tactical Action Model

In implementing a tactical order received from a supervisor, the CO should follow the steps listed below:

- Receipt of tactical order from supervisor.
- Tactical sizeup.
 - Safety considerations.
 - Area of involvement.
 - Construction.
 - Occupancy.
 - Problem identification.
 - Prioritization of problems.
 - Evaluation of resources.
- Task assignments (to firefighters).
- Take action to complete.
- Evaluate effectiveness.
- Report on effectiveness.

The Coordination of Tactical Operations

Proper coordination ensures that the various tactics and tasks are performed at precisely the right time. They can then have the greatest synergistic effect.

SINGLE-FAMILY DWELLINGS

A single-family dwelling is a structure designed for occupancy and use as a residence for one family. This includes detached or attached dwellings, e.g.: single home, row home, townhouse, etc.

SPECIAL CONSTRUCTION FACTORS OF SINGLE-FAMILY DWELLINGS

In single-family dwellings, there are some construction features that fire officers must understand. The types of construction were discussed in MCTO: Preparation.

Wall Construction

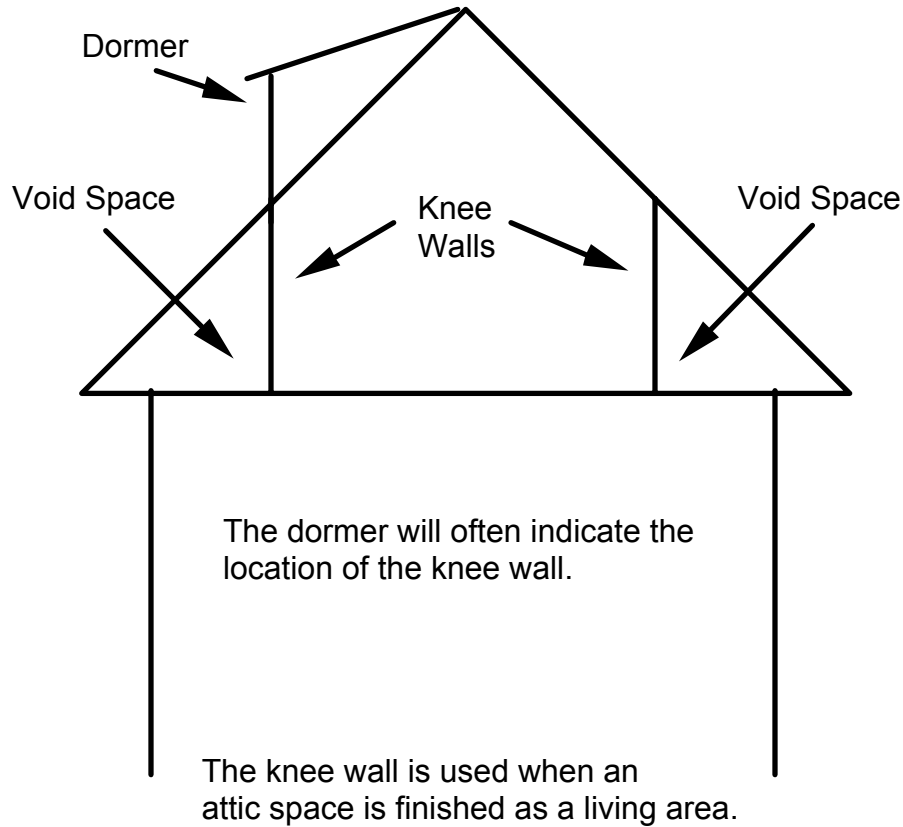
Single-family dwellings may have walls constructed of masonry--concrete, concrete block, or brick. The walls also may be of frame construction that includes platform, balloon, or post and beam.

In **platform** construction, after the foundation is in place, the first floor is assembled, including the deck on which one will walk. Then, the exterior bearing walls are set in place. Next, a second floor platform is built, including the deck on which one will walk. Now, the second floor exterior walls are set in place. Finally, a roof assembly is completed. Of course, the roof assembly could have been placed over the first floor and no second floor built. **From the basement interior, you cannot see past the underside of the first floor sheathing.**

In **balloon** construction the foundation is completed first. Then long, vertical wall studs are set in place. These studs reach to the top of the highest floor level. Next, a ledger board is nailed to the wall studs at each level where a floor assembly (including the attic floor assembly) will be placed. At this point, floor joists are set on and nailed to the ledgers. The floor joists are covered with wood sheathing. Sheathing is usually 1" x 6" or 1" x 8" boards laid diagonally. **From the basement interior, you can look upward inside the wall. You can see all the way to the attic if you can get a good angle.**

In **post and beam** construction vertical posts are set in a foundation. Beams are set horizontally to tie the posts together. Then, joists and studs are placed between the posts and beams. Next, sheathing is placed on the joists and a finish material is placed on the inside of the studs.

In finished attic spaces, one may find a configuration known as a knee wall, illustrated below.



There are **combustible void spaces** in dwelling walls that are made of lumber. Also, there are other void spaces that must be checked when a dwelling is involved in fire. These are vertical shafts that include duct work risers, vent pipes, and electrical conduits. There are drop or suspended ceilings. Stairwells may have openings within the assembly that will carry fire to floors above. Finally, remodeling may create combustible void spaces.

Roof Assemblies

The **roof assembly** on a single-family dwelling may be **flat-beam and rafter**. This is considered a **very strong assembly** that can withstand the effects of fire better than a truss. The roof may be pitched with a **ridgepole and rafter** assembly for attics that provide more living space. This is considered a **strong assembly** that can withstand the effects of fire better than a truss.

A **wood truss** assembly can be nailed at the points where the chords and webs meet, with the use of plywood or flat sheet-metal

gusset plates. Another method is to use **gusset plates with 3/8" spikes (called gang-nailers)** pressed into the wood at the joints. **Wood trusses tend to fail very early under fire conditions** when the bottom chords are supported only at the ends. However, in dwellings, there tend to be a number of points where **partition walls from the floor below support the bottom chord**. This increases the strength of the truss and makes total truss failure less likely. ***Still, truss assemblies involved in fire are dangerous to firefighters working on the roof.*** Again prefire planning is critical to know exactly whether or not there is a truss assembly or what type of truss is on a structure and what is supporting the bottom chord. We often assume that there are supporting partitions in residential occupancies. In other occupancies we should not make that assumption.

For a wood truss roof that is not supported except at the ends, stay off the roof when fire or high heat have entered the truss area. Get off any truss roof that shows signs of truss involvement as seen by fire/smoke conditions in the attic space. If the wood truss is supported by partitions or walls along the bottom chord, and the degree of fire involvement is not excessive, working on a wood truss roof should be relatively safe. It is best to stay away from the area directly above the involved portion.

Lightweight wood truss roof assemblies are being used almost exclusively in the housing industry, as well as the commercial industry. Wood truss roofs are dangerous assemblies during fire conditions. It is recognized that lightweight construction will be responsible for firefighter injuries and deaths in increasing numbers. However, in dwellings, lightweight wood truss assemblies have an advantage that isn't found in other occupancies where wood truss is used. There are partition walls supporting most of the truss bottom chords. This supporting network of partition walls (even though they aren't bearing members), coupled with the relatively short length of the trusses, significantly reduces the collapse potential of the truss.

Short truss assemblies spanning open areas such as attached or unattached garages are somewhat more likely to collapse than those in the dwelling. Relatively long wood truss assemblies, such as those spanning the large open areas of warehouses, restaurants, and other public assembly occupancies are subject to massive collapse under fire conditions.

It is important to assign the correct risk/benefit value to any roof assembly before putting personnel on or under it. Dwelling roofs, even under fire conditions, may be reasonably safe to operate on or under because of the partition wall support.

Floor Assemblies

Floor assemblies can be **beam and joist**. This construction is **considered very strong** and tends to resist the effects of fire. These solid joists are typically 2" x 8", 2" x 10", or 2" x 12" boards. There is also a **parallel wood-chord truss** assembly. These trusses may have **webs of wood or metal**. Under fire conditions **where the trusses are significantly involved, failure tends to occur** very early. **Wooden I-beams** are also used in modern construction. To determine the floor assembly construction, consult the prefire plan. If this information is not available, pull ceiling in the affected area to check on floor assembly construction elements for exposed floors.

Entry--Doors

Entry into a dwelling is normally made with little difficulty through a front, rear, or side door on the first floor level. Ranchers, two- and three-story dwellings, and split-level homes normally enter onto a floor. Split-foyers have exactly that--a split foyer, or entrance area. The **split foyer** features a **front door** that enters onto a **landing** from which one can go **up or down a half-flight of stairs** to reach a living area.

Most **dwellings with a basement** have **stairs** with a door located **on the first floor**. If the structure is **two or more stories**, the interior **basement stair** is normally **under the stairs to the second floor**. Many dwellings have exterior basement entrances usually located at the rear. In some cases these exterior stairs are located on a side of the dwelling.

In a single-family dwelling, stairs to the upper floors are usually located on the interior. You often find the **stairs from the first floor** located just **inside the front entrance door**, but not always. **Exterior stairs** to the upper floor are **not typical**. Exterior stairs often indicate a **multiple-family dwelling**.

Entry--Windows

Windows are a **secondary means** of **entrance** into a dwelling. **Most homes** built through the 1970s **have wooden sashes**. These are either a one-over-one or a six-over-six configuration. More **modern homes** may have either **wood, plastic, or aluminum** sashes. Some **older homes may have steel window assemblies**. **This type of assembly** can make ladder company personnel look foolish. Steel window assemblies are difficult to remove, take significant time to remove, and tend to twist and bend rather

than come out. They are more difficult to remove than a wooden, plastic, or aluminum assembly.

Some windows may be **placed high in a wall**, like the awning or sliding windows in some bedrooms. This placement **hinders your ability to enter** these areas from the outside. It also **traps occupants in their rooms**.

Remember, we are creatures of habit--we normally use the doors of a dwelling for entrance. Windows, in the right place, may offer a better attack or search advantage point. BUT, BEWARE--MAKE SURE YOU CAN GET OUT THE SAME WAY!

Also, keep in mind that **security devices**, such as mesh, heavy screens, and bars, may increase the amount of time it takes to provide entry or escape from a dwelling.

COMMON PROBLEMS IN SINGLE-FAMILY DWELLINGS

In a dwelling, there are a number of standard problems that the CO should expect to encounter. The **life hazard** probability is primary. More citizens die in dwelling fires than in any other occupancy. You can expect to find **people in bedrooms** at any hour of the day. This is **especially true for children**. Children often try to escape the effects of fires by hiding in closets or beneath furniture. It is important to do a **primary search of all dwellings**. **Primary search helps** to ensure that the savable people are removed. A primary search includes **all areas** of the structure, in addition to the bedrooms.

You can **expect extension of the fire into void spaces**. These include the combustible void spaces in the **walls and floors of balloon-frame construction**. There are **void spaces at the stairwells** that can transmit fire to floor(s) above. In **kitchens and bathrooms**, **duct work** or **pipes** travel horizontally or vertically through the walls. It is important to make sure that the fire has not entered these **voids** and **poke-throughs**. Some new homes have a **six-inch first-floor partition wall**. This wall carries the **electrical wiring, plumbing and ducts** from the basement to the second floor.

Extension can also occur by **rollover, flashover, or direct flame contact** through the living spaces.

A **knowledgeable CO** should be able to **predict fire and smoke spread** through a dwelling. By predicting fire spread, an officer can determine where to **place resources for extension control**.

BASIC TACTICS

There are some **basic tactics that the officer needs to know** concerning single-family dwellings. Knowing these **reduces the time required for making decisions**. This knowledge also helps to ensure that important problem areas are not overlooked. **Remember, the lists below define basic tactics. Any given situation may require a modification in the operation. A situation may present a major resource commitment to any one or more of those listed.** For example, a rescue situation may require six to ten personnel to be quickly assigned. Balloon-frame construction may require four personnel and one hoseline in every room. They will be required to open walls, floors, and ceilings to extinguish the fire.

First Floor Fire

1. Primary search and rescue.
2. Ventilate to support the primary strategy (search and rescue), then to support other strategies.
3. Interior fire attack from the unburned toward the burned.
4. Check for extension on all six sides.

Basement Fire

1. Primary search and rescue.
2. Ventilate to support primary strategy (search and rescue). Then ventilate to maintain control of the first floor. The first floor is your operating area, don't give it up easily.
3. Ventilate the basement area. Use exterior doors and windows.

In some cases it may be necessary to open a hole in the first floor over the fire. This is a last-choice option. It should only be taken when firefighters do not have any other effective means to attack the fire, e.g., using interior/exterior stairs, or if basement windows are inadequate (or if attempts to enter the stairs and push the fire back into the basement were unsuccessful).

4. Fire flow options include use of cellar nozzles and taking handlines into the basement. Apply handline water through an exterior

basement door or through windows. Another option is to advance down the interior stairs. **Do NOT advance down the interior stairs while an attack is being made from any other position. Firefighters have died when this rule goes unheeded.**

There are a number of safety issues that basement fires present. The interior stairway may be burned out and cause firefighters to fall into the fire area. Basement fires are difficult to ventilate. There is unpredictable storage in basements. Many times there is only one means of egress. Beware of the interior stairs acting like a chimney when the door is opened.

Second/Third Floor Fires

1. Second floor with third floor above.

Treat as a first floor fire and provide the laddering that is necessary to support operations. Be sure to provide a **secondary means of escape**.

2. Top floor with attic/attic space above.

Treat as a second floor fire with laddering and check for extension into attic/attic space. This can be done by using a scuttle or stairs from the top floor, or by pulling some ceiling.

Attic Fire

1. Attack the fire from the floor below.
2. Pull ceilings ahead of the fire and apply hose streams into the attic area. For safety, pull ceiling from a doorway when possible.
3. Ventilate the attic horizontally--less time consuming.
4. Ventilate vertically **only on large attic** areas or where **horizontal ventilation is not possible**.

Attached Garage Fire

1. Keep the fire from entering the main living area. Attack from the unburned to the burned.
2. Provide handlines for the main living area and the garage fire.

3. Pull walls and ceilings where required to ensure that the fire has not entered voids.
4. When you assume truss construction in the garage, do not get on or under the roof assembly when the trusses are well involved in fire.
5. Provide for ventilation in the main living area--opening windows is preferred to breaking glass.

Support Activities

The IC must provide for Self-Contained Breathing Apparatus bottle changes. A dwelling fire situation will also require electricity and lights and utility control. A rehab area at a working dwelling fire will be required.

ACTIVITY 6.1

APPLYING TACTICAL OPERATIONS

**ACTIVITY OVERVIEW
AND
WALK-THROUGH SCENARIO**

ACTIVITY 6.1

APPLYING TACTICAL OPERATIONS

Purpose and Overview of Simulation Activity:

A simulation is an attempt to do in the classroom what is actually performed on the incident scene. This includes mental processing, communications as if radios were being used, and the inability to have most face-to-face conversations.

During this activity, students have an opportunity to apply what they learned during the entire MCTO series of courses. Class members simulate the actions of a fire department responding to two or three realistic residential house fires. They perform the same kinds of tasks under the same types of conditions as they would in an actual incident.

Directions:

The instructor will assign you to one of the following roles: **Command Officer** (Chief), **Chief's Aide**, **Company Officer**, **Firefighter**, **Dispatcher**, or **Facilitator/Timekeeper**.

For each scenario there is a dispatch script with response card and an arrival sequence chart, a plot plan/floor plan, an equipment guideline, brief initial arrival report form, and a firefighter worksheet to record the activities of the company. The class will **review scenario materials** before starting the simulation.

The class will decide between a **municipal water supply** or **water tanker/tenders**. You may wish to **alternate between the two types**.

You will be **shown one slide** of the fire situation. You will control the situation using the information presented in the MCTO series of courses.

The simulation will be done as if **you were on the incident scene and radios were the means of communicating**. Whenever possible, you can use **face-to-face conversation--** but only if it would be **possible at a real incident scene**.

The Facilitator will be given a **Plot Plan/Floor Plan transparency** and **water- or alcohol-soluble** transparency pen. COs will need to document on the transparency operations decisions, such as apparatus, hoselines, and ventilation openings. **ONLY** use a proper transparency pen on these sheets.

You must **coordinate your actions with other tactical officers** to provide a safe working environment.

A **timeout** will be taken ten minutes after initial dispatch of the alarm. The instructor will ask some specific questions about the incident and tactical assignments made to that point.

At the conclusion of the simulation there will be a **postincident analysis**. You will be required to **report to the class** the actions you took.

The IC will draw his/her ICS organization at the end of the postincident analysis.

To give you **time to think and make good decisions**, we will attempt to do the simulation in "real" time.

You will see a video of a typical simulation before you actually do one.

ACTIVITY 6.1 (cont'd)

ROLE RESPONSIBILITIES

Facilitator/Timekeeper

The Facilitator is an integral part of the simulation exercise. This person must perform effectively to ensure that all tactical actions, as they are completed, are being drawn on the overhead transparency. The Facilitator has the following responsibilities:

- Upon dispatch of the first-alarm companies, note the time, following the arrival sequence on the bottom of the dispatch script, and notify the officers when it is time for them to arrive at the fire scene.
- As each Company Officer is assigned to a tactic or tactical operation, have that officer come to the overhead projector and locate his/her apparatus and any supply line being laid.
- All apparatus shall be shown as rectangles with the apparatus number inside the rectangle.
- Company Officers from engine companies should be told to report back when they have gotten their attack lines into place.
- When the Engine Company Officers return, have them draw their hoselines from the water source to the fire room or building.
- Truck Company Officers should initially show the parking location of their apparatus. They should be directed to return just before they report to their supervisor that a particular type of ventilation is COMPLETED.
- When windows are vented, place an 'X' on the drawing at the location of each window that was vented.
- When a vertical ventilation hole has been completed, show the opening as a rectangle with the opposite corners connected so that it resembles an X in a box.
- At the conclusion of the simulation, the Facilitator will assist with the post-incident analysis by pointing out hoseline and vent holes as they are described by the Company Officers.
- At the conclusion of the postincident analysis, the Facilitator shall clean and dry the transparency and return it to the instructor.

Incident Commander (IC)

The IC will be responsible for performing **initial sizeup, problem identification, determining strategy, and identifying tactics**.

The IC must give a **brief initial report using the format provided**.

Using the **Communications Model for radio communications**, the IC will **implement an action plan** to achieve the strategy. The IC shall call dispatch for additional resources, as required.

Operations will be managed using the **ICS**. Maximum **span of control is five**. The IC must designate **Division** and **Group Supervisors**. This must be done when a CO is assigned to a geographic area or tactical function.

Chief's Aide

The Chief's Aide can act as recorder to track resources and provide communications as directed by the IC.

Dispatcher

The Dispatcher must refer to the dispatch sheet provided. That sheet contains a **script for the dispatch of the first-alarm assignment**, the address, and other information received at dispatch relevant to the incident. The script further shows the day, time, second alarm, and additional resources. There is also a run card to advise units when they are on location based on the included arrival sequence.

Company Officers

Company Officers will perform a **tactical sizeup** when assigned a tactic. The CO determines the tasks required to achieve the tactic. The IC may assign any CO as a **Division** or **Group Supervisor**.

Additional resources may be required to achieve a tactic. **The COs shall request** them from their supervisor. The CO will use the **Communications Model for radio communications**.

All COs, when assigned a tactic, will **report to the Facilitator** at the overhead projector. The CO will show where their apparatus is parked, what supply lines have been laid (if any), and where ladders are being thrown.

Company Officers must remember that it takes time to get hoselines and ladders into position. **Do not show** hoseline and ladder placement until setup time has passed (e.g., three minutes for hoselines and five minutes for ladder placement).

As additional firefighting lines are placed in service and ventilation holes are cut, etc., the CO must return to the Facilitator. The transparency is marked accordingly. **Do not show vent holes prior to the time they are completed.**

IT IS CRITICAL FOR THE INSTRUCTOR'S KNOWLEDGE OF FIRE CONTROL INFORMATION THAT THE OVERHEAD BE COMPLETED IN A TIMELY MANNER BY THE COMPANY OFFICERS.

Instructor

The instructor shall act as a **coach and facilitator**.

The instructor also will give **special messages** to some of the COs that will require some type of action to be taken.

The instructor will decide when the incident can be placed "**under control**." This will be based on fire flow being applied and other tactics being in place with sufficient personnel to perform the tasks.

Firefighters

Firefighters will carry out their roles as directed by the Company Officer. If the orders from the CO are not clear, discuss the assignment until they are. Then complete the worksheet by answering the questions that are appropriate for your company's tactical assignment.

ACTIVITY 6.1 (cont'd)

WALK-THROUGH SCENARIO

DISPATCH SCRIPT AND RESPONSE CARD

Hydrant Area: Engine 1, Engine 2, Truck 1, and Chief 1 respond to a structure fire at 260 Fairview Drive. Time out is 2200 hours on a Thursday.

Nonhydrant Area: Engine 1, Engine 2, Engine 124, Water Tanker/tender 1, and Chief 1 respond to a structure fire at 260 Fairview Drive. Time out is 2200 hours on a Thursday.

1st Alarm	Engine 1	Engine 2	Truck 1 or *Engine 124	Chief 1	**Tanker/tender 1
2nd Alarm	Engine 3	Engine 4	Engine 5		**Tanker/tender 2
3rd Alarm	Engine 6	Engine 7	Truck 2		**Tanker/tender 3
4th Alarm	Engine 8	Engine 9	Engine 10		

*Dispatch Engine 124 in place of Truck 1 if response is to a nonhydrant area.
**Dispatch Tanker/tenders to a nonhydrant area.

Note: Should the Incident Commander determine that resources beyond the first alarm companies will be needed, any resources listed for the four alarms can be summoned by calling for a 2nd, 3rd, or 4th alarm or by special calling only the resources needed. As an example the IC can request the response of Truck 2 or any of the Tanker/tenders shown. In addition, the IC can summon any of the resources listed below:

Basic Life Support Units:	Paramedic Units:	Air Supply 1
Ambulance 1	Paramedic 1	
Ambulance 2	Paramedic 2	Utility Company 1
Ambulance 3		

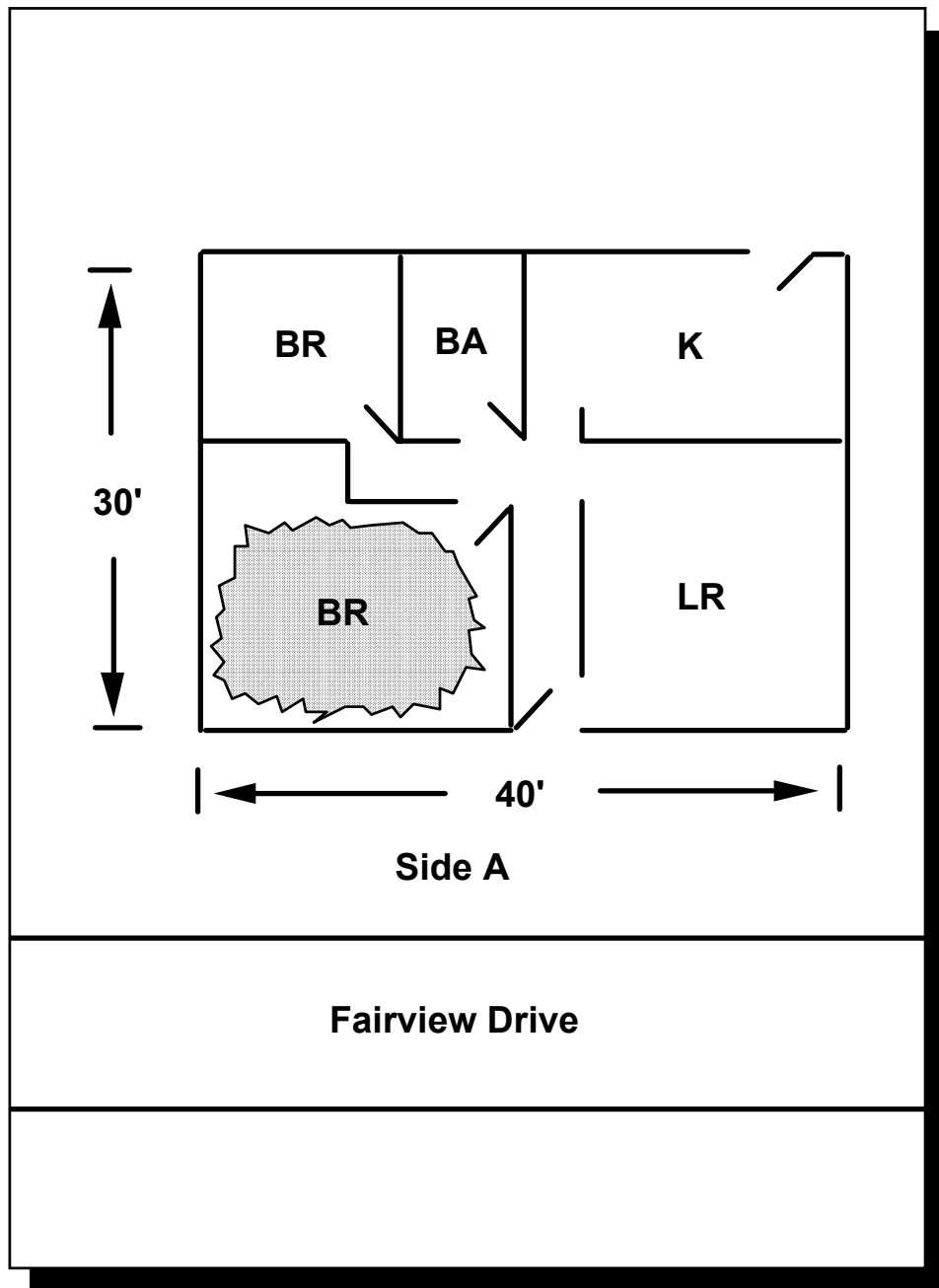
ARRIVAL SEQUENCE AFTER DISPATCH:

Chief 1.....	1 min.
Engine 1	2 min.
Engine 2	3 min.
Truck 1 or Engine 124	4 min.
Tanker/tender 1 if dispatched.....	5 min.

ACTIVITY 6.1 (cont'd)

WALK-THROUGH SCENARIO

PLOT PLAN/FLOOR PLAN



ACTIVITY 6.1 (cont'd)

WALK-THROUGH SCENARIO

EQUIPMENT GUIDELINES

For the purpose of the simulation exercise, the apparatus being dispatched is equipped as follows:

Engine Companies 1, 3, 5, 7, and 9

1,500-gpm pump

1,200' of 5" supply hose

600' of 2-1/2" supply hose

3 preconnected attack lines

Blue- 200' 1-1/2" hose w/120 gpm fog nozzle

Green- 250' 1-3/4" hose w/automatic fog nozzle

Black- 250' 2" hose w/smooth bore 1" tip

Standard complement of other equipment as would be expected on a modern engine company

Engine Companies 2, 4, 6, 8, and 10

1,000-gpm pump

800' 3" supply hose

800' 2-1/2" supply hose

2 preconnected attack lines

Yellow- 200' 1-1/2" hose w/120 gpm fog nozzle

Orange- 200' 1-3/4" hose w/automatic fog nozzle

Standard complement of other equipment as would be expected on a modern engine company

Truck Company 1

100' straight aerial ladder

202' ground ladders

Preconnected bed ladder pipe with 500-gpm fog nozzle

Fly ladder pipe with 2" straight stream nozzle (not preconnected)

Standard complement of other equipment as would be expected on a modern ladder truck company

Truck Company 2

110' aerial platform

165' ground ladders

1,500-gpm pump

600' 3" supply hose

Two preconnected 1,000-gpm fog nozzles on platform

Standard complement of other equipment as would be expected on a modern ladder truck company

Tanker/tender Companies 1 and 2

2,000-gallon tank (dump time 3 minutes)

750-gpm pump (fill time 5 minutes)

One 2,500-gallon portable tank

Travel time to water supply and return totals 12 minutes

Standard complement of other equipment as would be expected on a modern water tanker/tender company

ACTIVITY 6.1 (cont'd)

WALK-THROUGH SCENARIO

EXAMPLE BRIEF INITIAL REPORT

"Chief ____ arrived location Side ____ of a (describe the structure type)."

Describe fire situation. Indicate where the fire is located and from where the smoke and flames are exiting the structure.

"Chief ____ is Command."

Call for additional resources if needed at this time. Assign the other resources.

EXAMPLE TACTICAL CHECKLIST

To provide consistency and a system for logical thinking, a checklist is provided. Once assigned a tactic or a task, the COs must do a sizeup. They must determine the best methods of accomplishing the tactic. They must determine needed resources and provide for safety and control of the operation. The checklist assists with developing the correct information. Students are urged to use such a mind-jogger on actual incidents.

This list is from the **Tactical Action Model** developed by Chief Alan Brunacini, Phoenix Fire Department.

- ☐ Receipt of tactical order from your supervisor.
- ☐ Tactical sizeup.
 - ☐ Safety considerations.
 - ☐ Area of involvement.
 - ☐ Construction.
 - ☐ Occupancy.
 - ☐ Problem identification.
 - ☐ Prioritize.
 - ☐ Evaluate resources.
- ☐ Assignment of tasks to crew members.
- ☐ Take action to complete the assignment given.
- ☐ Evaluate the effectiveness of the actions being performed.
- ☐ Report to your supervisor the effectiveness of your actions.

ACTIVITY 6.1 (cont'd)

WALK-THROUGH SCENARIO

FIREFIGHTER WORKSHEET

After your engine, truck, or water tanker/tender has been given a tactical assignment and the Company Officer has informed you of the actions that your company is to initiate, answer the questions below that are pertinent to your company's operation.

1. What is your tactical assignment? _____

2. If your assignment involves fire confinement or extinguishment, answer the following:
 - a. Explain your water supply, including hoseline size: _____

 - b. Explain your attack line(s), including hoseline size, length, and nozzle attached: _____

 - c. Identify the total gallons flowing from your engine company:

3. If your assignment involves rescue, ventilation, salvage, utility control, or tactical assignment answer the following:

Explain your company's actions, including items such as where and how ventilation was conducted, where and how search was conducted, or where and how other tactical assignments were conducted: _____

4. If you were assigned to the water tanker/tender company, how many gallons per minute are you supplying? _____

5. What safety concerns do you have? _____

6. What other tactical assignments/operations must you coordinate with?

ACTIVITY 6.1 (cont'd)

APPLYING TACTICAL OPERATIONS

SCENARIOS 1-4

Scenario 1	SM 6-47
Scenario 2	SM 6-57
Scenario 3	SM 6-67
Scenario 4	SM 6-77

ACTIVITY 6.1 (cont'd)

SCENARIO 1

DISPATCH SCRIPT AND RESPONSE CARD

Hydrant Area: Engine 1, Engine 2, Truck 1, and Chief 1 respond to a structure fire at 624 Wood Place. Time out is 0600 hours on a Saturday.

Nonhydrant Area: Engine 1, Engine 2, Engine 124, Water Tanker/tender 1, and Chief 1 respond to a structure fire at 624 Wood Place. Time out is 0600 hours on a Saturday.

1st Alarm	Engine 1	Engine 2	Truck 1 or *Engine 124	Chief 1	**Tanker/tender 1
2nd Alarm	Engine 3	Engine 4	Engine 5		**Tanker/tender 2
3rd Alarm	Engine 6	Engine 7	Truck 2		**Tanker/tender 3
4th Alarm	Engine 8	Engine 9	Engine 10		

*Dispatch Engine 124 in place of Truck 1 if response is to a nonhydrant area.

**Dispatch Tanker/tenders to a nonhydrant area.

Note: Should the Incident Commander determine that resources beyond the first alarm companies will be needed, any resources listed for the four alarms can be summoned by calling for a 2nd, 3rd, or 4th alarm or by special calling only the resources needed. As an example the IC can request the response of Truck 2 or any of the Tanker/tenders shown. In addition, the IC can summon any of the resources listed below:

Basic Life Support Units:

Ambulance 1
Ambulance 2
Ambulance 3

Paramedic Units:

Paramedic 1
Paramedic 2

Air Supply 1

Utility Company 1

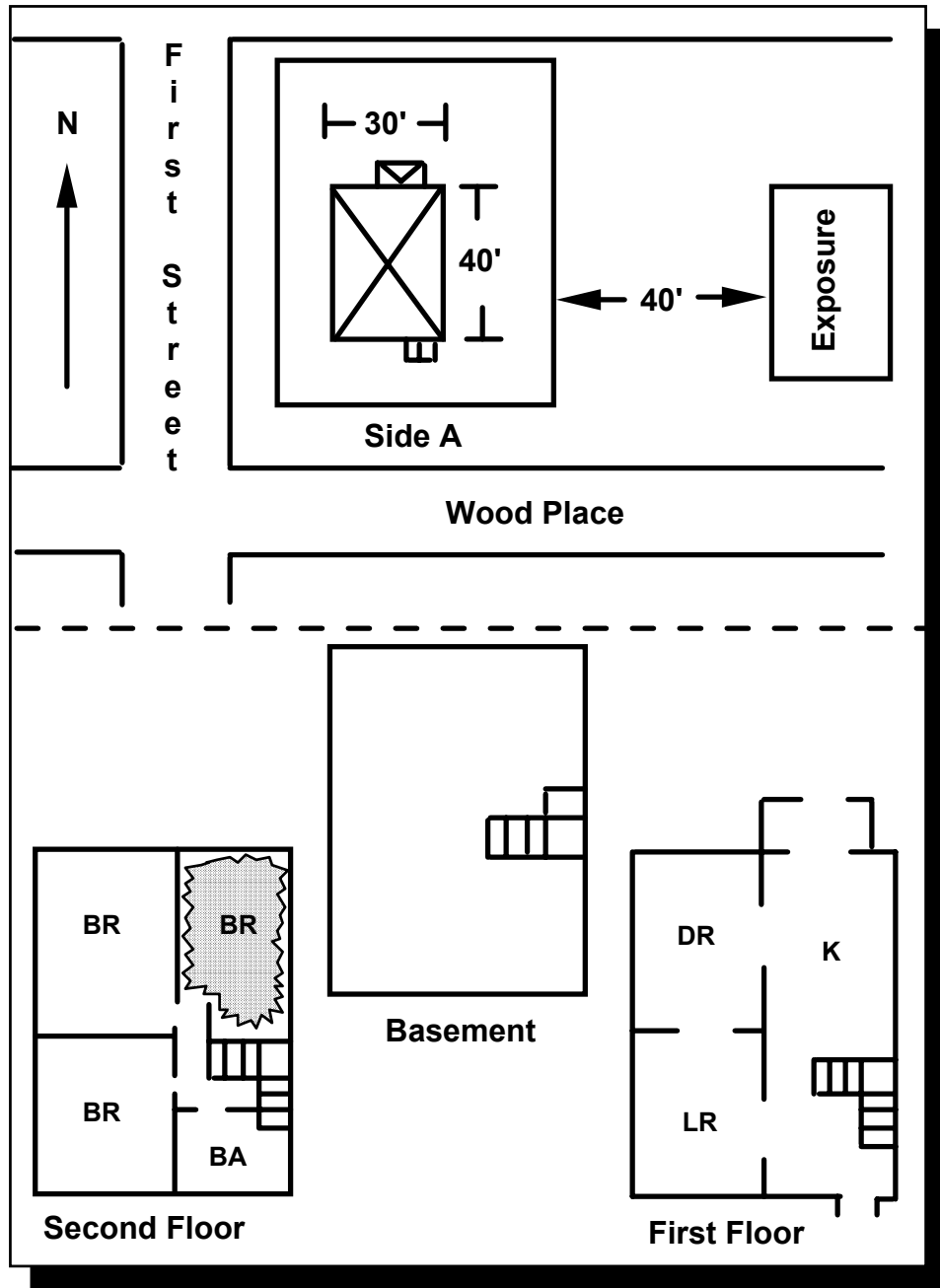
ARRIVAL SEQUENCE AFTER DISPATCH:

Chief 1 1 min.
Engine 1 2 min.
Engine 2 3 min.
Truck 1 or Engine 124 4 min.
Tanker/tender 1 if dispatched.....5 min.

ACTIVITY 6.1 (cont'd)

SCENARIO 1

PLOT PLAN/FLOOR PLAN



ACTIVITY 6.1 (cont'd)

SCENARIO 1

EQUIPMENT GUIDELINES

For the purpose of the simulation exercise, the apparatus being dispatched is equipped as follows:

Engine Companies 1, 3, 5, 7, and 9

- 1,500-gpm pump
- 1,200' of 5" supply hose
- 600' of 2-1/2" supply hose
- 3 preconnected attack lines
 - Blue- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Green- 250' 1-3/4" hose w/automatic fog nozzle
 - Black- 250' 2" hose w/smooth bore 1" tip
- Standard complement of other equipment as would be expected on a modern engine company

Engine Companies 2, 4, 6, 8, and 10

- 1,000-gpm pump
- 800' 3" supply hose
- 800' 2-1/2" supply hose
- 2 preconnected attack lines
 - Yellow- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Orange- 200' 1-3/4" hose w/automatic fog nozzle
- Standard complement of other equipment as would be expected on a modern engine company

Truck Company 1

- 100' straight aerial ladder
- 202' ground ladders
- Preconnected bed ladder pipe with 500-gpm fog nozzle
- Fly ladder pipe with 2" straight stream nozzle (not preconnected)
- Standard complement of other equipment as would be expected on a modern ladder truck company

Truck Company 2

- 110' aerial platform
- 165' ground ladders
- 1,500-gpm pump
- 600' 3" supply hose
- Two preconnected 1,000-gpm fog nozzles on platform
- Standard complement of other equipment as would be expected on a modern ladder truck company

Tanker/tender Companies 1 and 2

- 2,000-gallon tank (dump time 3 minutes)
- 750-gpm pump (fill time 5 minutes)
- One 2,500-gallon portable tank
- Travel time to water supply and return totals 12 minutes
- Standard complement of other equipment as would be expected on a modern water tanker/tender company

ACTIVITY 6.1 (cont'd)

SCENARIO 1

BRIEF INITIAL REPORT

"Chief ____ arrived location Side ____ of a (describe the structure type)."

Describe fire situation. Indicate where the fire is located and from where the smoke and flames are exiting the structure.

"Chief ____ is Command."

Call for additional resources if needed at this time. Assign the other resources.

TACTICAL CHECKLIST

- ☐ Receipt of tactical order from your supervisor.
- ☐ Tactical sizeup.
 - ☐ Safety considerations.
 - ☐ Area of involvement.
 - ☐ Construction.
 - ☐ Occupancy.
 - ☐ Problem identification.
 - ☐ Prioritize.
 - ☐ Evaluate resources.
- ☐ Assignment of tasks to crew members.
- ☐ Take action to complete the assignment given.
- ☐ Evaluate the effectiveness of the actions being performed.
- ☐ Report to your supervisor the effectiveness of your actions.

ACTIVITY 6.1 (cont'd)

SCENARIO 1

FIREFIGHTER WORKSHEET

After your engine, truck, or water tanker/tender has been given a tactical assignment and the Company Officer has informed you of the actions that your company is to initiate, answer the questions below that are pertinent to your company's operation.

1. What is your tactical assignment? _____

2. If your assignment involves fire confinement or extinguishment, answer the following:
 - a. Explain your water supply, including hoseline size: _____

 - b. Explain your attack line(s), including hoseline size, length, and nozzle attached: _____

 - c. Identify the total gallons flowing from your engine company:

3. If your assignment involves rescue, ventilation, salvage, utility control, or tactical assignment answer the following:

Explain your company's actions, including items such as where and how ventilation was conducted, where and how search was conducted, or where and how other tactical assignments were conducted: _____

4. If you were assigned to the water tanker/tender company, how many gallons per minute are you supplying? _____

5. What safety concerns do you have? _____

6. What other tactical assignments/operations must you coordinate with?

ACTIVITY 6.1 (cont'd)

SCENARIO 2

DISPATCH SCRIPT AND RESPONSE CARD

Hydrant Area: Engine 1, Engine 2, Truck 1, and Chief 1 respond to a structure fire at 1001 Clark Way. Time out is 1430 hours on a Monday.

Nonhydrant Area: Engine 1, Engine 2, Engine 124, Water Tanker/tender 1, and Chief 1 respond to a structure fire at 1001 Clark Way. Time out is 1430 hours on a Monday.

1st Alarm	Engine 1	Engine 2	Truck 1 or *Engine 124	Chief 1	**Tanker/tender 1
2nd Alarm	Engine 3	Engine 4	Engine 5		**Tanker/tender 2
3rd Alarm	Engine 6	Engine 7	Truck 2		**Tanker/tender 3
4th Alarm	Engine 8	Engine 9	Engine 10		

*Dispatch Engine 124 in place of Truck 1 if response is to a nonhydrant area.

**Dispatch Tanker/tenders to a nonhydrant area.

Note: Should the Incident Commander determine that resources beyond the first alarm companies will be needed, any resources listed for the four alarms can be summoned by calling for a 2nd, 3rd, or 4th alarm or by special calling only the resources needed. As an example the IC can request the response of Truck 2 or any of the Tanker/tenders shown. In addition, the IC can summon any of the resources listed below:

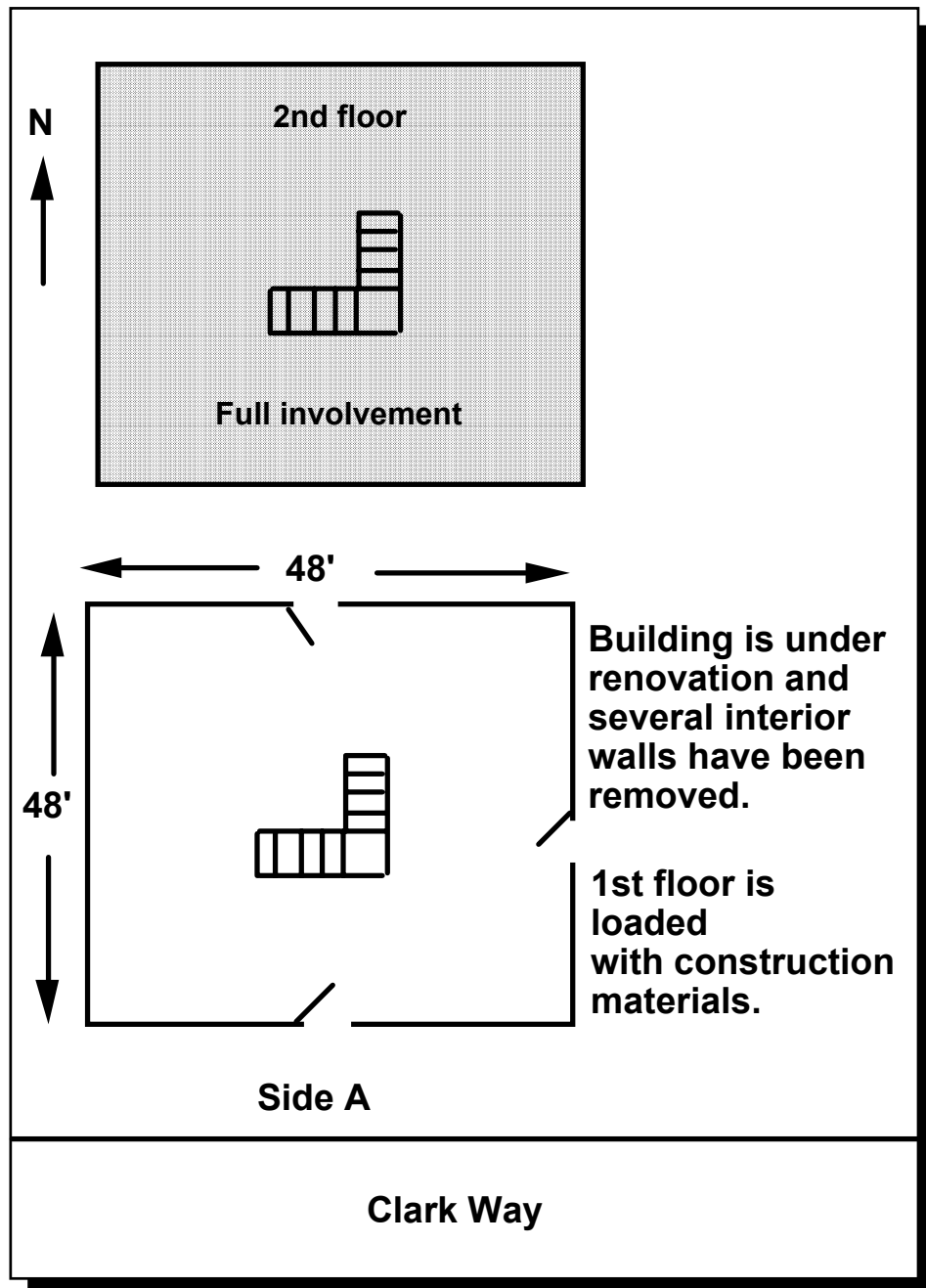
Basic Life Support Units:	Paramedic Units:	Air Supply 1
Ambulance 1	Paramedic 1	
Ambulance 2	Paramedic 2	Utility Company 1
Ambulance 3		

ARRIVAL SEQUENCE AFTER DISPATCH:	
Chief 1.....	1 min.
Engine 1	2 min.
Engine 2	3 min.
Truck 1 or Engine 124	4 min.
Tanker/tender 1 if dispatched.....	5 min.

ACTIVITY 6.1 (cont'd)

SCENARIO 2

PLOT PLAN/FLOOR PLAN



ACTIVITY 6.1 (cont'd)

SCENARIO 2

EQUIPMENT GUIDELINES

For the purpose of the simulation exercise, the apparatus being dispatched is equipped as follows:

Engine Companies 1, 3, 5, 7, and 9

- 1,500-gpm pump
- 1,200' of 5" supply hose
- 600' of 2-1/2" supply hose
- 3 preconnected attack lines
 - Blue- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Green- 250' 1-3/4" hose w/automatic fog nozzle
 - Black- 250' 2" hose w/smooth bore 1" tip
- Standard complement of other equipment as would be expected on a modern engine company

Engine Companies 2, 4, 6, 8, and 10

- 1,000-gpm pump
- 800' 3" supply hose
- 800' 2-1/2" supply hose
- 2 preconnected attack lines
 - Yellow- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Orange- 200' 1-3/4" hose w/automatic fog nozzle
- Standard complement of other equipment as would be expected on a modern engine company

Truck Company 1

- 100' straight aerial ladder
- 202' ground ladders
- Preconnected bed ladder pipe with 500-gpm fog nozzle
- Fly ladder pipe with 2" straight stream nozzle (not preconnected)
- Standard complement of other equipment as would be expected on a modern ladder truck company

Truck Company 2

- 110' aerial platform
- 165' ground ladders
- 1,500-gpm pump
- 600' 3" supply hose
- Two preconnected 1,000-gpm fog nozzles on platform
- Standard complement of other equipment as would be expected on a modern ladder truck company

Tanker/tender Companies 1 and 2

- 2,000-gallon tank (dump time 3 minutes)
- 750-gpm pump (fill time 5 minutes)
- One 2,500-gallon portable tank
- Travel time to water supply and return totals 12 minutes
- Standard complement of other equipment as would be expected on a modern water tanker/tender company

ACTIVITY 6.1 (cont'd)

SCENARIO 2

BRIEF INITIAL REPORT

"Chief ____ arrived location Side ____ of a (describe the structure type)."

Describe fire situation. Indicate where the fire is located and from where the smoke and flames are exiting the structure.

"Chief ____ is Command."

Call for additional resources if needed at this time. Assign the other resources.

TACTICAL CHECKLIST

- ☐ Receipt of tactical order from your supervisor.
- ☐ Tactical sizeup.
 - ☐ Safety considerations.
 - ☐ Area of involvement.
 - ☐ Construction.
 - ☐ Occupancy.
 - ☐ Problem identification.
 - ☐ Prioritize.
 - ☐ Evaluate resources.
- ☐ Assignment of tasks to crew members.
- ☐ Take action to complete the assignment given.
- ☐ Evaluate the effectiveness of the actions being performed.
- ☐ Report to your supervisor the effectiveness of your actions.

ACTIVITY 6.1 (cont'd)

SCENARIO 2

FIREFIGHTER WORKSHEET

After your engine, truck, or water tanker/tender has been given a tactical assignment and the Company Officer has informed you of the actions that your company is to initiate, answer the questions below that are pertinent to your company's operation.

1. What is your tactical assignment? _____

2. If your assignment involves fire confinement or extinguishment, answer the following:
 - a. Explain your water supply, including hoseline size: _____

 - b. Explain your attack line(s), including hoseline size, length, and nozzle attached: _____

 - c. Identify the total gallons flowing from your engine company:

3. If your assignment involves rescue, ventilation, salvage, utility control, or tactical assignment answer the following:

Explain your company's actions, including items such as where and how ventilation was conducted, where and how search was conducted, or where and how other tactical assignments were conducted: _____

4. If you were assigned to the water tanker/tender company, how many gallons per minute are you supplying? _____

5. What safety concerns do you have? _____

6. What other tactical assignments/operations must you coordinate with?

ACTIVITY 6.1 (cont'd)

SCENARIO 3

DISPATCH SCRIPT AND RESPONSE CARD

Hydrant Area: Engine 1, Engine 2, Truck 1, and Chief 1 respond to a structure fire at 106 Schein Avenue. Time out is 1130 hours on a Sunday.

Nonhydrant Area: Engine 1, Engine 2, Engine 124, Water Tanker/tender 1, and Chief 1 respond to a structure fire at 106 Schein Avenue. Time out is 1130 hours on a Sunday.

1st Alarm	Engine 1	Engine 2	Truck 1 or *Engine 124	Chief 1	**Tanker/tender 1
2nd Alarm	Engine 3	Engine 4	Engine 5		**Tanker/tender 2
3rd Alarm	Engine 6	Engine 7	Truck 2		**Tanker/tender 3
4th Alarm	Engine 8	Engine 9	Engine 10		

*Dispatch Engine 124 in place of Truck 1 if response is to a nonhydrant area.

**Dispatch Tanker/tenders to a nonhydrant area.

Note: Should the Incident Commander determine that resources beyond the first alarm companies will be needed, any resources listed for the four alarms can be summoned by calling for a 2nd, 3rd, or 4th alarm or by special calling only the resources needed. As an example the IC can request the response of Truck 2 or any of the Tanker/tenders shown. In addition, the IC can summon any of the resources listed below:

Basic Life Support Units:

Ambulance 1
Ambulance 2
Ambulance 3

Paramedic Units:

Paramedic 1
Paramedic 2

Air Supply 1

Utility Company 1

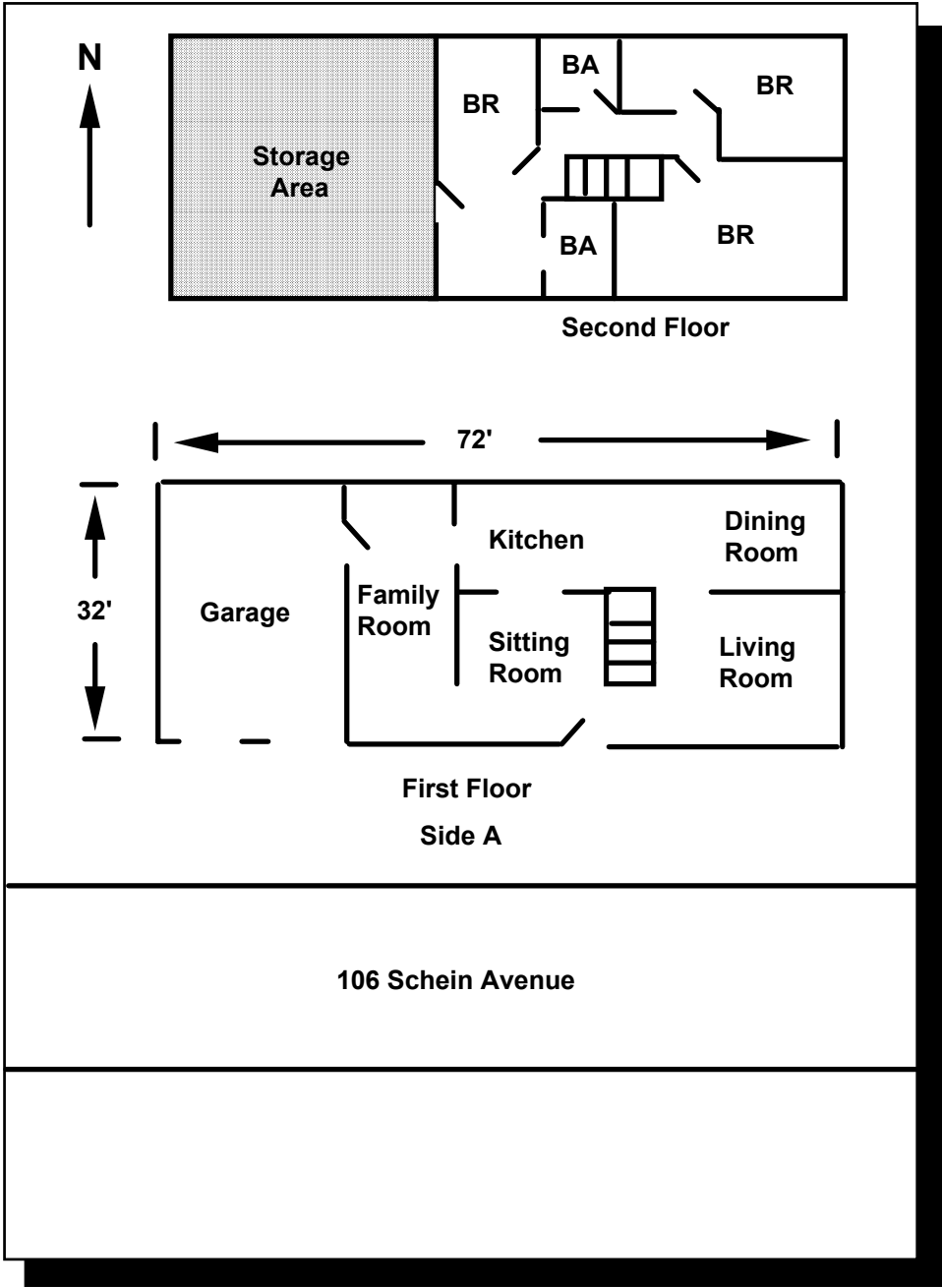
ARRIVAL SEQUENCE AFTER DISPATCH:

Chief 1 1 min.
Engine 1 2 min.
Engine 2 3 min.
Truck 1 or Engine 124 4 min.
Tanker/tender 1 if dispatched.....5 min.

ACTIVITY 6.1 (cont'd)

SCENARIO 3

PLOT PLAN/FLOOR PLAN



ACTIVITY 6.1 (cont'd)

SCENARIO 3

EQUIPMENT GUIDELINES

For the purpose of the simulation exercise, the apparatus being dispatched is equipped as follows:

Engine Companies 1, 3, 5, 7, and 9

- 1,500-gpm pump
- 1,200' of 5" supply hose
- 600' of 2-1/2" supply hose
- 3 preconnected attack lines
 - Blue- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Green- 250' 1-3/4" hose w/automatic fog nozzle
 - Black- 250' 2" hose w/smooth bore 1" tip
- Standard complement of other equipment as would be expected on a modern engine company

Engine Companies 2, 4, 6, 8, and 10

- 1,000-gpm pump
- 800' 3" supply hose
- 800' 2-1/2" supply hose
- 2 preconnected attack lines
 - Yellow- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Orange- 200' 1-3/4" hose w/automatic fog nozzle
- Standard complement of other equipment as would be expected on a modern engine company

Truck Company 1

- 100' straight aerial ladder
- 202' ground ladders
- Preconnected bed ladder pipe with 500-gpm fog nozzle
- Fly ladder pipe with 2" straight stream nozzle (not preconnected)
- Standard complement of other equipment as would be expected on a modern ladder truck company

Truck Company 2

- 110' aerial platform
- 165' ground ladders
- 1,500-gpm pump
- 600' 3" supply hose
- Two preconnected 1,000-gpm fog nozzles on platform
- Standard complement of other equipment as would be expected on a modern ladder truck company

Tanker/tender Companies 1 and 2

- 2,000-gallon tank (dump time 3 minutes)
- 750-gpm pump (fill time 5 minutes)
- One 2,500-gallon portable tank
- Travel time to water supply and return totals 12 minutes
- Standard complement of other equipment as would be expected on a modern water tanker/tender company

ACTIVITY 6.1 (cont'd)

SCENARIO 3

BRIEF INITIAL REPORT

"Chief ____ arrived location Side ____ of a (describe the structure type)."

Describe fire situation. Indicate where the fire is located and from where the smoke and flames are exiting the structure.

"Chief ____ is Command."

Call for additional resources if needed at this time. Assign the other resources.

TACTICAL CHECKLIST

- ☐ Receipt of tactical order from your supervisor.
- ☐ Tactical sizeup.
 - ☐ Safety considerations.
 - ☐ Area of involvement.
 - ☐ Construction.
 - ☐ Occupancy.
 - ☐ Problem identification.
 - ☐ Prioritize.
 - ☐ Evaluate resources.
- ☐ Assignment of tasks to crew members.
- ☐ Take action to complete the assignment given.
- ☐ Evaluate the effectiveness of the actions being performed.
- ☐ Report to your supervisor the effectiveness of your actions.

ACTIVITY 6.1 (cont'd)

SCENARIO 3

FIREFIGHTER WORKSHEET

After your engine, truck, or water tanker/tender has been given a tactical assignment and the Company Officer has informed you of the actions that your company is to initiate, answer the questions below that are pertinent to your company's operation.

1. What is your tactical assignment? _____

2. If your assignment involves fire confinement or extinguishment, answer the following:
 - a. Explain your water supply, including hoseline size: _____

 - b. Explain your attack line(s), including hoseline size, length, and nozzle attached: _____

 - c. Identify the total gallons flowing from your engine company:

3. If your assignment involves rescue, ventilation, salvage, utility control, or tactical assignment answer the following:

Explain your company's actions, including items such as where and how ventilation was conducted, where and how search was conducted, or where and how other tactical assignments were conducted: _____

4. If you were assigned to the water tanker/tender company, how many gallons per minute are you supplying? _____

5. What safety concerns do you have? _____

6. What other tactical assignments/operations must you coordinate with?

ACTIVITY 6.1 (cont'd)

SCENARIO 4

DISPATCH SCRIPT AND RESPONSE CARD

Hydrant Area: Engine 1, Engine 2, Truck 1, and Chief 1 respond to a structure fire at 1213 Clark Lane. Time out is 0530 hours on a Thursday.

Nonhydrant Area: Engine 1, Engine 2, Engine 124, Water Tanker/tender 1, and Chief 1 respond to a structure fire at 1213 Clark Lane. Time out is 0530 hours on a Thursday.

1st Alarm	Engine 1	Engine 2	Truck 1 or *Engine 124	Chief 1	**Tanker/tender 1
2nd Alarm	Engine 3	Engine 4	Engine 5		**Tanker/tender 2
3rd Alarm	Engine 6	Engine 7	Truck 2		**Tanker/tender 3
4th Alarm	Engine 8	Engine 9	Engine 10		

*Dispatch Engine 124 in place of Truck 1 if response is to a nonhydrant area.

**Dispatch Tanker/tenders to a nonhydrant area.

Note: Should the Incident Commander determine that resources beyond the first alarm companies will be needed, any resources listed for the four alarms can be summoned by calling for a 2nd, 3rd, or 4th alarm or by special calling only the resources needed. As an example the IC can request the response of Truck 2 or any of the Tanker/tenders shown. In addition, the IC can summon any of the resources listed below:

Basic Life Support Units:

Ambulance 1
Ambulance 2
Ambulance 3

Paramedic Units:

Paramedic 1
Paramedic 2

Air Supply 1

Utility Company 1

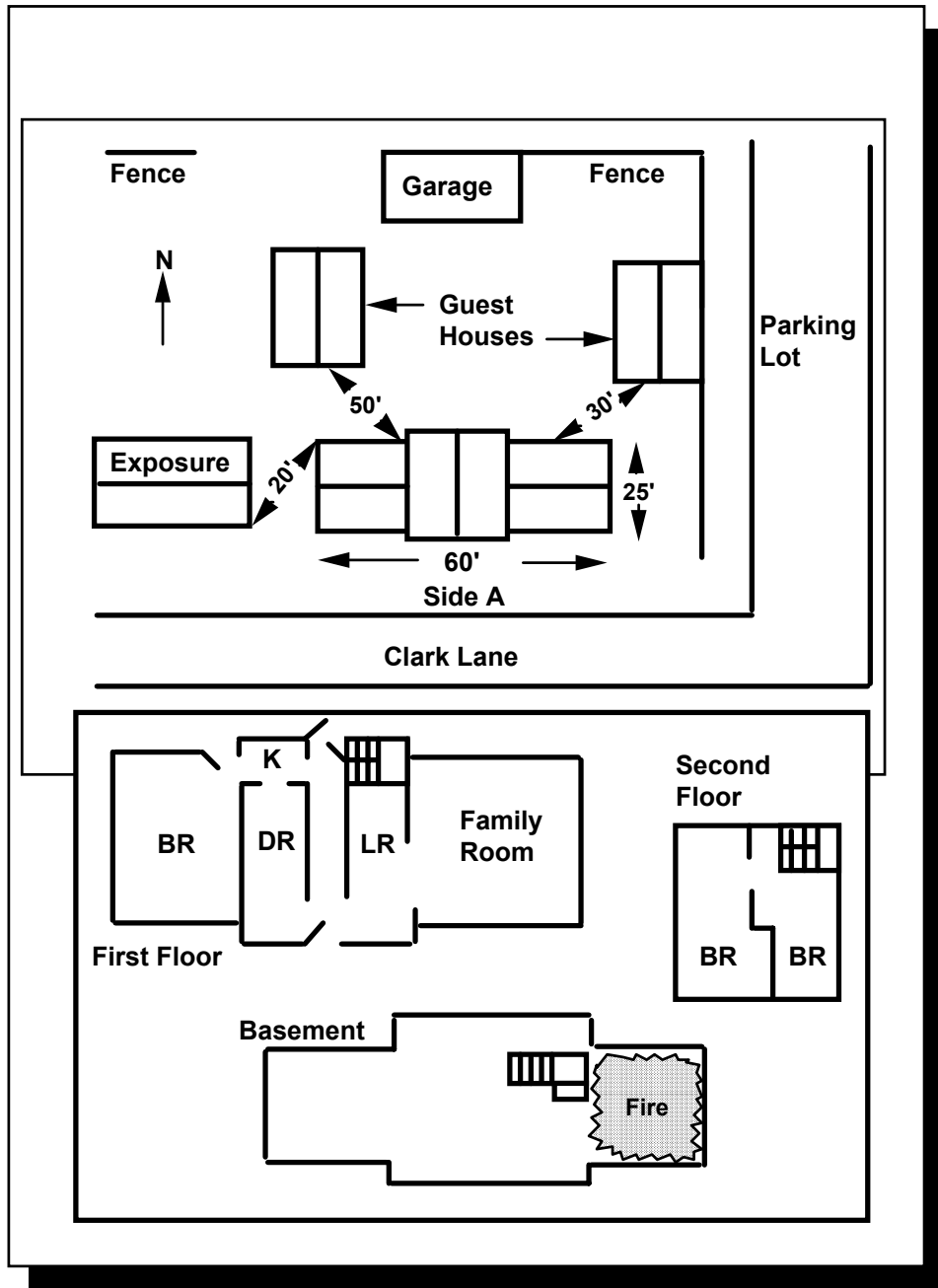
ARRIVAL SEQUENCE AFTER DISPATCH:

Chief 1 1 min.
Engine 1 2 min.
Engine 2 3 min.
Truck 1 or Engine 124 4 min.
Tanker/tender 1 if dispatched.....5 min.

ACTIVITY 6.1 (cont'd)

SCENARIO 4

PLOT PLAN/FLOOR PLAN



ACTIVITY 6.1 (cont'd)

SCENARIO 4

EQUIPMENT GUIDELINES

For the purpose of the simulation exercise, the apparatus being dispatched is equipped as follows:

Engine Companies 1, 3, 5, 7, and 9

- 1,500-gpm pump
- 1,200' of 5" supply hose
- 600' of 2-1/2" supply hose
- 3 preconnected attack lines
 - Blue- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Green- 250' 1-3/4" hose w/automatic fog nozzle
 - Black- 250' 2" hose w/smooth bore 1" tip
- Standard complement of other equipment as would be expected on a modern engine company

Engine Companies 2, 4, 6, 8, and 10

- 1,000-gpm pump
- 800' 3" supply hose
- 800' 2-1/2" supply hose
- 2 preconnected attack lines
 - Yellow- 200' 1-1/2" hose w/120 gpm fog nozzle
 - Orange- 200' 1-3/4" hose w/automatic fog nozzle
- Standard complement of other equipment as would be expected on a modern engine company

Truck Company 1

- 100' straight aerial ladder
- 202' ground ladders
- Preconnected bed ladder pipe with 500-gpm fog nozzle
- Fly ladder pipe with 2" straight stream nozzle (not preconnected)
- Standard complement of other equipment as would be expected on a modern ladder truck company

Truck Company 2

- 110' aerial platform
- 165' ground ladders
- 1,500-gpm pump
- 600' 3" supply hose
- Two preconnected 1,000-gpm fog nozzles on platform
- Standard complement of other equipment as would be expected on a modern ladder truck company

Tanker/tender Companies 1 and 2

- 2,000-gallon tank (dump time 3 minutes)
- 750-gpm pump (fill time 5 minutes)
- One 2,500-gallon portable tank
- Travel time to water supply and return totals 12 minutes
- Standard complement of other equipment as would be expected on a modern water tanker/tender company

ACTIVITY 6.1 (cont'd)

SCENARIO 4

BRIEF INITIAL REPORT

"Chief ____ arrived location Side ____ of a (describe the structure type)."

Describe fire situation. Indicate where the fire is located and from where the smoke and flames are exiting the structure.

"Chief ____ is Command."

Call for additional resources if needed at this time. Assign the other resources.

TACTICAL CHECKLIST

- ☐ Receipt of tactical order from your supervisor.
- ☐ Tactical sizeup.
 - ☐ Safety considerations.
 - ☐ Area of involvement.
 - ☐ Construction.
 - ☐ Occupancy.
 - ☐ Problem identification.
 - ☐ Prioritize.
 - ☐ Evaluate resources.
- ☐ Assignment of tasks to crew members.
- ☐ Take action to complete the assignment given.
- ☐ Evaluate the effectiveness of the actions being performed.
- ☐ Report to your supervisor the effectiveness of your actions.

ACTIVITY 6.1 (cont'd)

SCENARIO 4

FIREFIGHTER WORKSHEET

After your engine, truck, or water tanker/tender has been given a tactical assignment and the Company Officer has informed you of the actions that your company is to initiate, answer the questions below that are pertinent to your company's operation.

1. What is your tactical assignment? _____

2. If your assignment involves fire confinement or extinguishment, answer the following:
 - a. Explain your water supply, including hoseline size: _____

 - b. Explain your attack line(s), including hoseline size, length, and nozzle attached: _____

 - c. Identify the total gallons flowing from your engine company:

3. If your assignment involves rescue, ventilation, salvage, utility control, or tactical assignment answer the following:

Explain your company's actions, including items such as where and how ventilation was conducted, where and how search was conducted, or where and how other tactical assignments were conducted: _____

4. If you were assigned to the water tanker/tender company, how many gallons per minute are you supplying? _____

5. What safety concerns do you have? _____

6. What other tactical assignments/operations must you coordinate with?
