Introduction to Wildland/Urban Interface Firefighting for the Structural Company Officer

IWUIFSCO-Student Manual

1st Edition, 2nd Printing--May 2002

FEMA

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U.S. DEPARTMENT OF HOMELAND SECURITY

FEDERAL EMERGENCY MANAGEMENT AGENCY

UNITED STATES FIRE ADMINISTRATION

NATIONAL FIRE ACADEMY

FOREWORD

On March 1, 2003, the Federal Emergency Management Agency (FEMA) became part of the U.S. Department of Homeland Security. FEMA's continuing mission within the new department is to lead the effort to prepare the nation for all hazards and effectively manage federal response and recovery efforts following any national incident. FEMA also initiates proactive mitigation activities, trains first responders, and manages the National Flood Insurance Program and the U.S. Fire Administration.

FEMA's U.S. Fire Administration (USFA) serves as the agency fire protection and emergency response community expert. It is located at the National Emergency Training Center in Emmitsburg, Md., and includes the National Fire Academy and the Emergency Management Institute. The mission of the USFA is to save lives and reduce economic losses due to fire and related emergencies through research and training, public education and coordination with other federal agencies and fire protection and emergency service personnel.

To achieve the USFA'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 USFA's National Fire Academy offers a diverse delivery system. Courses are delivered at the Emmitsburg campus and throughout the nation in cooperation with state and local fire training organizations.

This training program is a joint effort of the NFA and the National Wildfire Coordinating Group (NWCG) to identify many of the operational activities and safety concerns when the Company Officer (CO) is assigned to a Wildland or Wildland/Urban Interface Fire.

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UNIT 1: INTRODUCTION TO WILDLAND AND WILDLAND/URBAN INTERFACE FIREFIGHTING

TERMINAL OBJECTIVE

The students will be able to describe a Wildland and Wildland/Urban Interface environment.

ENABLING OBJECTIVES

The students will:

1. *Describe the purpose of the course.*
2. *Describe a Wildland/Urban Interface Fire.*
3. *Identify expectations and concerns.*
4. *Identify additional training courses and educational materials.*

BACKGROUND

The purpose of this course is to provide a basic understanding of the Wildland and Wildland/Urban Interface environment in which the structural fire company may be assigned. With the knowledge contained in this course, a structural fire Company Officer (CO) will be able to use a structural fire company safely and effectively in a Wildland and Wildland/Urban Interface environment.

A wildland fire is a fire involving flammable vegetation, spread over topographical features, and influenced by local weather conditions. This could include a small grass fire burning in a vacant lot, or a large fire burning in mountainous terrain consuming several thousand acres. The wildland fire environment is affected by three factors: fuel, weather, and topography. The structural fire CO needs to have a basic knowledge of how these factors affect the fire behavior and the safe tactical deployment of an engine company.

Often, wildland fire terminology is different from the terms used in structural firefighting; therefore, a Glossary is included at the end of this Student Manual (SM).

A Wildland/Urban Interface Fire is a wildland fire that includes structures and dwellings as fuel or as exposures along its perimeter. As an area with wildland fuel is developed, and people begin to build their homes adjacent to or interspersed in this environment, the density and continuity of the structures change the fire environment and add to it the elements of structure and life safety protection. There are three different types of development that the structural fire CO may encounter in this environment:

1. Isolated areas of wildland within an urban area.

2. Several structures, often on small lots, bordered by wildland on a broad front.

3. Structures scattered over large wildland areas.

Wildland/Urban Interface Incidents are characterized by an abundance of continuous and readily available fuels for the fire. Breaks in this fuel load are significantly different from those familiar to the typical structural firefighter. Creeks and roadways, sometimes great distances from the fire's point of origin, take the place of the firewalls, fire separations, and alleys that are familiar to the structural firefighter.

The Wildland and Wildland/Urban Interface environment is not a new phenomenon. Fire has been part of the ecosystem for centuries. Wildland and Wildland/Urban Interface Fires have become an increasing concern due to the expansion of the U.S. population. With the influence of human-caused fires and the building of many structures in fuel areas, a significant increase in the number of fires has been noted. As areas have become more populated, these fires threaten to destroy improved properties and homes. These fires have become known as Wildland and Wildland/Urban Interface Fires.

What Does This Mean to You?

Increasing use of structural resources to fight fires in the Wildland and Wildland/Urban Interface has required wildland and structural firefighters to increase cooperation and change attitudes.

Wildland and structural firefighters must increase their knowledge of each other by learning and understanding all aspects of their jobs, including:

- personnel
- equipment
- training
- capabilities
- safety

Wildland and structural firefighters must have a common incident management system. Often wildland fire terminology is different from terms used in structural firefighting.

As a structural fire CO providing fire protection in the Wildland and Wildland/Urban Interface, it is important that you understand the factors that affect the environment:

- fuel
- weather
- topography

NATIONAL WILDFIRE COORDINATING GROUP

This course was developed by the National Fire Academy (NFA) and the National Wildfire Coordinating Group (NWCG). Wildland and Wildland/Urban Interface firefighting is a complex and demanding profession which requires significant knowledge in many subject areas obtained from years of experience. If you desire to become more proficient and knowledgeable in wildland firefighting, several courses are available from the NWCG and can be obtained through your State or Federal wildland fire agency. These courses should be taught by a qualified instructor. You are encouraged to contact your local wildland fire agency for assistance.

Some courses available through the NWCG include the following:

Skill course curriculum:

- S-110: Basic Fire Suppression Orientation;
- S-130: Firefighter Training;
- S-190: Introduction to Wildland Fire Behavior;
- S-205: Fire Operations in the Urban Interface;
- S-215: Fire Methods and Equipment;
- S-230: Single Resource; and
- S-290: Wildland Fire Behavior.

Incident Command System (ICS):

- I-100: Introduction to ICS; and

- I-200: Basic ICS.

What is the National Wildfire Coordinating Group?

The NWCG was formed officially on March 18, 1976, by an interagency Memorandum of Understanding (MOU) between the Secretary of the Interior and the Secretary of Agriculture. The original agreement was modified in June, 1994, to include the Federal Emergency Management Agency's (FEMA's) U.S. Fire Administration (USFA) as a member.

The partner agencies all face common problems: widely disbursed field areas, limited staff, and wildland fire activity that varies greatly from year to year. The ability to aggregate personnel and resources from all agencies during high fire activity is crucial to successful management. An umbrella organization was needed to facilitate the development of common practices, standards, and training to bond the wildland fire community. The success of the process is demonstrated continually during nationwide response to the heavy fire activity of recent years. It is equally valid for more typical fire years when personnel from adjacent field areas jointly attack local fires with their closest forces. NWCG contributes toward the cost-effective execution of each partner agency's program, to the benefit of the agency mandates and resources, and the taxpayer.

Membership

The NWCG includes representatives of the U.S. Forest Service, the Bureau of Land Management, the U.S. Fish and Wildlife Service, the Bureau of Indian Affairs, the National Park Service, USFA, and two representatives of the National Association of State Foresters.

Detailed products of the group are produced by working teams and advisory groups. Technical specialists are drawn from the member agencies, and they focus their collective talents on assigned tasks. Some of the teams are standing groups while others have a specific charge; they complete their task and are disbanded. Presently there are teams on Incident Operations Standards, Training, Prevention, Education and Communications, Safety and Health, Business Management, Information Resources, and Prescribed Fire Equipment. There is also a Publications Management Unit, and advisory groups that work with Fire Weather, Fire Danger, and the Urban Interface.

The products are approved by a consensus of NWCG members after which agreed-upon polices, standards, and procedures are implemented by each agency through regular channels.

The 70's

- The National Interagency Fire Qualification System and associated suppression training courses were implemented.
- The National Fire Cache System was standardized.
- The step test and/or $1^1/_2$-mile run was adopted as the standard measure of physical fitness.

The 80's

- The National Interagency Incident Management System (NIIMS) was developed, along with its operational organization, the ICS.
- Prescribed fire qualifications, monitoring, and smoke management guides were published.
- A new generation of training packages was developed for the ICS.

The 90's

- A performance-based qualification system, the ICS, and suppression fire training and qualification curricula were refined and revised.
- The ICS National Training Curriculum for all-risk users was published.
- Computers were implemented to better link all wildland fire agencies to a common system.
- The use of typical wildland resources was expanded into all-risk applications in support of FEMA.
- Prescribed fire, qualification, and training systems were approved, and courses were developed.

Evolving Programs and Products for the Next Decade

- Increased use of the Internet for information sharing.
- Improved ability of all agencies to use electronic media to share information, skills, and abilities.

For more information, contact

National Wildfire Coordinating Group
Executive Secretary
c/o U.S. Fish and Wildlife Service
3833 S. Development Ave.
Boise, ID 83705
www.NIFC.gov

A catalogue of NWCG courses is included in your student materials.

Activity 1.1

Expectations

Purpose

To share experiences in the Wildland and Wildland/Urban Interface environments and to discuss the expectations that you have for this class.

Directions

1. Working in groups of four, introduce yourselves and take turns sharing the experiences you have had in the Wildland or Wildland/Urban Interface environments.

2. On an easel pad, list any problems that group members may have encountered as structural firefighters in a Wildland or Wildland/Urban Interface situation. If no one in the group has any such experience, list problems that you anticipate may occur.

3. You are allowed 20 minutes for your group work.

4. Choose a spokesperson to present your group's list to the class.

UNIT 2: WILDLAND OR WILDLAND/URBAN INTERFACE ENVIRONMENT

TERMINAL OBJECTIVE

The students will be able to evaluate the environment and how the environment affects their assignment in a Wildland and Wildland/Urban Interface Incident.

ENABLING OBJECTIVES

The students will:

1. *Describe considerations in the wildland fire environment that may be different in the structural environment.*
2. *Describe wildland firefighter tactical approaches.*
3. *Identify equipment considerations.*
4. *Identify communications considerations.*
5. *Identify command and control reporting issues.*

WILDLAND FIRE ENVIRONMENT

At the end of this manual, you will find a full and complete Glossary which covers the terminology used in this course. You are encouraged to review this list carefully because many of the terms used in wildland firefighting have meanings different from those in the structural firefighting community. For those not familiar with topographic definitions and weather-related terms, this Glossary will prove to be very useful.

The structural fire Company Officer (CO) needs to be aware of the terms used to describe the parts of a wildland fire. These include

- **Head**: the head of a fire is the most rapidly spreading portion of a fire perimeter.
- **Flank**: the parts of a fire perimeter that are roughly parallel to the main direction of the spread. Commonly referred to as the left or right side of the fire.
- **Rear**: the portion of the fire spreading into the wind; slowest spreading portion opposite the head. Also known as the heel.
- **Island**: an unburned area within the fire's perimeter.
- **Spot**: fire ignited outside the perimeter of the main fire by a firebrand.
- **Finger**: the long narrow portion of the fire which projects ahead of the main body of the fire.

Wildland and Wildland/Urban Interface Incidents are characterized by having an abundance of continuous and readily available fuels for the fire.

- Fuel loads are significantly larger than those familiar to the typical structural firefighter.
- Creeks and roadways, sometimes large distances from the original point of origin, take the place of firewalls, fire separations, and alleys that are familiar to the structural firefighter.

Environmental characteristics frequently associated with Wildland and Wildland/Urban Interface Incidents are compounded by the inherent challenges these incidents offer to operations. A few examples of each are listed on the following page.

Wildland Environment

- size, location, and number of fires;
- major topographical features;
- fire intensity, direction, and rate of spread;
- actual and predicted weather conditions;
- fuel type, age, and continuity;
- narrow, unpaved roadways;
- limited water sources;
- difficult-to-locate occupancies/addresses; and
- abundance of combustible construction.

Challenges to Operations

- extended travel times and multiple alarms;
- incidents of long duration;
- mixed agencies at work;
- working with unfamiliar resources; and
- overloaded communications.

It is difficult to gain access by narrow, unpaved roadways. Driveways replace the usually code-compliant streets and avenues which are found in more developed areas. These difficult access points provide very different challenges for the structural fire CO. Difficulty in locating threatened properties and gaining access to these properties are more the norm than the exception.

As communities in the Wildland and Wildland/Urban Interface continue to increase in number, construction often takes place without the benefit of traditional planning and zoning requirements. Lot sizes can be anticipated to be larger and shaped more irregularly. Construction code enforcement may be lax or nonexistent, and house numbering systems also may be nonexistent. Each of these characteristics will challenge the structural fire CO in the Wildland and Wildland/Urban Interface.

Structures and properties in these areas may be constructed poorly and/or poorly maintained. It has become increasingly popular to "return to the woods." Many of these properties are valued in the hundreds of thousands, and sometimes millions of dollars. In some cases, million-dollar properties are located directly adjacent to properties of significantly less value. The structural fire CO should keep in mind, however, that all properties are valuable to their owners, and his/her best efforts should be made to save them.

Upon arrival at large-scale incidents, the structural fire CO will be required to work in an emergency setting that may be different from that with which he/she is familiar. Large-scale incidents almost always will consist of multijurisdictional resources consisting of local, county, State, and Federal agencies. Large-scale incidents will be managed differently than routine major structural incidents. It will be difficult or impossible to know the big picture because of the sheer geographical size usually associated with Wildland and Wildland/Urban Interface Fires.

While we have discussed Wildland and Wildland/Urban Interface Fires as being large and typically complicated, fires often are relatively small in size. Fires have started in small wildland areas, spreading to destroy or threaten improved properties within the Wildland and Wildland/Urban Interface zone.

Dynamic Fire Behavior

In structural firefighting, the fire usually is contained within a definable area and extinguished within a relatively short period of time. Wildland and Wildland/Urban Interface zone fires, however, are dynamic, fast-moving, and generally take longer to extinguish. Their movement is facilitated by readily available combustible fuels, driving winds, and prevailing weather and terrain conditions.

Fires viewed from individual operating units at the scene of wildland incidents frequently are not representative of "the big picture." It is important to keep the mobility of your company in mind when tactically deployed on the Wildland and Wildland/Urban Interface Fire to maximize the use of your company as the fire moves through the fire area.

Wildland and Wildland/Urban Interface Fires can spread rapidly and develop from a small, rather simple fire, to a fire of devastating proportions when accompanied by increasing winds or changing terrain. In fact, most wildland firefighting fatalities have occurred at fires that generally are in light fuels and are small in size.

Communications Difficulty

Wildland and Wildland/Urban Interface Incidents frequently involve multiple agencies from various levels of government. As a result, radio communications frequently are difficult. Difficulties usually arise from the number of frequencies available and the number of persons attempting to use those available frequencies. Terrain differences in elevation and vegetation complicate conventional radio communications. These items represent only a few of the deficiencies that may be experienced in such operations. Many of these communication issues can be resolved through preincident planning (PIP) and response agreements.

Complex Logistical Issues

As an incident increases in size, the need for additional resources to deal with the critical objectives also increases. As resources continue to increase, so does the need to service and support them in the field and to develop an appropriate management infrastructure. The logistical support requirements for this type of incident usually will outpace the ability of incident support staff to rapidly manage the increasing resources and logistical support needs. As a result, it may be 24 to 48 hours before full management and logistical resources can be in place to support the incident needs.

As a result of the delays associated with the initial operating period, you can anticipate the following:

- communications overload;
- lack of command and support staff;
- extended periods of work without relief;
- lack of a written action plan;
- delayed feeding;
- weak logistical support; and
- lack of an integrated communications plan.

If the duration of an incident is long, and a large deployment of resources is necessary, it will require a major incident team and related logistical support. As a result you can anticipate some of the following:

- twelve-hour operational periods;
- multiple large Staging areas;
- longer periods awaiting assignments;
- the use of base camps for feeding, sleeping, and fueling;
- a written Incident Action Plan (IAP);
- an expanded incident and management organization; and
- formal incident briefings.

Personal Protective Equipment

In most instances, the structural firefighter can use his/her existing personal protective equipment (PPE) to fight Wildland and Wildland/Urban Interface Fires for short periods of time. It should be stressed that wildland firefighters engaged in these types of operations usually adjust their PPE needs accordingly. Lightweight and specialized equipment will be the norm for the wildland firefighter. Fire departments that typically perform structural firefighting, but are faced with increasing demands to fight fires in wildland areas may wish to offer this type of equipment to their personnel.

The use of structural firefighting equipment in wildland situations for a long duration of time may be detrimental to the user's health and safety because this equipment is not designed for prolonged use in such environments. The outfitting of structural firefighters with lightweight helmets, gloves, shrouds, lugged-sole work boots, Nomex™ shirts and pants, etc., should be a consideration for structural firefighters who frequently may be used in wildland firefighting operations. The National Fire Protection Association (NFPA) has developed NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting* (1993).

Fire Shelters

Fire shelters are constructed of an aluminized material that provides protection from flames and heat for individual firefighters. While these devices are used by wildland firefighters, they are not typically standard issue for structural firefighters. Should local jurisdictions decide to supply their structural firefighters with this equipment, they need to ensure that appropriate training is available. References which may provide such support are located at the end of this unit.

Firefighter Fitness

While donning PPE is an action that can be done at the time of the incident, maintaining basic firefighter fitness must be an ongoing process. Just as wildland terrain and basic extinguishment functions take their toll on firefighters wearing PPE, they also take their toll on firefighters' cardiovascular systems. There is no substitute for participation in a good physical fitness program by firefighters who might be called upon to function at such emergencies.

WILDLAND FIREFIGHTER TACTICAL APPROACH

In both structural and wildland firefighting, the extinguishment of the fire is paramount. However, the methods for reaching this objective may take different paths. The structural firefighter needs to be aware of these differences and be prepared to recognize and support them.

Indirect versus Direct Attack

While structural firefighters typically locate and apply extinguishing agent to the seat of the fire, such activity may be difficult at best, and impossible, in some cases, in the wildland. Therefore, indirect methods of extinguishment may be used. Indirect attack is observed most frequently during periods when the fire perimeter is permitted to expand in order to control the fire at a geographic point, or to permit construction of adequate fire lines. Elements of wildland firefighting that make the indirect attack or perimeter expansion preferable include the terrain, weather, fuel loading, and the overall size and location of the incident.

Figure 2-1
Direct Attack

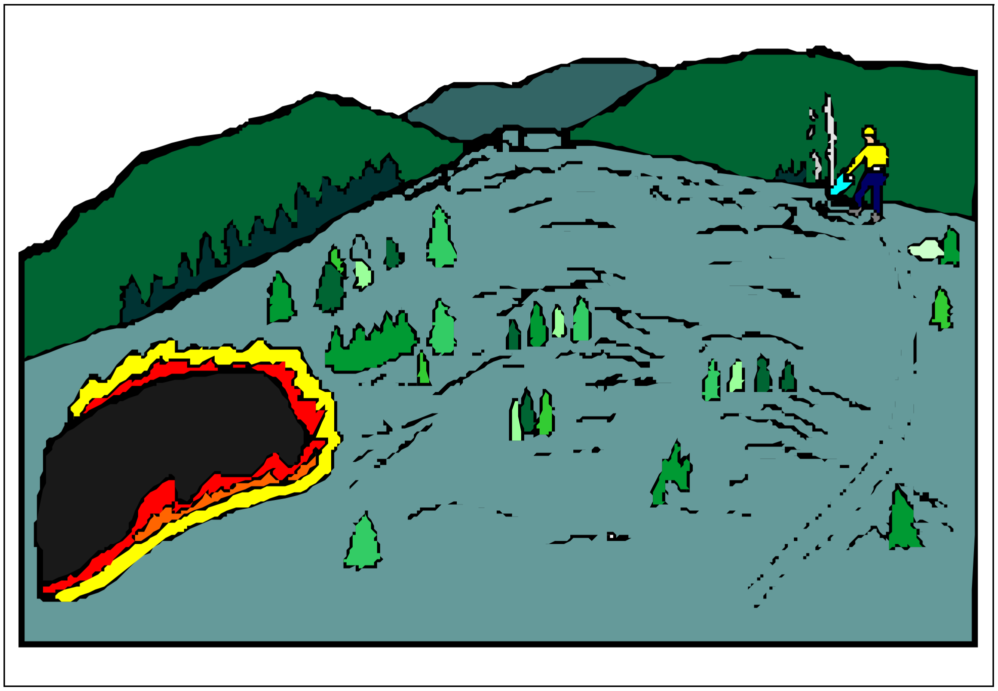

Figure 2-2
Indirect Attack

Immediate Action versus Sustained Effort

Wildland and Wildland/Urban Interface zone fires generally cover large geographic areas and are marked by difficult-to-access areas. If it is necessary to operate at the scene for extended periods, the need to access, extinguish, and thoroughly mop up the fire will consume a significant amount of time and resources. This results in an effort which may take several days or even weeks, which is a significant deviation from standard structural fire attacks.

Mobile Operations versus Static Operations

While structural operations typically focus on one structure or one geographic area, Wildland and Wildland/Urban Interface Fires frequently have several tactical fronts, at several locations.

Structural firefighters will have to adapt to this characteristic and be ready to move at all times. The need to mobilize and relocate rapidly will require structural firefighters to take nontraditional approaches to fire suppression in the wildland. Consider this in maintaining crew integrity, deploying equipment, and positioning apparatus.

EQUIPMENT CONSIDERATIONS

Miscellaneous Equipment

Structural companies called upon frequently to respond to wildland fires may want to investigate the possibility of carrying equipment, e.g., a portable pump, scraping and cutting tools, lightweight, smaller diameter hose, and Class "A" foams.

Maps

When structural firefighters are asked to respond outside of their initial response areas to Wildland and Wildland/Urban Interface Incidents, they should consider equipping themselves with appropriate maps. While street and road maps are basic, choosing and carrying appropriate topographical maps also is encouraged. Topographical maps provide a graphic view of the terrain and may include water sources not found on local maps.

Aircraft

Fixed and rotary wing aircraft, primarily air tankers and helicopters, frequently are used at the scene of Wildland and Wildland/Urban Interface Incidents to drop/apply retardants and water, and to transport personnel. Specific training for the operation and support of such aircraft is available in a host of other references. These units constitute a unique danger to incident personnel, and care must be taken when operating in proximity to this equipment.

Personal Service Needs

<u>Cash/Credit Cards</u>

Upon receipt of dispatch, structural CO's should inventory their crews for both cash and personal credit cards, which will be needed to purchase nonissued items at the scene, and for travel expenses, and luxury items. Department credit cards also may be needed to fuel apparatus en route to or when returning from the incident, or for minor repairs (tires, windshield wipers, etc.).

Clothing

Crew members should be instructed by the CO's to include at least a change of clothing and personal hygiene items with their turnout gear. Uniformed members may wish to pack civilian clothing in addition to uniforms. These items may be needed if the incident lasts longer than 12 hours.

Food

It needs to be reinforced that personnel who respond to and work at the scene of Wildland and Wildland/Urban Interface Fires may not be fed for up to 24 hours. Firefighters will need to locate their own meals before a base camp facility is established.

SUMMARY

The wildland fire environment may be different than the structural environment. Tactical approaches, equipment, and communication concerns all have considerations unique to the wildland fire environment.

UNIT 3: WILDLAND FIRE BEHAVIOR

TERMINAL OBJECTIVE

The students will be able to evaluate the impact of fire behavior and weather on the safety of operations at a Wildland or Wildland/Urban Interface Incident.

ENABLING OBJECTIVES

The students will:

1. *Describe factors that affect the start and spread of wildland fires.*
2. *Describe fuel considerations in Wildland and Wildland/Urban Interface Incidents.*
3. *Describe topography considerations in Wildland and Wildland/Urban Interface Incidents.*
4. *Describe weather considerations in Wildland and Wildland/Urban Interface Incidents.*
5. *Recognize situations that indicate problem or extreme wildland fire behavior.*

WHY ARE FIRE BEHAVIOR AND WEATHER CONSIDERATIONS IMPORTANT TO THE STRUCTURAL FIRE COMPANY OFFICER?

The information contained in this unit is essential to the structural firefighter when involved in operations at the scene of Wildland and Wildland/Urban Interface Incidents. The rate of spread and fire behavior of these types of fires can be predicted using the information contained in this unit. Knowledge of how the fire will behave when coupled with basic weather information can be used to assure the safety and survival of firefighters. Therefore, a thorough understanding of these elements and how they relate to these types of incidents will prepare better the structural firefighter to deal with the fire environment and to provide for firefighter safety at the scenes of Wildland and Wildland/Urban Interface Incidents.

Fuel, weather, and topography affect fire behavior, and fire behavior will affect the strategy selected and the tactics used, as well as safety.

Fire Triangle

While the fire triangle is part of every firefighter's basic training, it is important to review its importance at this time. Just as all fires must adhere to the laws of the fire triangle, so must Wildland and Wildland/Urban Interface Fires. There must be fuel to burn; air to supply oxygen for the flame; and heat both to start and to continue the combustion process. Eliminate any one part of this triangular model and there can be no fire. As you know, structural fire attack is based predominately upon the elimination of the heat factor (cooling with water). In wildland firefighting, the elimination of the fuel is used frequently to extinguish the fire. In other cases, retardants, or Class "A" foams, are used to eliminate the oxygen from the fuel.

Heat Transfer

There are several methods where heat can be supplied to a fuel to start the fire process. These methods can be applied either accidentally or with criminal/malicious intent. Matches, lightning, and carelessly discarded cigarettes are only a few examples of heat transfer methods. It is important in the Wildland/Urban Interface Incident that we know how the fire continuously spreads once it has started.

We know that heat must move from one burning piece of fuel to another or the fuel component of the fire triangle will be broken. We call this movement heat transfer. There are three methods for the transfer of heat from one object (fuel) to another: radiation, convection, and conduction.

Let's take a look at each of these for a quick review, and to link them to Wildland and Wildland/Urban Interface firefighting.

Radiation

Think of radiant heat as a heat ray or wave. Just as radiant heat warms you as you stand close to a campfire, it can heat and dry surrounding fuels and ignite them at wildland fires. At times, the heat from such fires can cause a phenomenon known as "area ignition." This occurs when objects, preheated by the approaching fire, reach their ignition temperatures and suddenly "burst" into flame. This process can be witnessed when combustible roofs and sidings are heated to their combustion temperatures.

Convection

Transfer of heat through convection occurs when the lighter hot air from a hostile fire moves upward. The hot gases, and sometimes associated embers, dry and raise the ignition temperature of other fuels. Frequently such causes of ignition can be observed when fires spread vertically to fuels on higher ground.

Conduction

This transfer process occurs when heat is conducted from one fuel to another. The transfer medium does not always have to be a fuel; it could be a noncombustible object such as a metal pipe or a metal support beam. Since wood is a poor conductor (i.e., heat will not travel through it easily), this process is viewed as the least important of the three to fire behavior.

FACTORS THAT AFFECT FIRE BEHAVIOR

Fuel, Topography, and Weather

There are three primary contributors to the spread of wildland fires: fuel, topography, and weather. Either separately or in combinations of two or more, these elements, coupled with basic fire spread characteristics, will determine the direction and speed of the fire. Through careful evaluation of these elements, it will be possible to gain enough insight to predict accurately when, where, and how a fire will spread. Such information is absolutely critical for preparing to provide for the safety of structural firefighters and for the development of the overall strategy and techniques necessary to deal with a given Wildland/Urban Interface Fire situation.

FUEL

Fuel factors that affect the start and spread of wildland fires include

- fuel moisture;
- size and shape;
- fuel loading;
- horizontal continuity; and
- vertical arrangement.

Fuel Types

A simple definition of fuel in the wildland environment is any combustible material. Wildland fuels can be defined further as live or dead plant material. The wildland firefighting community has categorized fuels into the various types described below. You will note that each fuel is very simply categorized by the primary fuel that carries the fire. Types of fuels vary in nature from one area of the country to another and even within the same area. There are four major fuel types.

1. **Grass**: found in most areas, but more dominant as a fuel in desert and range areas where other types of fuel are less prevalent. It can become prevalent in the years after a fire in formerly timbered areas.

2. **Shrub (brush)**: found throughout most areas of the United States. Some examples of highly flammable shrub fuels are the palmetto/ gallberry in the Southeast, sagebrush in the Great Basin, and chaparral in the Southwest.

3. **Timber litter**: This type of fuel is most dominant in mountainous topography, especially in the Northwest.

4. **Logging slash**: Found throughout the country, this is the debris left after logging, pruning, thinning, or shrub-cutting operations. It may include logs, chunks, bark, branches, stumps, and broken understory trees or shrubs.

Fuel Characteristics

Regardless of the type of fuel, fire behavior is dependent on the characteristics of the fuel **at the time of the incident**. In this unit, we will concentrate on the following characteristics: fuel moisture, size and shape, fuel loading, horizontal continuity, and vertical arrangement.

Fuel Moisture

Fuel moisture is the amount of water (moisture) in a fuel. This measurement is expressed as a percentage. The higher the percentage, the greater the content of moisture within the fuel. How well a fuel will ignite and burn is dependent, to a large extent, on its moisture content. Dry fuels will ignite and burn much more easily than the same fuels when they are wet (contain a high moisture content). As fuel's moisture content increases, the amount of heat required to ignite and burn that fuel also increases. Remember that light fuels take on and lose moisture faster than heavier fuels.

- Wet Fuels: fuels that have a high moisture content because of exposure to precipitation or high relative humidity.
- Dry Fuels: fuels that have a low moisture content because of prolonged exposure to sunshine, dry winds, drought, or low relative humidity.

Size and Shape

The physical characteristics of fuel. Basically, fuels can be divided into two categories on the basis of their size and shape.

1. Light fuels such as shrubs, grasses, leaves, and pine needles (any fuel having a diameter of one-half inch or less) burn rapidly and are quickly ignited, as they are surrounded by plenty of oxygen. Fires in light fuels spread rapidly but burn out quickly, are easily extinguished, and fuel moisture changes more rapidly than in heavier fuels.

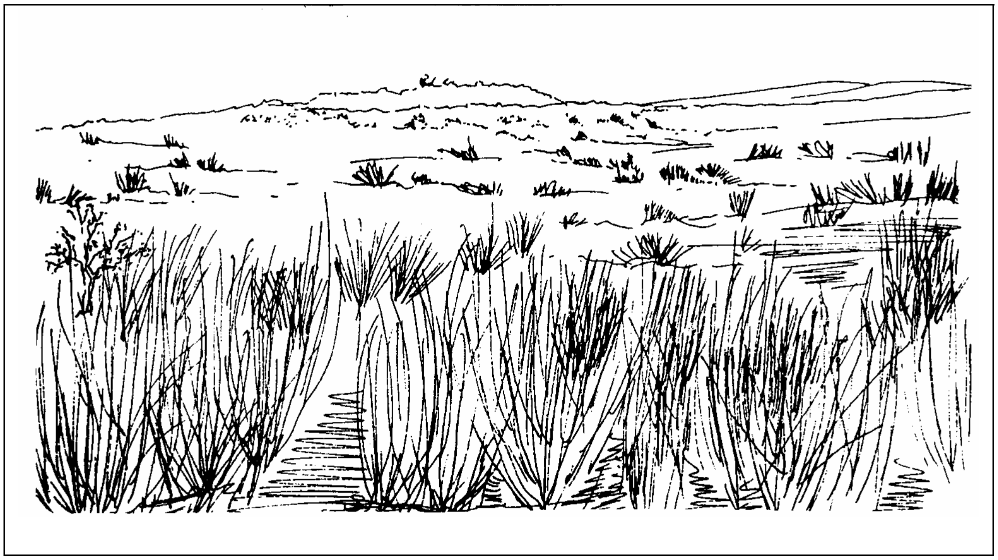

Figure 3-1
Light Fuels

2. Heavy fuels such as limbs, logs, and tree trunks (any fuel one-half inch or larger in diameter) warm more slowly than light fuels, and the interiors are exposed to oxygen only after the outer portion is burned.

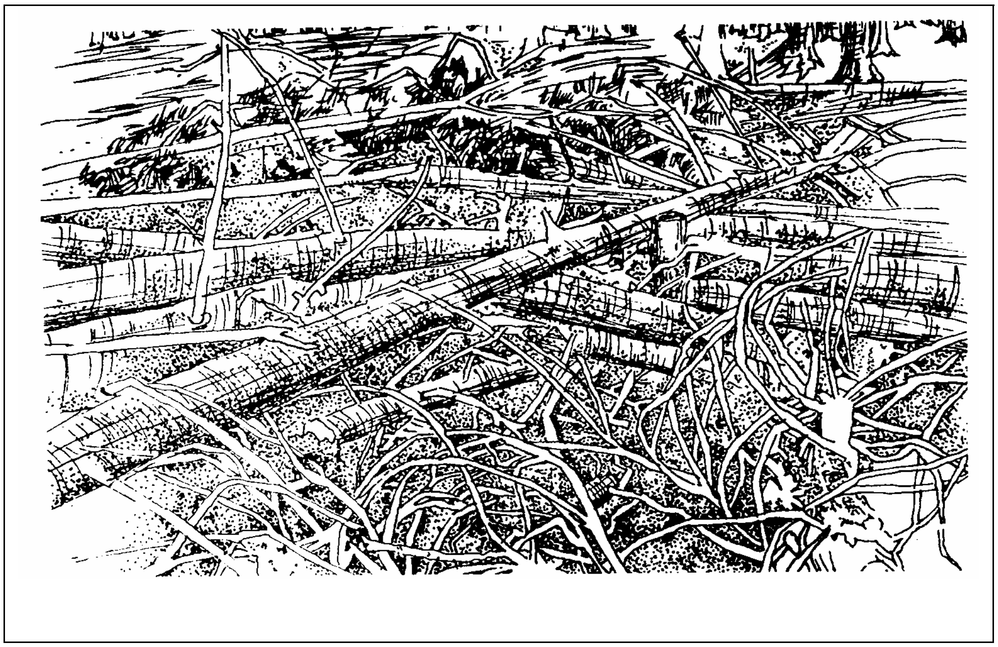

Figure 3-2
Heavy Fuels

Fuel Loading

Fuel loading is the quantity of fuels in a given area. The loading of the fuels in any given area does not necessarily mean the fire will burn with great intensity.

Horizontal Continuity and Vertical Arrangement

These two definitions refer to the physical arrangement of fuels as related to their positioning over a certain area. Horizontal continuity and vertical arrangement can be broken down into many different fuel types:

Horizontal Continuity

- **Uniform fuels** include all of the fuels distributed continuously over an area. Areas containing a network of fuels that connect with each other to provide a continuous path for a fire to spread are included in this category.

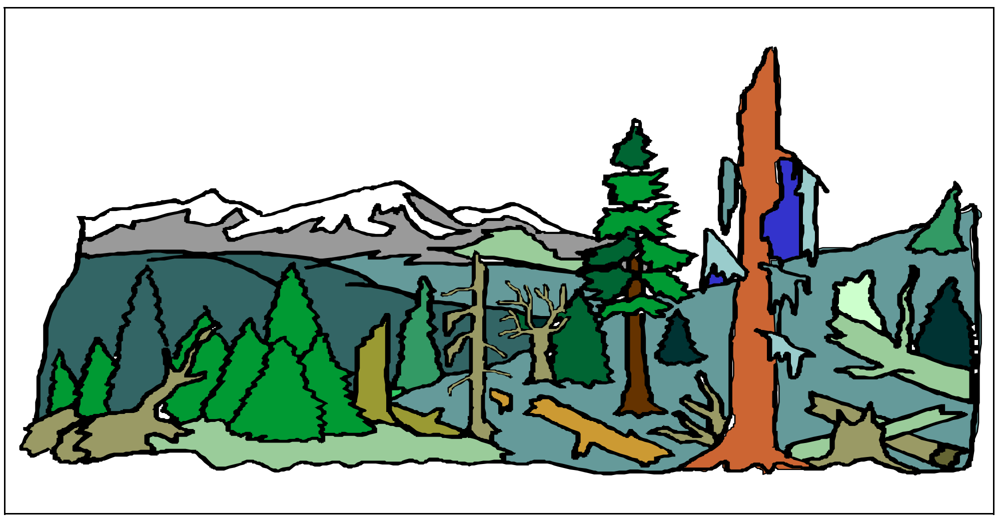

Figure 3-3
Uniform Fuels

- **Patchy fuels** include all fuels distributed unevenly over an area, or as areas of fuel with definite breaks or barriers present, such as patches of rock outcroppings, bare ground, swamps, or areas where the dominant type of fuel is much less combustible.

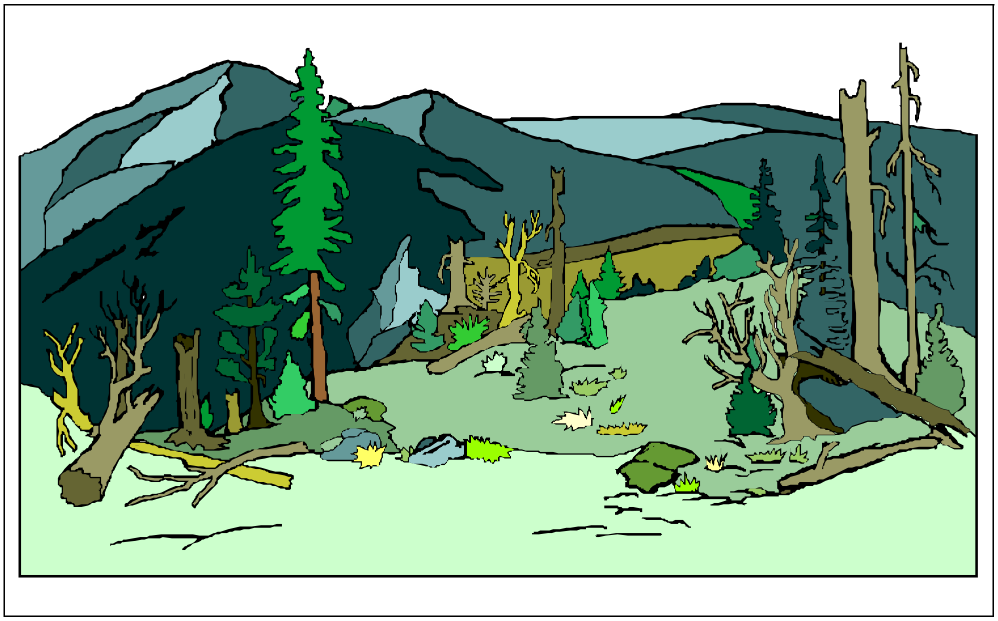

Figure 3-4
Patchy Fuels

Vertical Arrangement

- **Ground/Subsurface fuels** are all of the combustible materials lying beneath the surface, including deep duff, tree roots, rotten buried logs, and other organic material.

- **Surface fuels** are all of the combustible materials lying on or immediately above the ground, including needles or leaves, duff, grass, small deadwood, downed logs, stumps, large limbs, and low shrubs.

- **Aerial fuels** are all of the green and dead materials located in the upper canopy, including tree branches and crowns, snags, hanging moss, and tall shrubs.

AERIAL FUELS: All green and dead materials located in the upper forest canopy including tree branches and crowns, snags, moss, and high shrubs.

SURFACE FUELS: All materials lying on or immediately above the ground including needles or leaves, duff, grass, small dead wood, downed logs, stumps, large limbs, and low shrubs.

GROUND/SUBSURFACE FUELS: All combustible materials lying beneath the surface including deep duff, roots, rotten buried logs, and other organic material.

Figure 3-5
Vertical Arrangement of Fuels

While we are all familiar with the typical "brush fire," we should understand that such an incident is actually a surface fire. A surface fire consumes the litter, debris, small shrubs, and other vegetation that are close to the ground.

Ground fires are defined as those fires which actually are burning the organic and combustible materials beneath the surface, such as a peat fire.

An example of the "crown fire" is one that burns through the tops of trees or shrubs. This type of fire is extremely dangerous because it can advance in conjunction with, or be independent of, the surface fire.

FACTORS OF TOPOGRAPHY THAT AFFECT THE START AND SPREAD OF WILDLAND FIRE

Topography is the configuration of the earth's surface, including relief and position of the natural and manmade features. It is much easier to predict the influences that topography will have on a fire than to predict the influences of fuel and weather. The principles that affect the spread of wildland fire apply equally whether the variations in elevation and topography are minimal or extreme (hills or mountains). These principles are valid and contribute wherever there is any variation in elevation. The following are a few topographic terms and principles to assist the structural fire officer at the scene of Wildland/Urban Interface Incidents.

Topographic Definitions

Aspect: the direction a slope is facing in relationship to its exposure to the sun. The aspect of a slope generally determines the amount of heating it gets from the sun and therefore the amount, condition, and type of fuels present. South and southwest slopes normally are exposed directly to sunlight and generally have sparse, light fuels, higher temperatures, lower humidity, and lower fuel moisture. South and southwest slopes are the most critical in terms of the start and spread of fire. North-facing slopes, being more shaded, have more and heavier fuels, lower temperatures, higher humidities, and higher fuel moisture.

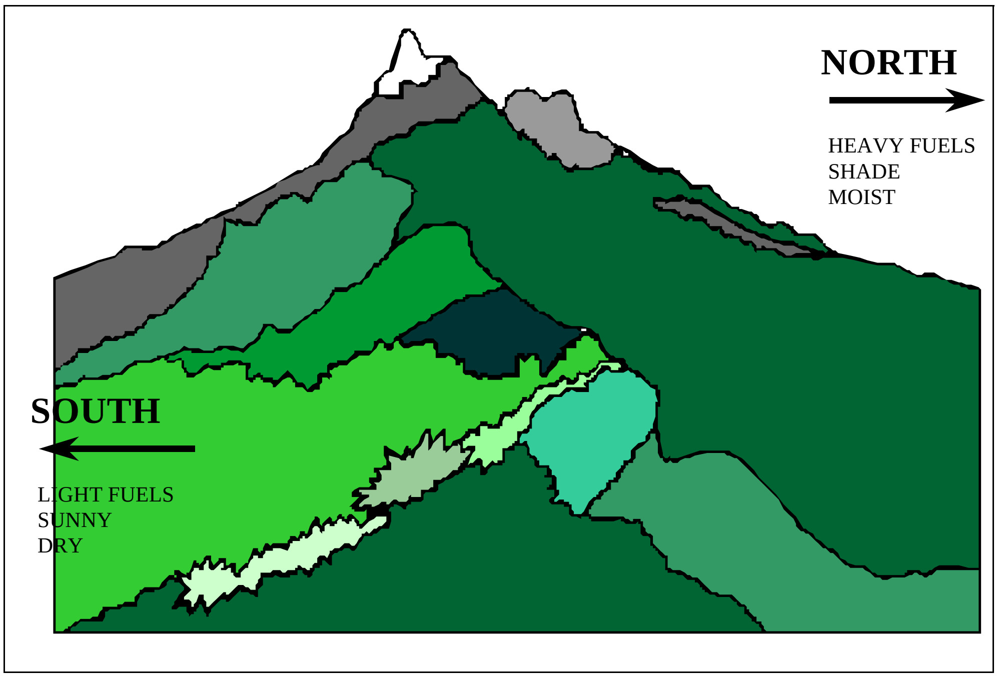

Figure 3-6
Aspect

Slope: the amount or degree of incline of a hillside (e.g., a steep slope). Fires burn more rapidly uphill than downhill. The steeper the slope, the faster the fire burns. This is because the fuels above the fire are brought into closer contact with the upward-moving flames. Convection and radiant heat help the fuel catch fire more easily.

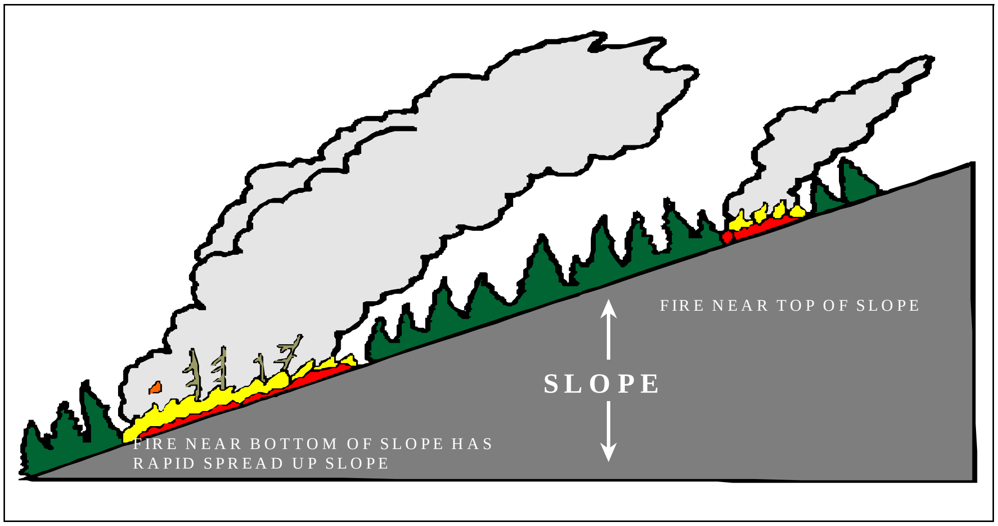

Figure 3-7
Slope

A major concern when working with fires on steep slopes is the possibility of burning material rolling downhill that can ignite fuel below the main fire.

The position of the fire in relation to the topography is a major factor in the resulting fire behavior. A fire on level ground is influenced primarily by the fuels and wind. A fire that starts near the bottom of a slope during normal upslope, daytime wind conditions normally will spread faster and burn more area than a fire that starts near the top of the slope, because it has a longer uphill run.

"The Shape of the Country"

Box canyons, narrow canyons, and other rugged topographic features can influence the wind's speed and direction. The shape of the country also can influence the direction of fire spread, rate of spread, and the intensity of wildland fires.

Box canyons: Fires starting near the base of box canyons and narrow canyons may react similarly to a fire in a wood-burning stove or fireplace. Air will be drawn in from the canyon bottom creating very strong upslope drafts. These upslope drafts create rapid fire spread up the canyon. **This effect can result in extreme fire behavior and can be very dangerous to firefighters.**

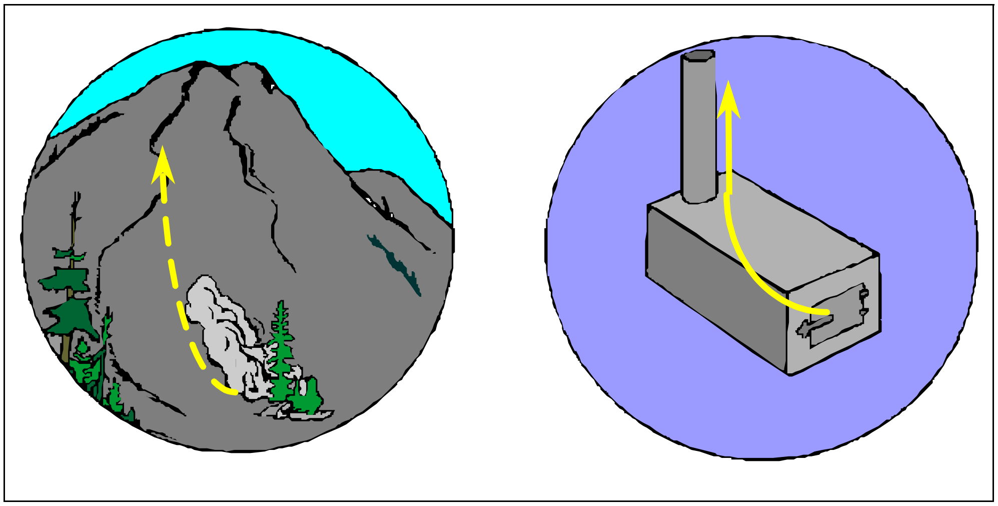

Figure 3-8
Box Canyon and Chimney Effect

Narrow canyons: Fire in a steep, narrow canyon can spread easily to fuels on the opposite side by radiation and spotting. Wind direction normally will follow the direction of the canyon. Wind eddies and strong upslope air movement may be expected at sharp bends in a canyon.

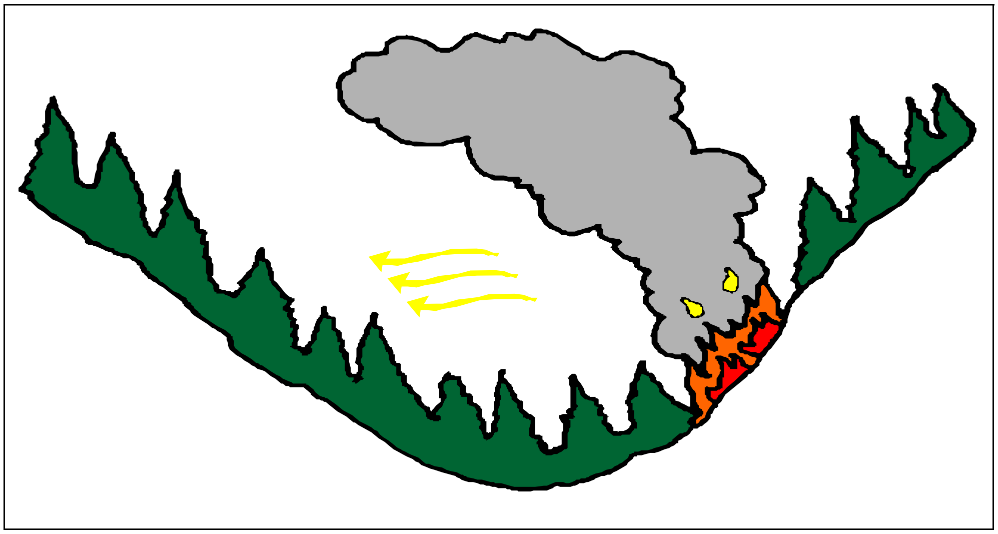

Figure 3-9
Radiant Heat Across Narrow Canyon

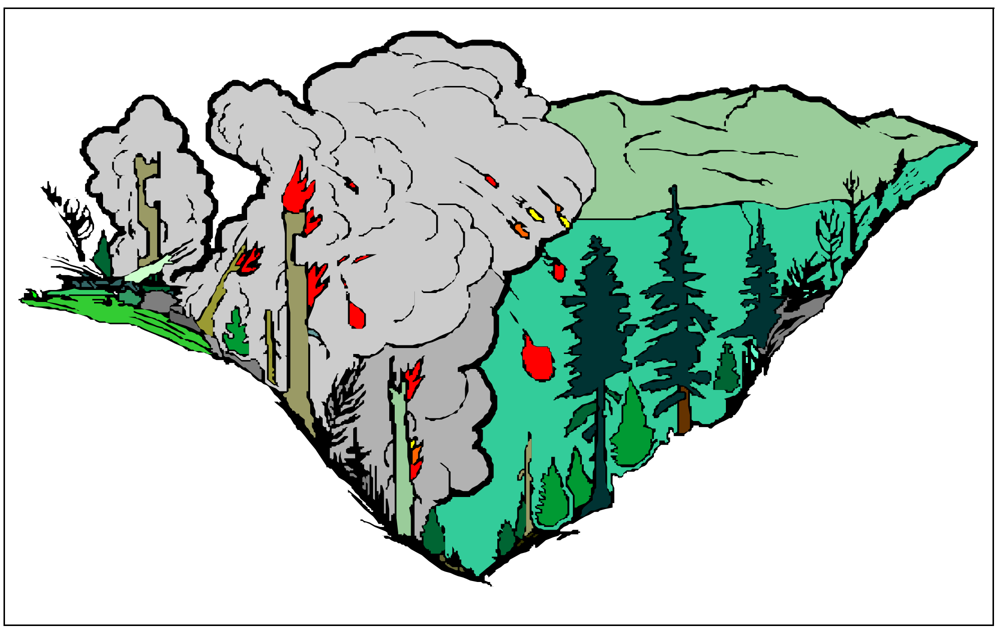

Figure 3-10
Spotting Across Narrow Canyon

Wide canyons: Prevailing wind direction can be altered by the direction of the canyon. Cross-canyon spotting of fires is not common except in high winds. Strong differences will occur between general fire conditions on north and south aspects.

Ridges: Fires burning along lateral ridges may change direction when they reach a point where the ridge drops off into a canyon. This change of direction is caused by the flow of air in the canyon. In some cases, a whirling (eddying) motion by the fire may result from a strong flow of air around the point of a ridge. These push fire in many directions.

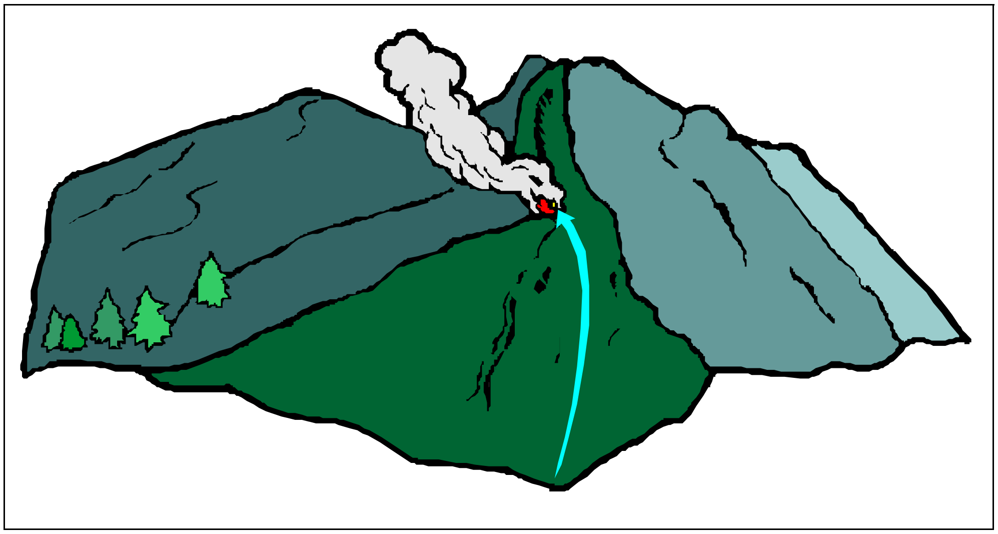

Figure 3-11
Fire Burning on Lateral Ridge to Canyon

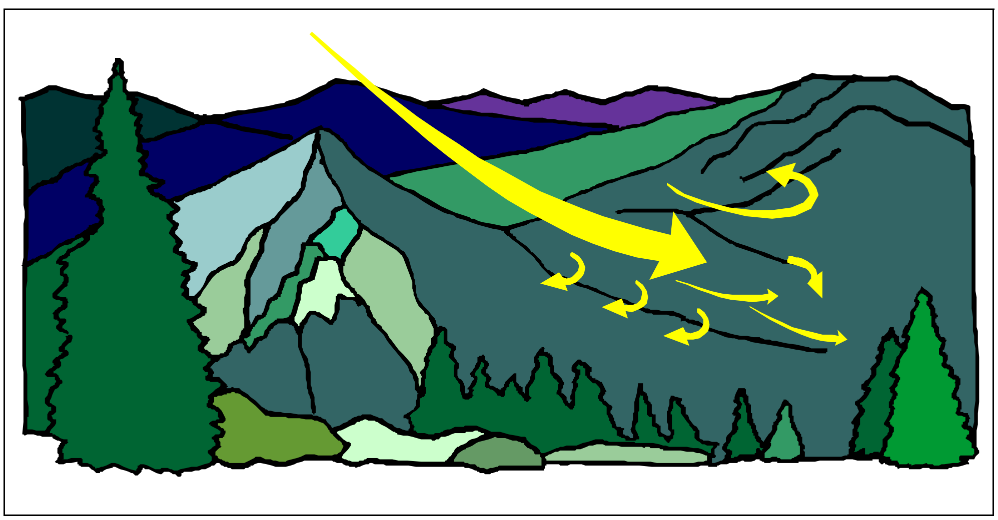

Figure 3-12
Mountains Cause Channeling of Wind

Saddles: Wind blowing through a saddle or a pass in a mountain range can increase in speed as it passes through the constricted area and spreads out on the lee (downwind) side with a probable eddy action.

Elevation: the height of the terrain above mean sea level, usually expressed in feet. Elevation plays a large role in determining the condition and the amount of fuel. Fuels at lower elevations are exposed to higher temperatures and dry out earlier in the year than those at higher elevations. In extremely high elevations, such as high mountain peaks and ridges, fuels may be completely absent. Elevation affects fire behavior in several other ways, such as the amount of precipitation received, the exposure to winds, and the relationship to the surrounding terrain.

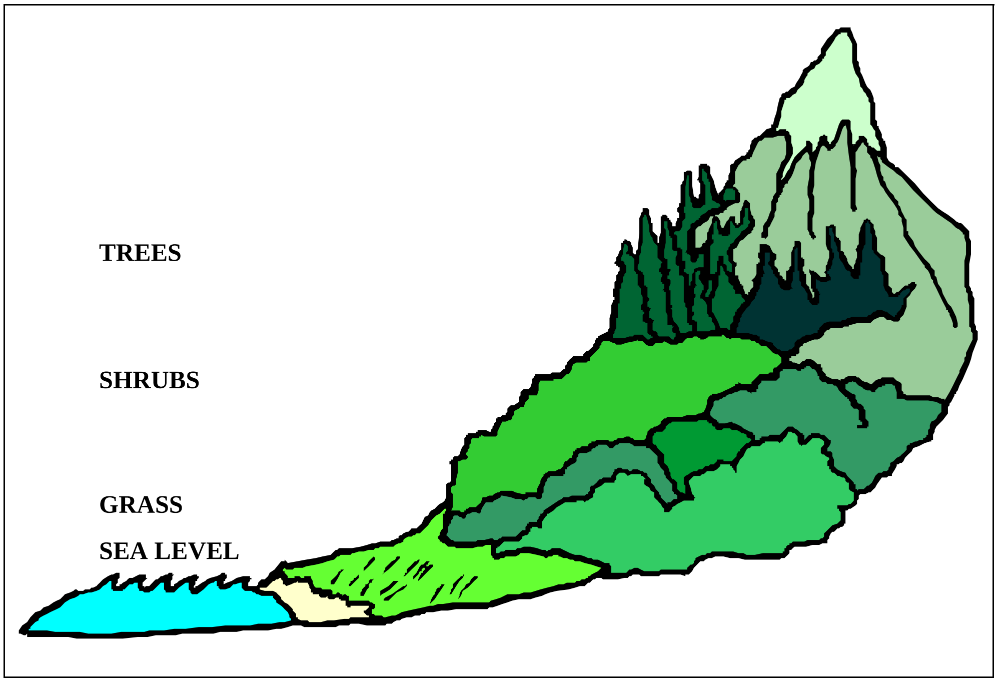

Figure 3-13
Elevation

Barriers: any obstruction to the spread of fire; typically an area or strip devoid of flammable fuel. Barriers to fire include many things, both natural and manmade. Natural barriers include rivers, lakes, rock slides, and some fuels whose moisture content or other characteristics do not burn as well as others in the same area. Manmade barriers include roads, highways, reservoirs, and the fire line that you build.

Figure 3-14
Natural Barrier

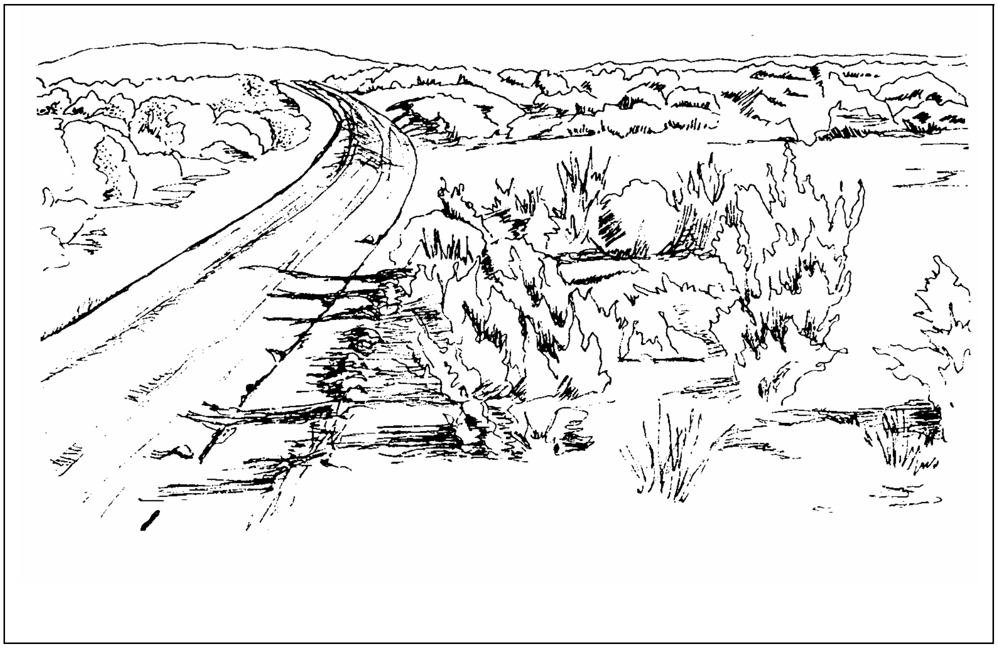

Figure 3-15
Manmade Barrier

WEATHER FACTORS

Weather is difficult to understand because it is changing constantly and is difficult to predict. Like fuels, there are terms and processes that need to be understood. It is not the intent of this course to make a weatherperson out of every structural fire Company Officer (CO). Instead, this section is designed to provide a basic overview of those weather factors that have a direct impact on the safety and survival of operations personnel and on the behavior of the wildland fire. We will concentrate on the following basic principles of weather as they relate to fire behavior.

Temperature

As we all know, the main source of heat for outside air is the solar energy provided by the sun. Fuel and ground temperatures are affected by the amount of direct radiation received from the sun. The surface air temperature rises or cools because of contact with the ground. An elevated ground temperature results in higher fuel temperatures, which make it easier for fuels to burn. In some cases, there can be as much as 50 or more degrees difference between fuel temperatures in the sun versus those in the shade. Heated fuels will burn much more readily than those fuels of the same type at lower temperatures.

Wind

Wind is the horizontal movement of air relative to the surface of the earth. Wind is one of the most important influences on fire behavior, influencing both combustion and the speed of fire spread. Any increase in windspeed will increase the rate of fuel combustion and the rate of fire spread significantly, creating immediate threats to firefighter safety. This change is accomplished by:

- increasing the supply of oxygen;
- influencing direction of fire spread;
- drying the fuels through constant air movement;
- carrying sparks and firebrands ahead of the main fire; and
- preheating fuels ahead of the fire by pushing heated air ahead of the fire.

Weather forecasts always identify the direction the wind is coming from. In general, winds will play a significant part in all decisions that are made relative to a Wildland/Urban Interface Incident. Not only do present weather conditions need to be evaluated carefully, but also the impact of predicted weather conditions. Weather factors need to be evaluated constantly against the overall Incident Action Plan (IAP).

General or Gradient Winds

Large-scale winds caused by high- and low-pressure systems are referred to as general or gradient winds. Generally, these winds are influenced and modified in the lower atmosphere by terrain. In general, the primary direction of the fire will be determined by the direction of the prevailing wind. It is important to remember that wind direction is determined by the direction from which the wind is blowing, i.e., a north wind means that the wind is blowing from the north.

Cold Fronts

A cold front is the boundary line of a cooler air mass that is replacing a warmer air mass. This replacement process is accompanied in all cases by winds. These winds can range from minimal to extreme, predicated on the temperature deviation between the two fronts. **It is also a distinct possibility that the direction of the wind and the wind speed will change with the arriving cold front.**

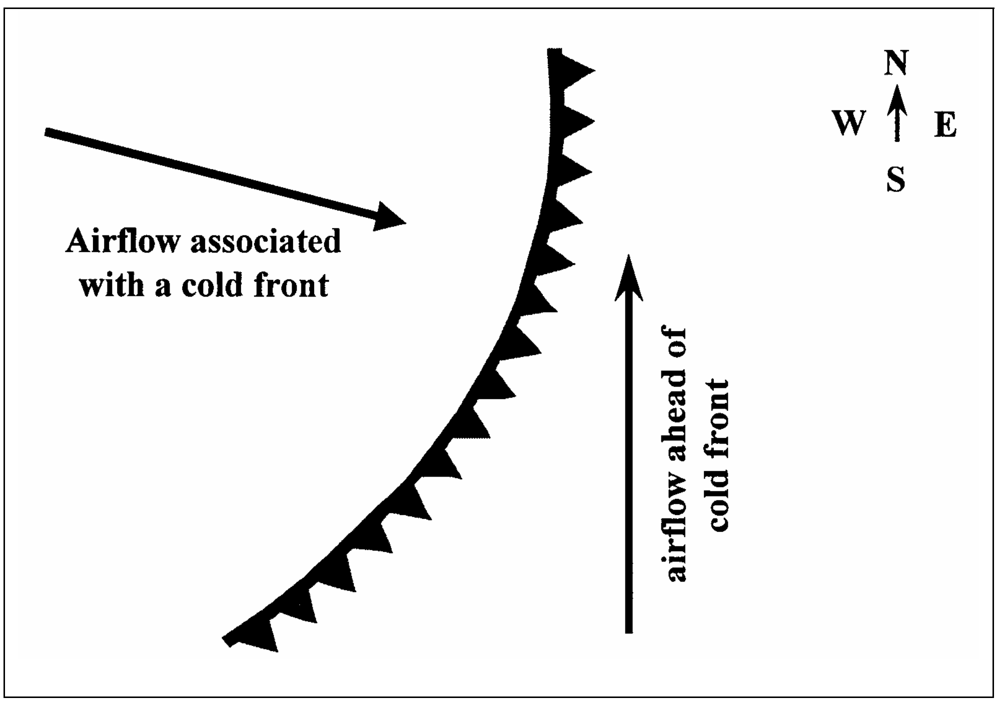

Figure 3-16
Cold Front Winds

Foehn Winds

These are dry types of winds with strong downward components, very much like the lee (downwind side) winds normally associated with mountain ranges. They are usually, but not always, warm for the season.

Foehn winds frequently reach speeds of 40 to 60 mph, but have been known to reach speeds as high as 90 mph. These winds can persist for days. Relative humidity usually will drop with the onset of foehn winds, and there will be a noticeable decrease in fuel moisture content. Foehn winds are commonly found in areas of the western United States and the Appalachian Mountains.

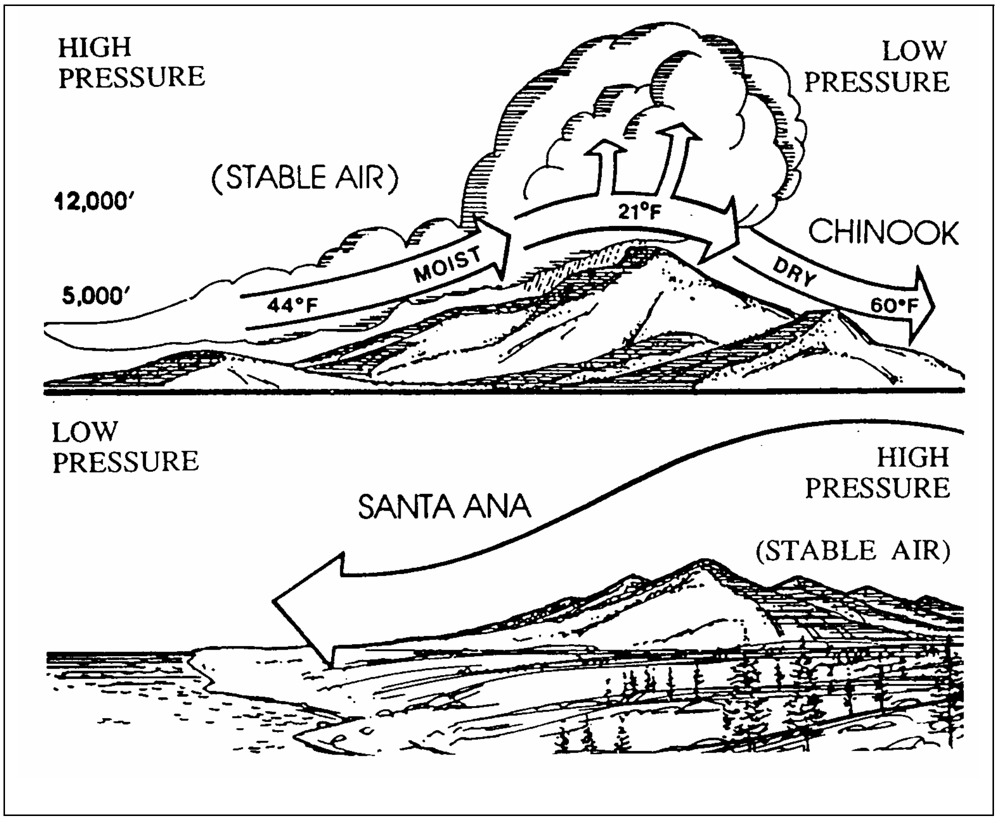

Figure 3-17
Foehn Winds

Thunderstorms

These storms are produced by a cumulonimbus cloud, and always are accompanied by lightning and thunder, usually attended by strong wind gusts, heavy rain, and, in some cases, hail. Thunderstorms are usually of short duration with 2 to 3 hours for any one storm being viewed as unusual.

Downdraft winds from thunderstorms that reach the ground usually spread radically in all directions. These wind velocities often will be 25 to 35 mph and can reach as high as 60 mph.

Thunderstorms can be potentially dangerous to firefighters at the scenes of Wildland/Urban Interface Fires.

- A thunderstorm produces strong, gusty surface winds affecting the direction that the fire will burn.

- Downdraft winds will be quite erratic but always away from the thunderstorm.

- Thunderstorms produce lightning, which can be dangerous.

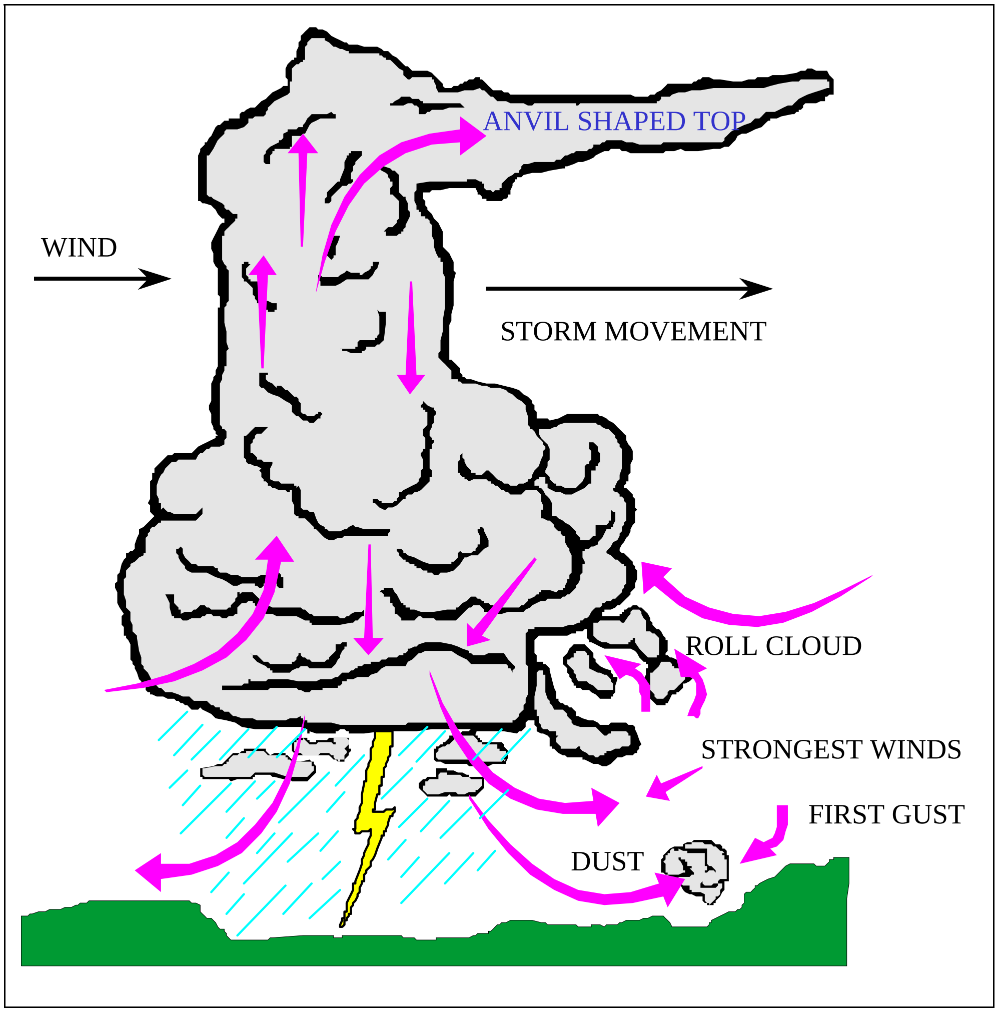

Figure 3-18
Thunderstorm

Local Winds

A local wind is named because of the effect that local temperature differences and terrain have on its creation. As the term implies, these winds are characteristic of local areas or regions. They are characterized by general wind conditions, which, over a long period of time, have become predictable, based on the time of day, the month, or the season.

Sea and Land Breezes

Sea breeze: a daytime breeze in which cooler air from high pressure over the coastal waters moves onshore to replace heated air rising off the warmer land mass. Typical windspeed is between 10 and 20 mph. However, windspeed can attain 20 to 30 mph along the California, Oregon, and Washington coasts.

Land breeze: a light nighttime breeze which originates over the relatively cool land surface and flows out over the warmer coastal waters. Typical windspeed is between 3 and 10 mph.

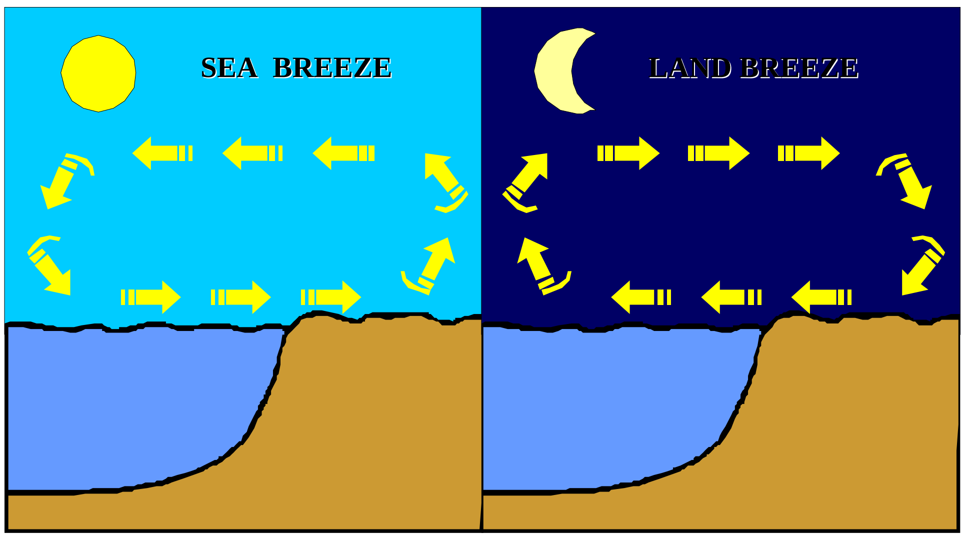

Figure 3-19
Sea and Land Breezes

Slope Winds

Local wind conditions also are found in mountainous areas where the differential effects of heating and cooling occur. Firefighters refer to this as slope wind. The general pattern is to have upslope winds during the day and downslope winds at night. There are some exceptions, but usually they involve local areas. Local firefighters usually will be aware of these prevailing wind conditions, so they should be used as a resource.

Generally speaking, the south-facing slopes warm more during the day than do slopes of other aspects (topographical position of the slope). This causes stronger updrafts during the day. Different surfaces will absorb different amounts of heat. The air flows from the cooler to the warmer surfaces.

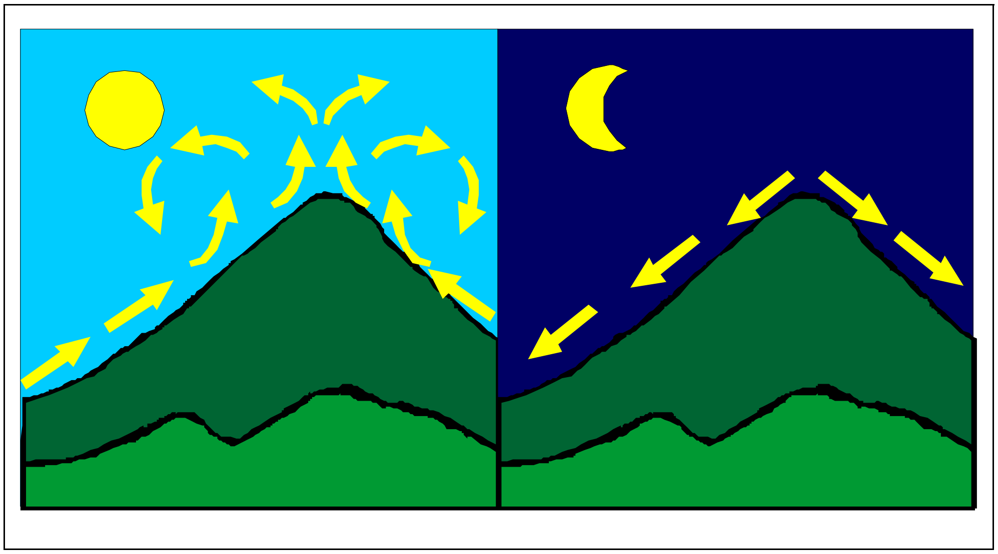

Figure 3-20
Slope Winds

Upslope Winds

Under light general wind conditions, air flows up the slope during the day.

- Warm air rises. The air in the valleys becomes warmer than the air on the mountain top and thus rises.
- Maximum upslope winds occur about midafternoon.

Downslope Winds

Under light general wind conditions, air flows down the slope at night. Usually these winds are no stronger than 2 to 5 mph, whereas upslope winds often are 3 to 8 mph. This is one reason why fire spreads faster uphill. The change of air from upslope to downslope usually is gradual, so the air may become calm for an hour or more during the change.

- Cold air sinks. The air along the mountain tops at night cools faster than the air in the valley.

- Maximum downslope flow occurs after midnight.

Slope winds can be dangerous, especially during the midafternoon when upslope winds are at their peak. Sudden changes in wind direction can cause a fire burning on a slope to spread rapidly.

During the evening hours, if the downslope wind flow is strong enough, a fire burning on a slope could reverse direction and begin burning downhill. Night downslope winds seldom produce dangerous conditions, but if augmented by foehn wind conditions, the danger to firefighters increases.

Valley Winds

Valley winds are the result of temperature differences between the air in the valley and the air at the same elevation in the adjacent plain. Valley winds flow upvalley during the day and downvalley at night. Upvalley winds start later in the day than upslope winds, typically late morning, and reach speeds of 10 to 15 mph during the afternoon. Downvalley winds begin a few hours after dark and reach speeds of 5 to 10 mph.

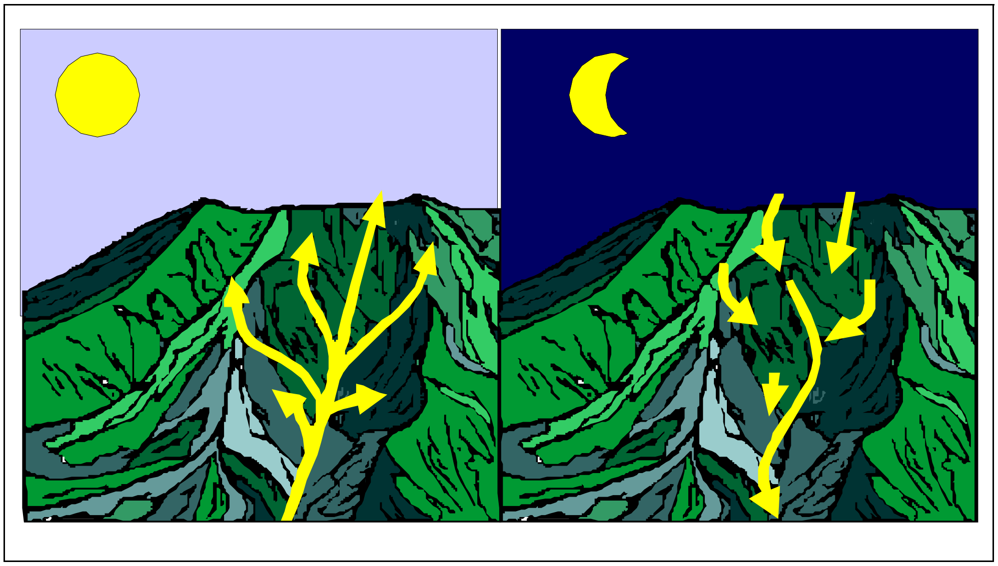

Figure 3-21
Valley Winds

Relative Humidity

This refers to the ratio of the amount of moisture in the air to the amount of moisture which the air could hold at the same temperature and pressure if it were saturated; usually expressed as a percentage. Dead forest fuels and the air always are exchanging moisture. Low humidity takes moisture from fuels; fuels, in turn, take moisture from the air when the humidity is high. Light fuels (e.g., grass) gain and lose moisture quickly with changes in relative humidity. Heavy fuels, on the other hand, respond to humidity changes much more slowly.

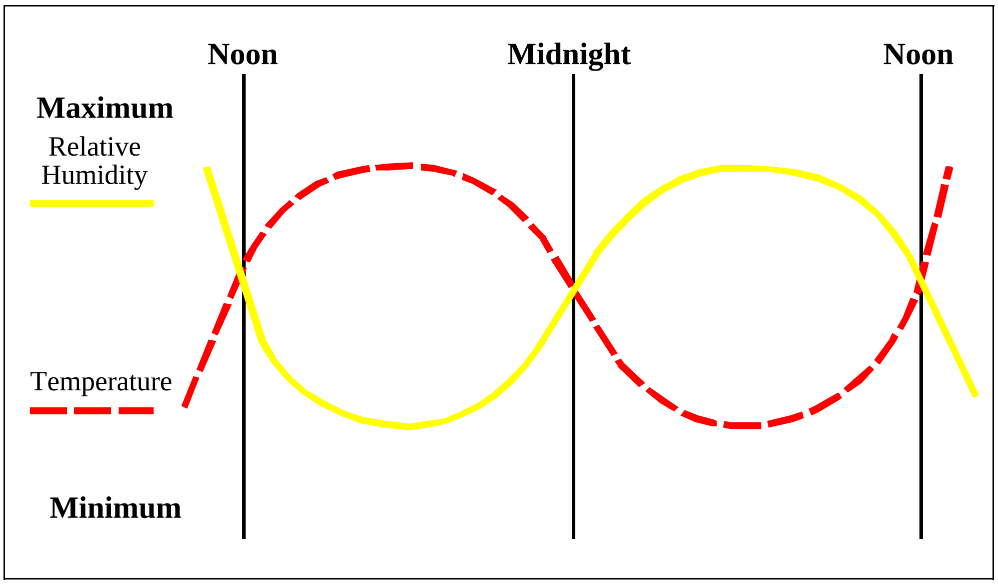

Figure 3-22
Temperature/Relative Humidity Chart

Precipitation

Precipitation is the collective name for moisture, in either liquid or solid form, large enough to fall from the atmosphere (e.g., rain) and reach the earth's surface. Fuel moisture content is affected directly by the amount and duration of precipitation. Fine light fuels are affected most rapidly by precipitation since they gain or lose moisture at an incredibly fast rate. For the most part, fine fuels can make this transition within an hour. Heavy fuels are not affected nearly as drastically since they gain or lose moisture at a much slower rate.

Atmospheric Stability

Stable or Unstable Air

The resistance of air to vertical movement is defined as stable or unstable air stability. When air is unstable, upward motion results in good mixing. When air is stable, there is very little upward motion or even downward motion, which results in poor mixing. Wildland fires burn hotter and with more intensity when the air is unstable.

Visual indicators of stable air:

- clouds in layers;
- stratus-type clouds;
- smoke column drifts apart after limited rise;
- poor visibility due to smoke or haze;
- fog layers; and
- steady winds.

Visual indicators of unstable air:

- vertical cloud growth; smoke rises to great heights;
- cumulus-type clouds;
- gusting winds;
- good visibility; and
- dust devils and firewhirls.

Inversion

This condition is caused by the layer in the atmosphere where the temperature increases with altitude. During an inversion, the smoke and warm gases generated by a wildland fire will rise only until their temperature equals that of the surrounding air; then the smoke will flatten out and begin to spread horizontally because it has lost its lift.

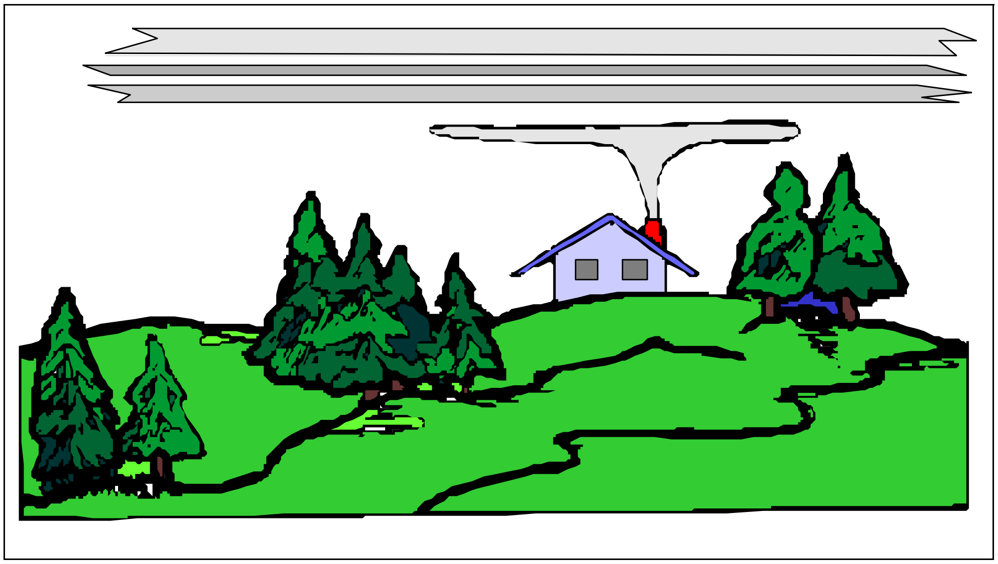

Figure 3-23
Inversion

$$\frac{\text{Warm air}}{\text{Cold air}} = \textbf{Stable condition}$$

$$\frac{\text{Cold air}}{\text{Warm air}} = \textbf{Unstable condition}$$

Inversions forming at night are commonly referred to as "night inversions," or "surface inversions." Night inversions are important to fire behavior and are common during calm, settled weather. They usually are easy to identify because they trap smoke, impurities, and gases, resulting in poor visibility in valleys. When inversions begin to lift or break, the behavior of the fire can be expected to change abruptly to increase the rate of spread and intensity.

Thermal Belt

In mountainous areas, the top of the "night inversion" usually is located below the main ridges of the associated mountains. The height of the warmest air temperature, located at the top of the inversion, can be found by measuring the temperature along the slope. When measured from the top of the inversion, the temperature will decrease as one proceeds farther up or down the slope. This region of warmer air on the middle third of the slope is called the **thermal belt**.

The thermal belt is characterized by the highest minimum temperature and the lowest nighttime relative humidity. Within the thermal belt, wildland fires can remain active throughout the night.

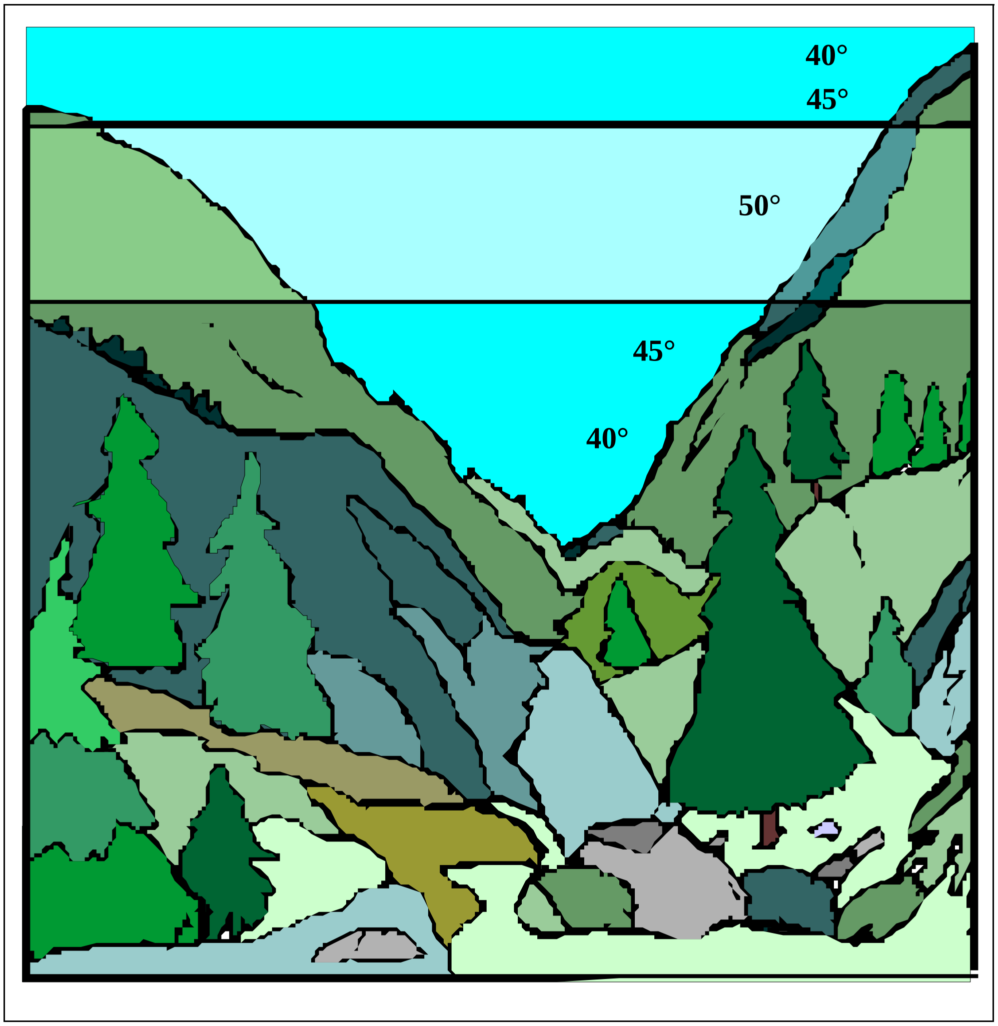

Figure 3-24
Thermal Belt

Subsidence

Subsidence is the large-scale sinking of air associated with high-pressure systems. As air from higher elevations in high-pressure systems descends to lower elevations, it warms and dries. Although the air is stable, subsidence can lead to increased fire activity as this warmer and drier air sinks to the surface. Subsidence is usually a factor in the development of foehn winds.

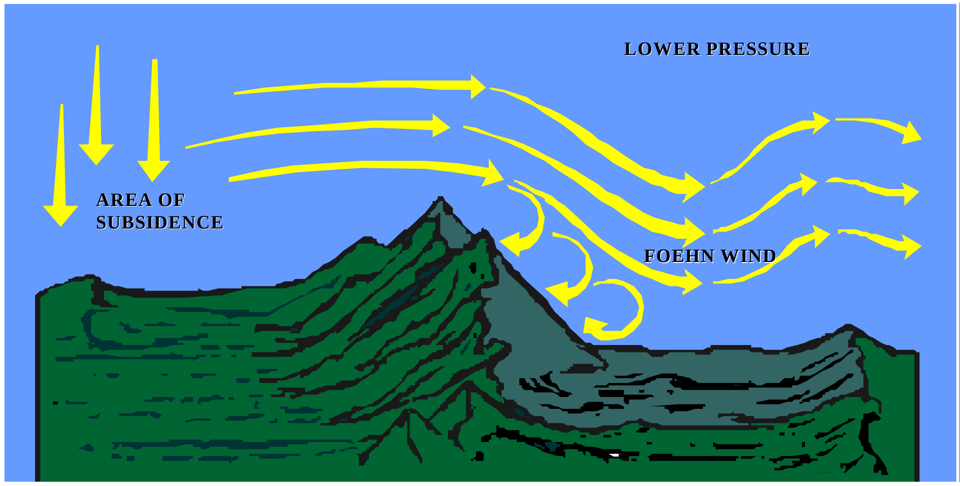

Figure 3-25
Foehn Winds Caused by Subsidence

Dust Devils and Firewhirls

Dust devils are one of the most common indicators of unstable air. They occur on hot days over dry ground when skies are clear and the winds are light. Under intense heating, air near the ground rises in upward-spiraling motions in columns or chimneys. The size of dust devils can range from 10 feet to over 100 feet in diameter with heights from 10 feet to 3,000 or 4,000 feet. Windspeeds in dust devils are often more than 20 mph and, at times, have exceeded 50 mph.

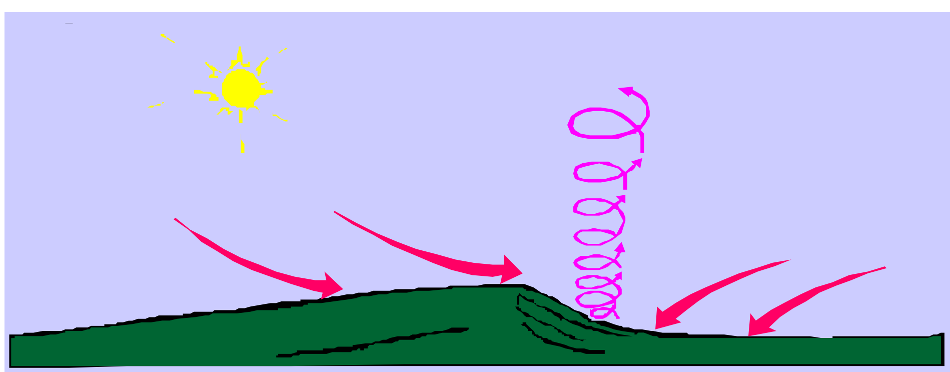

Figure 3-26
Dust Devil Development

Firewhirls, generated by intense fires, have been known to twist off trees more than 3 feet in diameter. They can pick up large burning members and spew them far across the fire line, causing numerous spot fires. Firewhirls occur most often where heavy concentrations of fuel are burning. A favorite area for firewhirl development is on the lee side of ridges. These firewhirls can be generated by the fire itself, not just by weather conditions.

INDICATORS OF PROBLEM AND EXTREME FIRE BEHAVIOR

Problem Fire Behavior

Problem fire behavior is fire activity that presents potential hazards to fire line personnel if the tactics being used for control are not adjusted.

Extreme Fire Behavior

This is the most intense type of fire behavior, and can be described by the specific elements that include

- Rapid rate of spread: the rapid advancement of the flame front from high wind speeds, fuel type changes, and increase in angle of slope.
- Intense burning.
- Spotting: behavior of a fire producing sparks or embers that are carried by the wind and which start new fires beyond the zone of direct ignition by the main fire.
- Crowning: fire advancing from treetop to treetop or shrubs more or less independent of a surface fire.

The prediction or anticipation (proactive behavior) of fire behavior is always the key to good safety and tactical decisions.

Extreme fire behavior has the greatest potential to put the wildland firefighter in jeopardy.

Indicators

These are clues used to size up the fire environment and to predict or anticipate fire behavior. The following are indicators that fire line personnel must monitor continuously.

Fuel Indicators

- Unusually dry fuels.
- Large amount of light fuels (shrubs, grass, needles, moss, etc.) that are continuous.
- Fuels exposed to direct sunlight.
- Fuels dried by prolonged drought.
- Ladder fuels will allow a surface fire to move into the crowns of shrubs or trees.
- Crown foliage dried by surface fire over a large area.
- Concentration of snags.

Topography Indicators

- Steep slopes allow fire to spread faster upslope.
- Chutes, saddles, and box canyons provide conditions for the "chimney effect" to occur.
- Narrow canyons increase the possibility for fire to spread by spotting across drainage.

Weather Indicators

- Strong wind.
- Sudden changes in direction and/or velocity of wind when weather fronts move through the area.

- High clouds moving fast may indicate unusual surface winds to follow.
- Unexpected calm may indicate that winds will shift.
- Thunderstorms, above or in close proximity to a fire, usually lead to dangerous downdraft winds.
- Unusually high temperatures and low relative humidity.
- Dust devils and whirlwinds developing.
- Bent smoke column.

Fire Behavior Indicators

- Keep an eye on the smoke column. This will give you a good idea of the direction of fire spread, location of possible spot fires, and changes in fire intensity.
- Many simultaneous fires starting or smoldering over a large area beginning to pick up in intensity.
- Fire begins to torch small groups of trees or brush.
- Frequent spot fires occurring.
- Firewhirls beginning to develop inside the main fire.
- Crown fires.

Activity 3.1

Factors Influencing Fire Behavior

Purpose

To identify the factors influencing fire behavior.

Directions

1. View the five video segments.

2. Identify the factors influencing fire behavior that are shown in each video segment.

Activity 3.1(cont'd)

Factors Influencing Fire Behavior

Video 1:

Video 2:

Video 3:

Video 4:

Video 5:

UNIT 4: COMMAND AND CONTROL ISSUES OF WILDLAND/URBAN INTERFACE

TERMINAL OBJECTIVE

The students will be able to evaluate the safety and effectiveness of operations at a Wildland/Urban Interface Incident.

ENABLING OBJECTIVES

The students will:

1. *Identify the 18 Watch Out Situations.*
2. *Identify the Ten Standard Firefighting Orders.*
3. *Conduct an incident sizeup, including safety considerations.*

INCIDENT COMMAND SYSTEM

Primary Incident Command System Management Factors

- Command
- Operations
- Logistics
- Planning
- Finance/Administration

The individual designated as the Incident Commander (IC) has responsibility for all functions. That person may elect to perform all functions, or delegate authority to perform functions to other people in the organization. Delegation does not free the IC from overall responsibility.

The principal Incident Command System (ICS) management functions are

Command: The IC is responsible for all incident or event activity. Although other functions may be left unfilled, there will always be an IC.

Operations: The Operations Section is responsible for directing the tactical actions to meet incident operations.

Planning: The Planning Section is responsible for the collection, evaluation, and display of incident information, maintaining status or resources, and preparing the Incident Action Plan and incident-related documentation.

Logistics: The Logistics Section is responsible for providing adequate services and support to meet all incident or event needs.

Finance/Administration: The Finance/Administration Section is responsible for keeping track of incident-related costs, personnel, and equipment contracts associated with the incident or event.

Each of these functional areas can be expanded as needed into additional organizational units with further delegation of authority.

Management by Objectives

Within ICS, management by objectives covers four essential steps. These steps take place on every incident regardless of size or complexity.

1. Understand agency policy and direction.

2. Establish incident objectives.

3. Select appropriate strategy.

4. Perform tactical direction (applying tactics appropriate to the strategy, assigning the right resources, and monitoring performance).

Unity of Chain of Command.

In ICS, Unity of Command means that every individual has a designated supervisor. Chain of Command means that there is an orderly line of authority within the ranks of the organization, with lower levels subordinate to, and connected to, higher levels. In probably 95 percent of incidents, the organizational structure for operations will consist of:

- command; and
- single resources.

However, as incidents expand, the Chain of Command is established through an organizational structure which can consist of several layers as needed:

- Command
- Sections
- Branches
- Divisions/Groups
- Units
- Resources

Establishment and Transfer of Command

Command at an incident is established initially by the highest ranking authority at the scene who/which has jurisdiction for the incident.

Transfer of command at an incident may take place for the following reasons:

- A more qualified person assumes command.

- The incident situation changes over time to where a jurisdiction or agency in command is legally required, or it makes good management sense, to make a transfer of command.

- Normal turnover of personnel on long or extended incidents.

Organizational Flexibility

The ICS organization adheres to a "form follows function" philosophy. In other words, the organization at any given time should reflect only what is required to meet planned tactical objectives. A number of organizational elements may be activated in the various sections without activating sectional chiefs. Each activated element must have a person in charge of it. In some cases a single supervisor initially may be in charge of more than one unit. Elements that have been activated and clearly are no longer needed should be deactivated to decrease organizational size.

Unified Command

Unified Command is an ICS management process that allows all agencies having jurisdictional or functional responsibility for the incident to develop a common set of incident objectives and strategies jointly. This is accomplished without losing or giving up agency authority, responsibility, or accountability. Unified Command is an important feature of ICS. It allows agencies having a legitimate responsibility at an incident to be part of the Incident Command function.

Under Unified Command, the following always apply

- The incident will function under a single, coordinated Incident Action Plan.
- One Operations Section Chief will have responsibility for implementing the Incident Action Plan.
- One incident Command Post (CP) will be established.

There are a number of other considerations involved in Unified Command.

Span of Control

Span of control pertains to the number of individuals one supervisor can manage effectively. Maintaining an effective span of control is particularly important on incidents where safety and accountability have top priority. In ICS, the span of control for any supervisor falls within a range of three to seven. If a supervisor has fewer than three people reporting, or more than seven, some adjustment to the organization should be considered. The rule of thumb for span of control in ICS is one supervisor to five subordinates.

Common Terminology

In the ICS, common terminology is applied to:

- organizational elements;
- position titles;
- resources; and
- facilities.

Organizational Elements: There is a consistent pattern for designating each level of the organization (e.g., sections, branches, etc.).

Position titles: Those charged with management or leadership responsibility in ICS are referred to by position title such as officer, chief, director, supervisor, etc. This is done to provide a way to place the most qualified personnel in organizational positions on multiagency incidents without confusion caused by various multiagency rank designations. It also provides a standardized method for ordering personnel to fill positions.

Resources: Common designations are assigned to various kinds of resources.

Many kinds of resources also may be classified by type, which will indicate their capabilities (e.g., types of helicopters, patrol units, engines, etc.). For example, in ICS a vehicle that is used in fire suppression is called an engine. Recognizing that there are a variety of engines, a type classification is given based on tank capacity, pumping capability, staffing, and other factors.

Personnel Accountability

Several procedures within ICS ensure personnel accountability.

- **Check-In**: mandatory for all personnel upon arrival at an incident.

- **Unity of Command**: ensures everybody has only one supervisor.

- **Resource Status Unit**: maintains status of all assigned resources.

- **Division/Group Assignment Lists**: identifies resources with active assignments in the Operations Section.

- **Unit Logs**: a record of personnel assigned and major events in all ICS organizational elements.

Personnel Accountability and Wildland Check In Process

During initial attack the incident commander is responsible, along with the dispatch center, for tracking resources. Tracking resources is done through an order system with requests being validated through a dispatch center and confirmed back to the IC, who keeps a record on an ICS 201 form. In essence, resources are requested, dispatched, and then tracked by both until assigned to the incident where other command or supervisory personnel then become responsible for immediate accountability.

This is similar in concept to personnel accountability systems used by the structural community; however, the wildland firefighting community must rely on a system that is more global in nature. In structural firefighting our accountability systems rarely involve tracking thousands of personnel in large geographic locations. Wildfires sometimes require resources from across the Nation and the enhancements that allow us to expand the ICS enable us to maximize command and control of many resources at significant, dynamic incidents. This is why it is important for the wildland community to be extremely proficient in the overall use of all facets of ICS.

Structural personnel must understand this system when they work with local, State and national resources that use it in lieu of the personnel accountability systems normally used by the structural community. The structural community can still consider its system for its resources; however, the structural company officer must know where, how, when and with whom to check when being assigned to a wildfire incident that involves multiple agencies. This information is offered so that you can understand the relationships and, conceptually, how the systems are parallel.

For each order request for resources during a wildfire incident involving wildland firefighters, the ICS form 201 probably will be used. This four-part form contains an organizational chart, a resource order page, an area to sketch a map, and an incident action plan and incident command area for narrative information. For each resource requested the resource is assigned a reporting, staging, incident command post or possibly base area. Regardless of their check-in point before deployment, structural company officers must understand what is required of them per the ICS 201 form. Above all, the company officer needs to ensure that he/she understands the check and tracking of resource procedures.

It typically is within the Planning Section Chief's purview to establish a check-in recorder for the ICS. As one moves from one area to another, check-in occurs. For example, if a structural company officer and his/her personnel are dispatched to an incident, the company officer is responsible for determining to whom he/she should check in. According to ICS, when you are dispatched and assigned to staging, you will fall under the responsibility of the staging area manager and check in through this part of the system. What is important is that you are familiar with the differences between personnel accountability as we know it and its relationship to the ICS: that it has a personnel accountability component already built into the system. The challenge for structural personnel is that they do not use this system daily; rather they rely on a system that is more portable for fixed incidents and those of short duration.

It is important to know with whom you are working and to train with these individuals before an incident. If you have a contact at the State forest service, begin a dialogue that will establish sound command and control procedures when there is deployment to interagency wildfire incidents.

ON INCIDENT

IC Responsible Initially

ICS 201

↓

Planning Section Chief Responsibility Established

↓

ICS 211 Check-In Form

Remember, this is just an illustration. You as the Company Officer should contact your State training or State forest service counterpart to understand the relationship of both systems.

Communications

Four forms of communication.

1. Face-to-face.
2. Radio.
3. Cellular telephone.
4. Written.

Become familiar, in advance, with all the communication methods. Due to potential of multiple agencies working at an incident scene use plain English and clear text. Each agency should provide equipment that can be used to communicate on the frequencies used by all agencies involved in a Wildland and Wildland/Urban Interface Fire. Field-programmable radios offer the flexibility to be modified. Portable radios should have extra batteries to sustain operations for longer duration incidents.

Integrated Communications

The ability to communicate within ICS is absolutely essential. Communications can be viewed at least three different ways:

1. The "hardware" systems that transfer information.
2. Planning for the use of all available communications frequencies and resources.
3. The procedures and processes for transferring information.

Just as every incident requires an IAP, every incident also needs a Communications Plan. Like the action plan, it can be very simple and stated orally, or it can be quite complex, and form a part of a written IAP.

Several communications networks may be established depending upon the size and complexity of the incident. These may include

- **Command net**: established to link supervisory personnel from IC down to and including division and group supervisors.

- **Tactical nets**: established in a variety of ways, e.g., by agency, department, geographical area, or function. Tactical nets may be established for each branch, or for divisions and groups, depending upon hardware and frequency availability and specific incident needs.

- **Support nets**: established on larger incidents to handle logistics traffic and resource status changes.

- **Ground-to-Air net**: established to coordinate ground-to-air tactical traffic.

- **Air-to-Air**: assigned for coordination among aircraft assigned to an incident.

An awareness of available communications systems and frequencies, combined with an understanding of incident requirements, will enable the communications plan for each operational period.

An essential part of an effective multiagency incident management system is for all communications to be in clear text. That is, do not use radio codes.

Resource Management

Resources assigned to an incident are managed in one of three ways:

1. **Single resources**: Single resources include both personnel and their required equipment.

2. **Task forces**: A task force is any combination of single resources within span-of-control guidelines. They are assembled for a particular tactical need, with common communications and a leader. Task forces can be predetermined or assembled at an incident from available single resources.

3. **Strike teams**: A strike team is a combination of a designated number of the same kind and type of resources with common communications and a leader. The number of resources to be used in the team will be based on what is needed to perform the function. Span-of-control guidelines should apply. Strike teams can be predetermined or assembled at an incident from available single resources.

The use of task forces and strike teams:

- maximizes effective use of resources;
- reduces span of control; and
- reduces communications traffic.

Tactical resources performing an active assignment.

- **Assigned**: resources performing an active assignment.

- **Available**: resources ready for deployment.

- **Out of service**: resources not assigned or not available.

The Incident Action Plan

Every incident needs an action plan.

- The purpose of the plan is to provide all incident supervisory personnel with appropriate direction for future actions.

- The plan may be oral or written.

Written plans should be used when it is essential that all levels of a growing organization have a clear understanding of the tactical actions associated with the next operational period. It is important to use a written action plan whenever:

- Two or more jurisdictions are involved.

- The incident will overlap major changes in personnel or go into a new operational period.

- There is a partial or full activation of the ICS organization.

In ICS, an Incident Briefing Form ICS 201, is used on smaller incidents or during initial attack to record initial actions and list assigned and available resources. As incidents grow in complexity and/or size, ICS provides a format for a written action plan.

Developing the Organization

ICS is based on a requirement that the system must be capable of handling both small and large incidents.

In other words, ICS must be able to expand easily from very small, routine operations into a larger organization capable of handling a maximum size event. It also must be capable of selective and total demobilization or downsizing in an efficient manner.

There are no hard and fast rules for when or how to expand the ICS organization. Many incidents will never require the activation of Planning, Logistics, or Finance/Administration Sections, while others will require some or all of them to be established.

The following are general guidelines that will be useful in developing the ICS organization.

Establish a Command Post (CP)

- Designate a CP and make its location known to all incident resources.

- As an incident grows, the CP also may expand in size. Therefore, the location selected should be capable of accommodating additional personnel.

- The CP may be a vehicle, trailer, fixed facility, or any location suitable to accommodate the function. Normally, the CP will not be moved once established.

Develop Initial Organization

If the incident is growing in size or complexity, and/or reaching or exceeding span-of-control limits, it is important to establish rapidly the organizational framework necessary to manage it. This usually means filling essential General and Command Staff positions first, although unit-level positions may be filled whenever required.

It is better to overestimate the need for a larger organization than to underestimate it, as it is always possible to downsize the organization. Initial organization development on an expanding incident should provide positions to cover at least the following activities.

- check-in;
- resource tracking; and
- logistical support.

The experience of the IC is a key factor in successful incident management. The IC should be aware when a situation is growing or becoming more complex, and may require more resources. Arrival of the media and agency representatives is always a good indication of increasing complexity.

Consider Specialized Needs

Dealing directly with the media or support agency representatives can seriously disrupt the IC's attention to other matters. Assigning a person or persons to fill the Command Staff positions can save the IC a tremendous amount of time and trouble.

Monitor and Maintain Good Span of Control

Keep all elements of the organization within the span-of-control guidelines of between three and seven persons or elements reporting to a supervisor. A ratio of one to five is the model to follow whenever possible. Anticipate a growing incident and, as necessary, plan for span of control for a larger incident.

Demobilize Organizational Elements When no Longer Necessary

Avoid over-organization. If it is clear that a particular function is no longer required it is perfectly appropriate to demobilize the unit, and to reassign or release the personnel. This is one of the features of ICS that keeps the organization size proportionate to the need and also reduces cost.

Anytime an ICS position is demobilized, the function it was performing goes to the next higher level in the Chain of Command.

Avoid Combining ICS Organizational Positions

One person may be assigned more than one function on the incident organization chart. However, functional positions should not be combined within the organization. This could create problems later if units that were merged need to be separated. For example, do not combine Logistics and Planning activities in one box on the organizational chart. This can be confusing to both on- and off-incident personnel. Also, as the incident grows, it will be more difficult later to split the positions than it will be to assign a second person to manage one of the functions.

COMMAND AND CONTROL RESPONSIBILITIES--YOUR ROLE

Just as in a structure fire, the successful management of a wildland fire or a Wildland/Urban Interface Incident begins with the first-arriving structural fire CO. You may be involved in, or responsible for, command operations. Operational responsibilities of command include three levels:

1. **Strategic level**: determines overall direction of the incident.

2. **Tactical level**: assigns operational (tactical) objectives.

3. **Task level**: completes specific tasks assigned to companies.

The strategic level is a function of the IC. The IC sets the overall plan and sets strategic priorities.

The tactical level is a function of the Operations Section Chief. Operations selects tactical objectives and prioritizes the accomplishment of the objectives. When an Operations Chief has not been designated, the IC must perform the tactical-level responsibilities.

When, and if, the Planning Section is established, the strategic and tactical levels of operation should become part of the information given to the Planning Section Chief. This is vital information for planning, since the primary function of this section is evaluating the incident and forecasting incident needs. The Planning Section also must develop alternative plans that include both strategic and tactical level information.

The task level is a responsibility of the CO and firefighters who are performing the individual tasks that achieve the tactical objectives.

Task-level operations at a Wildland or Wildland/Urban Interface Incident include

- rescue and evacuation;
- structural and site preparation;
- engine operations structural protection;
- support for perimeter control;
- supplying water; and
- patrol and mopup.

Regardless of your mission in the ICS or your specific tactical assignment, your primary responsibility is the safety of your crew. In order to ensure your crew's safety, you will need to understand the special considerations on assignments to a Wildland or Wildland/Interface Fire, wildland fire behavior, safety considerations for the structural fire CO in the Wildland

and Wildland/Urban Interface, and the CO's role. These topics will be covered during the remainder of this course.

COMMAND AND CONTROL REPORTING ISSUES FOR THE COMPANY OFFICER

Upon receipt of dispatch, structural CO's should obtain as much information about the incident as possible, including

- incident location;
- reporting location and instructions;
- strike team information, if applicable;
- request order number, if applicable;
- travel route; and
- assigned radio frequency.

En route to the incident, structural CO's should

- brief crew on location and type of incident;
- review potential assignments with crew;
- carefully monitor assigned radio frequency;
- remain with the strike team, when applicable; and
- monitor fire weather.

Upon arrival at the incident, structural CO's should

- check in, or report to IC;
- report to assigned location;
- obtain a briefing, review the Incident Action Plan (IAP) and assignment;
- have all crew members don personal protective equipment (PPE);
- keep crew intact;
- carefully monitor assigned radio frequency; and
- remain available for immediate response.

Once assigned to the incident, the structural CO should

- review objectives with crew members;
- maintain the Chain of Command;
- carefully monitor assigned radio frequency;
- provide updates on progress;
- complete assignment and report exceptions and needs;
- continually "size up" the area in which he/she is working;
- be continuously aware of an escape route;

- wear appropriate safety equipment; and
- continue to monitor weather and fire behavior.

In most cases there will not be a formal demobilization process from the incident. Structural CO's should assure that they have all of their assigned equipment with them before leaving the area. Additionally, the direct supervisor of the unit must be notified before returning to quarters from the incident. When returning from the incident, the structural CO must continually monitor his/her assigned frequency, be aware of travel location at all times, and remain prepared to respond to another incident.

SAFETY CONSIDERATIONS

Records have been kept since 1910 to record wildland firefighter deaths and their causal and contributing factors. Since then, 646 firefighters have died fighting wildfires. Of these fatalities, 446 were wildland firefighters employed by the Federal government, the State government, or the private sector, and 200 career and volunteer were structural firefighters from local governments. The following analysis is of the structural firefighter fatalities by cause.

Accident Type	Total Fatalities
Heart attack	20
Trapped, burn over	10
Vehicle accident	21
Vehicle burn over	2
Aircraft	1
Unknown	2

This effort to document and investigate fatal wildland firefighting accidents/incidents has assisted wildland management and safety personnel in determining causal and contributing factors for firefighter fatalities. With the knowledge gained from these studies, a number of fire line operations and safety reference documents have been developed to improve wildland firefighting safety. These reference documents are compiled in a pocket guide, *Fire Line Safety Reference* (PMS-427, November 1993), which is provided in your course materials. For the following, refer to that guide:

- **Ten Standard Firefighting Orders**: The Standard Firefighting Orders relate to safety, fire behavior, and communications to keep wildland firefighters focused on survival and effectiveness.

1. Fight fire aggressively, but provide for safety first.
2. Initiate all action based on current and expected fire behavior.
3. Recognize current weather conditions and obtain forecasts.
4. Ensure that instructions are given and understood.
5. Obtain current information on fire status.
6. Remain in communication with crew members, your supervisor, and adjoining forces.
7. Determine safety zones and escape routes.
8. Establish lookouts in potentially hazardous situations.
9. Retain control at all times.
10. Stay alert, keep calm, think clearly, act decisively.

- **18 Watch Out Situations (Survival Checklist)**: The Watch Out Situations are designed for and provided as a checklist for wildland fire personnel to identify potential life-threatening situations. It is important that anyone responding to a wildland fire incident is familiar with, and can identify, these 18 situations.

1. The fire is not scouted and sized up.
2. You are in country not seen in the daylight.
3. Safety zones and escape routes are not identified.
4. You are unfamiliar with weather and local factors influencing fire behavior.
5. You are not informed of tactics, strategy, and hazards.
6. Instructions and assignments are not clear.
7. No communication link has been established with crewmembers or your supervisor.
8. You are constructing line without a safe anchor point.

9. You are building fire line downhill with fire below.

10. You are attempting a frontal assault on the fire.

11. There is unburned fuel between you and the fire.

12. You cannot see the main fire and are not in contact with someone who can.

13. You are on a hillside where rolling material can ignite fuel below you.

14. The weather is becoming hotter and drier.

15. The wind is increasing and/or changing direction.

16. You are getting frequent spot fires across the line.

17. The terrain and fuels make escape to safety zones difficult.

18. You are taking a nap near the fire line.

- **Look Outs, Communications, Escape Routes, Safety Zones (LCES)**: Relates to understanding assignments, always observing conditions, always knowing where personnel are, selecting and maintaining safety zones and escape routes, and keeping all personnel informed of plans, progress, and conditions.

- **Red Flag Warning:** This is a term indicating an ongoing or imminent critical fire weather pattern or condition. The "warning" is provided by the National Weather Service to weather forecast users to alert wildland fire services of conditions conducive to extreme fire behavior.

SIZEUP CONSIDERATIONS

Fire History

The behavior and travel patterns of many of today's fires can be predicted based on information from similar fires in the past. Wildland fires, when burning in the same areas as before, will repeat almost exactly the same travel pattern, given the same general conditions. Knowledge of these past fires can prove invaluable in assisting in the planning of your strategy and tactics.

Weather

Structural fire CO's use this sizeup factor every day. Most of the time it is not done with any effort.

- The CO knows whether it is raining or not, the strength and direction of the wind, and the relative temperature.

- During Wildland/Urban Incidents greater attention to the specifics of weather is absolutely critical.

While the wind is important, just as in structural firefighting, we must remember that the speed and direction of fire travel will have a direct correlation to wind speed. It also is important to note that, unlike suburban and urban areas, the direction of the wind at the scene of a wildland fire may become altered locally by the topography, the fuel load orientation, and, in some cases, by the fire itself.

The temperature of the atmosphere, when viewed through the eyes of the structural fire CO, is usually a factor in considering the duration of time that our personnel can be anticipated to operate while wearing full PPE, or to plan for potential freezing problems on the fireground.

- In the wildlands setting, temperatures are "preheating" our fuels. The higher the temperature the closer the fuel to its kindling temperature.

- The higher the ambient temperature of the atmosphere the higher the potential of fire spread.

- Such basic details frequently are overlooked.

Humidity usually is not considered in structural firefighting, again except in case where it affects personnel. In the wildlands, humidity has a major impact on the fire.

- The drier the air, the drier the fuel.

- This results in lower fuel moisture content, which results in more rapid preheating at warmer temperatures.

- The result is faster burning fuels.

Structural fire CO's need to be aware of fire weather conditions in the wildlands during periods when the temperatures are above seasonal levels, the relative humidity is below normal and wind speeds are escalated. These are all major cues that wildland fire conditions can be extreme.

Fuel

The types of fuels that are present will have an impact on the ability of the firefighter to protect threatened structures.

- Fuels vary from one geographic region to another, even in local areas.

- Fuels which are found in timber, grass, landscaping, and in typical wildland brush can be very different from each other, ranging from the extremely combustible to the very stable.

The quantity, the arrangement on the site, and the size of fuels all will have an impact on your ability to defend threatened structures.

- Your sizeup also should include observations as to how much dead material is intermixed with the live vegetation.

- Significant amounts of dead fuels will significantly increase the fuel loading at the site.

There are no "solve all" formulas or theories available to base our decisions on concerning fuel loading and the distance the fuel should be removed from around a structure. One method which has been used extensively is to consider a clearance area of two to three times the length of anticipated flame height as the minimum.

Each structural fire CO will have to estimate the fire load based on his/her experience and prepare an action plan to deal with the removal of the fuels from a structure appropriately.

Topography

Just as in a structure fire the structural CO needs to observe the type of "construction" in which the fire is taking place. In the wildlands this "construction" is known as topography.

Just as fires in structures will act predictably and somewhat dangerously in utility shafts, large open spaces, and stairways, so will wildland fires act in canyons, ridges, and slopes.

In general, the terrain will cause the fire to act predictability but, at times, dangerously.

Natural and manmade barriers such as greenbelts, creeks, ponds, roadways, etc., are all fire breaks and should be used as a control line whenever possible. The use of such natural and manmade barriers assists not only in saving firefighting resources, but also improving our ability to protect properties, and assuring firefighter safety by avoiding a direct fire-to-firefighter confrontation.

Time of Year and Time of Day

The effect of the seasons and the time of day affect the moisture content of the fuels. Furthermore, the presence of vacationers, campers, etc., may be reliably gauged based on the time of the year. As discussed in other sections of this course, extreme fire behavior may be anticipated during certain periods of the year, especially during droughts. In most regions of the United States these times are well known to local wildland firefighters and are considered closely in decisionmaking.

Water Supplies

When surveying the area and preparing to provide structural protection, water supply is a major consideration. The location, availability, and reliability of that water source must be confirmed. Power failures caused by wildland fires have the potential to discontinue power to water supply pumps, rendering them inoperative.

Fire Behavior

When sizing up the scene, pay particular attention to the speed, direction, and behavior of the fire. It is possible that with these three factors closely observed, you may be able to determine approximately how much time is available prior to any structures being threatened.

Should spotting be observed by the structural fire CO, heightened awareness of local conditions is necessary. These spot fires may ignite fires in the rear of your operating companies and may pose a serious threat to your escape plan and, therefore, to your safety and that of your crew. A rapid increase in the number of spot fires in a given area is a primary consideration for the evacuation of emergency responders.

Evacuation Potential

It is important to consider carefully the number of civilians that may need to be evacuated. Larger numbers of potential evacuees will require additional numbers of emergency responders to assure their safe evacuation. Such emergency responders need to be contacted early in the incident so that this objective is undertaken early enough in the process to assure successful completion.

Structural Exposure

While sizing up the structure to be protected, it is important to remember that we are defending this structure from the wildland fire. Our objective is to keep the structure from becoming part of the fire. Therefore, careful consideration must be given to the amount of defensible space around the perimeter of the structure. Defensible space is defined as the area that has been cleared of thick brush, tree limbs hanging over the structure, etc., that otherwise would bring the fuel load closer to the structure to be protected.

Properties that are surrounded by such fuel loading certainly will draw the fire closer to the home and pose a situation in which not only will the structure will be threatened, but also the safety of fire suppression personnel. These may be deemed as undefendable structures. Careful consideration must be given prior to the expenditure of any resources on such a property.

Should the initial sizeup indicate that such defensible space exists, we then must make a further evaluation of the structure to be protected.

- We should determine whether the exterior siding of the building will contribute to the fire spread.

- Does the structure have open windows, attic vents, exposed eaves?

- Is skirting in place and low to the ground around mobile homes, or are there decks, which will act as a wick or trap for the fire to extend into or onto the building?

The exterior sizeup also must include a survey of the roof. Is the roof of noncombustible type, such as asphalt shingles, or terracotta tile, etc.? Or is it made from combustible materials, such as cedar shakes?

Access

In addition to assuring that sufficient space is available to provide a good defense for the structure, it also is important that the building be accessible. Structures not served by roadways large enough to facilitate apparatus and/or a clear view of the working areas should be carefully considered prior to committing resources for structural protection. The ability to pick up and relocate rapidly from a given operation always must be a primary consideration for the safety of operating personnel.

Resource Sizeup

The final step in the sizeup process is resource evaluation. Directly affecting this evacuation is the amount of time left prior to structure(s) becoming threatened. When evaluating this critical element carefully it may be possible to select from different operations options, which may prove prudent for the particular situation. Is heavy equipment available? Will a last-minute clearing of the fuel load from around the structure improve its potential to survive? The exercise of this option may require only bulldozers, plows, or other heavy equipment. It also will require a certain amount of time for these resources to complete the clearing process prior to the arrival of the fire. Are aircraft available? Can an air drop of retardant or water be used to knock down the fire? This action may take some of the heat intensity out of the fire and allow for rapid extinguishment by your engine company.

INITIAL STRATEGY AND ACTION PLAN

Just as in a structure fire, the successful management of an incident begins with the first-responding CO or initial attack IC.

- If this person correctly interprets the sizeup factors and quickly recognizes the interface potential, the result may be a successful extinguishment of the fire.

- If he/she does not, or fails to recognize the interface potential and falls behind the resource power curve, the outcome may be devastating to the local community.

Action Plan Development

An action plan represents the strategy and tactics that will be used to address a specific incident.

- The action plan represents the overall emergency plan.

- A good IAP will allow all CO's to know what the overall plan is, what their part of the plan is, and to whom they report.

- Many large-scale action plans are written down; on larger, more complex incidents they even may be updated at regular intervals.

A well-prepared action plan will identify the strategic goals and tactical objectives as they relate to the incident's priorities.

- Adequate resources will be matched with the action plan to ensure the effective, efficient, and safe operation of all resources operating within the plan.

- Action plans need to be evaluated continually, whether they are written down or not.

Incident Priorities

As in structural firefighting, the suppression priorities can vary in how they are presented from one incident to another. However, the incident priorities will remain the same.

- Life safety is always our first priority.

- Incident stabilization is our second priority, but may be addressed at the same time as life safety.

- Property conservation is always our third priority. Nevertheless, it is an important priority. After the life safety issues have been addressed and the incident has been stabilized, we need to do our best to limit the loss of any further property and the protection of the environment.

The above three priorities can act as a guide to prepare your IAP. The action plan must include

- Strategic goals.

  - Using the incident priorities as a framework the IAP's strategic goals may be developed.

  - Strategic goals are broad statements describing major actions required to address the threat of the incident.

- Goal: Protect the school located on the edge of the Pinedale subdivision.

- Tactical objectives.

  - These are the specific and measurable steps required to complete the strategic goals of the IAP.

  - At the completion of a set of these steps, a specific goal will have been attained.

  - Tactical objective: Use dozers and engines to protect the Pinedale School.

Determining Resource Needs

This determination needs to be made quickly. It is necessary for everyone to know how to do this regardless of rank or position on the fireground. It is not easy. However, training and experience will make the process easier.

The IC needs to begin with the sizeup process.

- Carefully weigh the factors that need to be evaluated against the incident priorities of life safety, incident stabilization, and property conservation.

- Items such as the number and type of structures threatened, the predominant fuel type in the area, weather conditions, topography, predicted fire behavior, evacuation probabilities, and response times for assistance to the scene all must be carefully analyzed.

These factors then will determine the type, kind, and numbers of fire apparatus, equipment, and personnel needed to take the appropriate action. Some factors in considering resources include apparatus capabilities (4 x 4 versus conventional wheel drive), amount of water, size and type of hose, and the number of personnel assigned to those units.

Rules of Thumb For Determining Resource Needs Structural Fire Protection

Engine Companies

Single-family structures.

- For separated structures mostly surrounded with wildland fuels: one engine per structure.
- For continuous structures, less than 50 feet apart: 1 engine per each 2 structures.
- Provide an additional engine to float for every five engines assigned to specific structures.

Cluster of 20 or more homes up to 50 feet apart.

- Count the number of homes on the perimeter, divide by four, and that equals the number of single engines needed, plus one additional engine strike team.
- Add an additional engine strike team if the roofs are combustible.

Water Tenders

Estimate water consumption, travel time to and from the water supply, and determine the number of water tenders required. At least two water tenders are generally recommended to facilitate water supply needs of engine strike team in nonhydrated areas.

Structural Triage and Site Preparation

Three Categories

1. Needing little or not attention for now.
2. Needing protection but savable.
3. Hopeless.

Decision Process

- What is the worse-case scenario?
- What will **probably** occur?
- What will the timing be?
- What can be done with available resources?

Triage Decision Factors

Structure Itself

- roof--construction type/debris;
- siding--combination or noncombustible;
- heat traps--gables/decks/vents; and
- windows--exposed/covered/type.

Fuels

- size and arrangement of surrounding fuels;
- age;
- proximity;
- loading;
- flammable or resistant;
- ornamental;
- wood piles;
- landscaping--fences, sprinklers;
- defensible space availability;
- yard accumulation--debris, furniture;
- flame or heat duration; and
- hazardous material/explosive fuels.

Fire Behavior

- rate of spread;
- topography;
- weather;
- flame length;
- spotting potential and distance;
- timing; and
- barriers.

Resources

- on site;
- kind and type;
- number;
- present location;
- availability; and
- capabilities and limits:
  - mobility,
  - water/foam, and
  - retardant.

Firefighter Safety

- ingress/egress routes:
  - adjacent fuels,
  - one-way/two-way traffic,
  - canopy,
  - slope, and
  - loops;
- power lines;
- smoke/visibility;
- hazardous materials;
- liquid propane gas (LPG) and fuel storage; and
- public panic.

<u>Hopeless Situations for Triage</u>

- Significant runs--especially with fire within 2x flame length of fuels.
- Spot fires igniting faster than you can put them out.
- Water supply running out or gone.
- Safety in jeopardy--escape route is being cut off.
- More than one-quarter of the roof involved, in windy conditions.
- Interior rooms involved--windows broken in windy conditions, other structures threatened or involved.

Nine Urban/Wildland Watch Outs

1. Wooden construction; shake roofs.
2. Poor access; one-way roads.
3. Inadequate water supply.
4. Natural fuels 30 feet or closer to structures.
5. Extreme fire behavior.
6. Strong winds (above 25 mph).
7. Evacuation of public (panic).
8. Structure located in chimneys, box or narrow canyons, on slopes 30 degrees or more, and in continuous flash fuel types.
9. Bridge load limits.

Activity 4.1

Case Study

Purpose

To identify safety and survival scenarios through a case study.

Directions

Watch the video depicting this case study. The case study contains an overview of the incident, a wildland fire that occurred on public lands managed by a Federal agency and supported by a local fire department. Events that occurred during the fire-suppression activities over the 2-hour and 22-minute period led to the deaths of two firefighters.

1. In your small group use the following list of the Ten Standard Firefighting Orders and the 18 Watch Out Situations.

2. Based on your knowledge, experience, and what you have learned up to this point, identify the items that were compromised. Be prepared to explain where the compromise occurred and discuss what could have been done differently.

18 Watch Out Situations

1. ______ The fire is not scouted and sized up.

2. ______ You are in country not seen in the daylight.

3. ______ Safety zones and escape routes are not identified.

4. ______ You are unfamiliar with weather and local factors influencing fire behavior.

5. ______ You are not informed of tactics, strategy, and hazards.

6. ______ Instructions and assignments are not clear.

7. ______ No communication link has been established with crewmembers or your supervisor.

8. ______ You are constructing line without a safe anchor point.

9. ______ You are building fire line downhill with fire below.

10. ______ You are attempting a frontal assault on the fire.

11. ______ There is unburned fuel between you and the fire.

12. ______ You cannot see the main fire and are not in contact with someone who can.

13. ______ You are on a hillside where rolling material can ignite fuel below you.

14. ______ The weather is becoming hotter and drier.

15. ______ The wind is increasing and/or changing direction.

16. ______ You are getting frequent spot fires across the line.

17. ______ The terrain and fuels make escape to safety zones difficult.

18. ______ You are taking a nap near the fire line.

Ten Standard Firefighting Orders

1. ______ Fight fire aggressively, but provide for safety first.

2. ______ Initiate all action based on current and expected fire behavior.

3. ______ Recognize current weather conditions and obtain forecasts.

4. ______ Ensure instructions are given and understood.

5. ______ Obtain current information on fire status.

6. ______ Remain in communication with crew members, your supervisor, and adjoining forces.

7. ______ Determine safety zones and escape routes.

8. ______ Establish lookouts in potentially hazardous situations.

9. ______ Retain control at all times.

10. ______ Stay alert, keep calm, think clearly, act decisively.

APPENDIX

Activity

Incident Command System Organization

Purpose

To apply ICS 201 Form to a scenario.

Directions

In your small group, read through the following scenario. Transcribe the information from the scenario to ICS Form 201

It is July 15. A wildfire is reported to Jones County Dispatch at 1430 hours. The report states that the fire is south of Martinsburg near the county dump. The fuel in the area is brush and grass. The weather for the area has been warm and dry for the last couple of weeks. The smoke is visible from town.

Engines 62 and 65 are dispatched from station 41 at 1435.

Upon arrival, at 1450, Capt. Bob Stevens, Engine 62, establishes command of the Jones County dump fire. During the initial sizeup of the situation, he determines that the fire is burning rapidly in a northeast direction, in heavy grass and brush. It is possible that the fire started at the dump and spread onto County lands.

IC Stevens calls dispatcher at 1455 and orders two additional engines, one dozer, and a water tender.

At 1457, Engine 65, with Lt. Smith, is sent on west flank after establishing an anchor point at County Road 16 (dump road) and the rear of the fire.

At 1505, Engine 44--Capt. Lopez, and Engine 51--Lt. Brown, arrive and are briefed by IC Stevens.

They are sent up the east flank working in tandem.

At 1515, Water Tender 16--White in command, arrives and sets up a refill station on County Road 16 at the dump entrance.

At 1530, Dozer 6 arrives and the operator is briefed by IC Stevens. The dozer is unloaded, and is sent to construct a line on the east flank and is to continue around the fire.

At 1545, Engines 65, 44, and 51 meet at the head of the fire. This is reported to IC Stevens. He orders the engines to proceed back along the flanks on which they had just worked, mopping up ten feet in from the fire edge as they go.

At 1600, they again meet at the origin of the fire on County Road 16. IC Stevens instructs them to refill and continue mopping up. This continues until 1730, at which time IC Stevens informs Dispatch that the fire has dozer line completely around it and is 100 percent mopped up 10 feet from the dozer line. All resources, except Engine 44, which will remain to patrol, are returning to station.

6. SUMMARY OF CURRENT ACTIONS		
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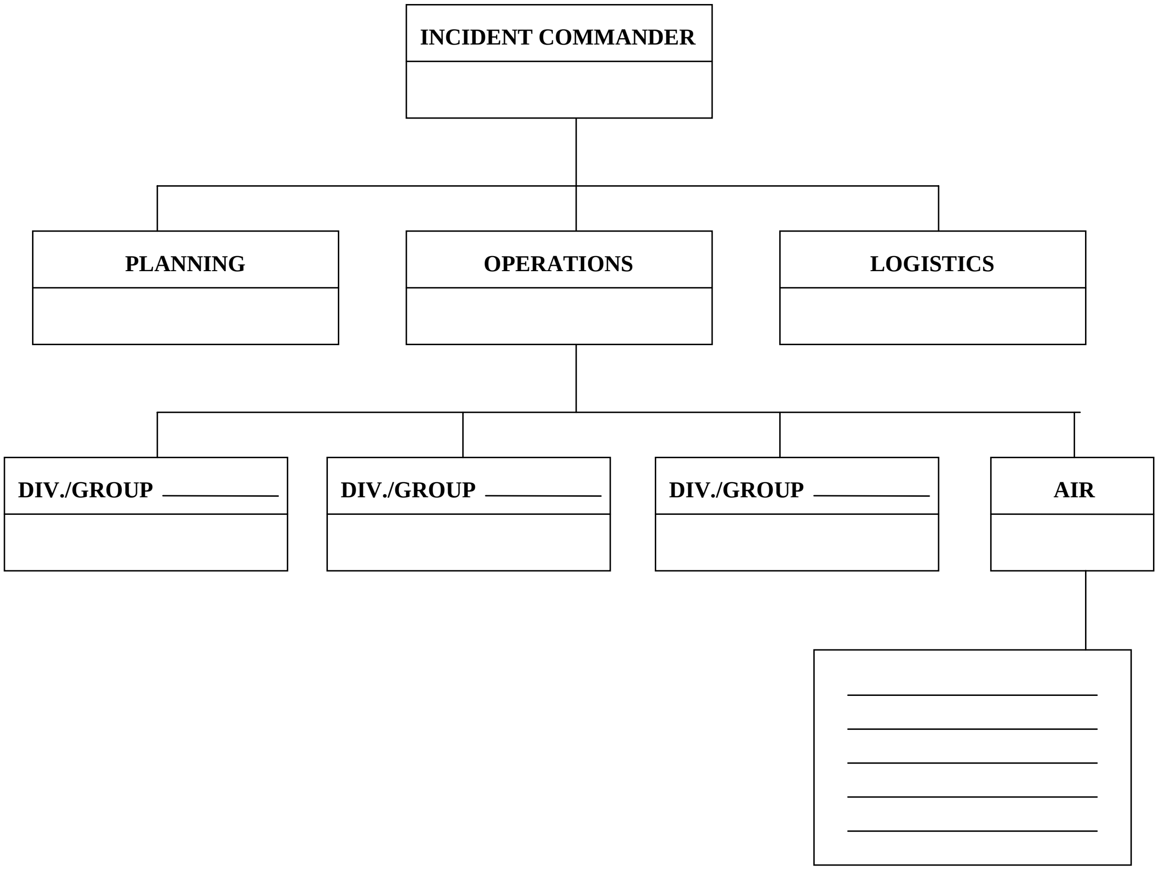
7. CURRENT ORGANIZATION



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8. RESOURCES SUMMARY				
RESOURCES ORDERED	**RESOURCES IDENTIFICATION**	**ETA**	**ON SCENE √**	**LOCATION/ASSIGNMENT**
ICS 201 (12/93) **NFES 1325**	PAGE 4			

UNIT 5: TACTICS

TERMINAL OBJECTIVE

The students will be able to interpret assignments and to identify operational safety issues when operating at a Wildland or Wildland/Urban Interface emergency.

ENABLING OBJECTIVES

The students will:

1. *Identify typical tasks involved, deployment concerns, and safety issues in a Wildland or Wildland/Urban Interface Fire when assigned to rescue and evacuation.*

2. *Identify typical tasks involved, deployment concerns, and safety issues in a Wildland or Wildland/Urban Interface Fire when assigned to supplying water.*

3. *Identify typical tasks involved, deployment concerns, and safety issues in a Wildland or Wildland/Urban Interface Fire when assigned to structural and site preparation.*

4. *Identify typical tasks involved, deployment concerns, and safety issues in a Wildland or Wildland/Urban Interface Fire when assigned to structural preparation.*

5. *Identify typical tasks involved, deployment concerns, and safety issues in a Wildland or Wildland/Urban Interface Fire when assigned to fire suppression.*

INTRODUCTION

As a structural fire Company Officer (CO) responding to a Wildland or Wildland/Urban Interface zone incident, you can expect to be assigned some common tactical assignments:

- covering stations;
- rescue and evacuation;
- supplying water;
- structural and site preparation;
- structural protection;
- engine operations in suppression of wildland fire; and
- patrol and mopup/overhaul.

COVERING FIRE STATIONS

Operators of structural fire apparatus may be called upon to provide coverage for personnel at stations already committed to an incident. Such assignments may last from a few hours to several days. Structural fire CO's should be prepared for such an assignment and treat it with importance.

When personnel arrive at the assigned station, they need to establish communications with the appropriate dispatch center, then check the station to locate all the necessary maps and information that might be needed to locate emergencies from this unfamiliar location. Be sure to review the maps' indexing methods; different departments sometimes use different systems.

After you establish communications and organize map information, check the remainder of the station for support resources for you and your crew. Look for foodstuffs, linens, and other commodities that will help to make your temporary stay comfortable. Assess station security and, whenever possible, upgrade it. Develop a system for locking up when you run alarms from this station. Keep in mind that you are a visitor; treat this station the same way you would want your station to be treated.

Some stations that you may be called upon to cover will have personnel who have been assigned to "pilot," or guide, your apparatus. A pilot is an individual who knows the area and can be invaluable in both navigating the streets and providing general information about the area. Get to know your pilot and provide space where he/she can communicate with both you and your driver.

While cover assignments are important, they are less glamorous than others. Keep your company on task and stay alert. Use downtimes for rest whenever possible because cover companies frequently are used to rotate to front-line positions.

RESCUE AND EVACUATION

Structural fire CO's who are requested to provide assistance at the scene of Wildland and Wildland/Urban Incidents most likely will be requested to provide structural fire protection to those properties threatened by the wildland fire. In many cases, this will include effecting rescue or evacuation of persons who reside in the area.

Should rescue/evacuation be required, the structural fire CO should advise the residents being removed to take only a minimum amount of personal property with them. They also should be advised to close up, but not lock up, their residences. While it is obvious that people are our primary consideration, pets and livestock need to be taken into consideration, as the threatening fire has the potential to destroy everything in its path.

Some residents will not leave the area and can be removed only by law enforcement personnel. Nothing can be gained by arguing with a citizen who does not want to leave his/her home. Our focus should be to continue to provide threatened residents with warnings and to assist residents to leave the area.

Evacuated civilians must be provided a route to leave the area. Therefore, fire apparatus must maintain at least one open lane that evacuees can use for this purpose. Notification must be made to other units operating in the area defining these routes. Firefighters and allied emergency responders should not tie themselves down by providing transportation out of the area for evacuees. These responders can be used more effectively to continue evacuation notification efforts for the greater number. Evacuees should be encouraged to provide their own transportation from the scene. Local shelters may be opened for such events.

SUPPLYING WATER

As a structural CO, you may be accustomed to having adequate water supplies in your community; however, in the Wildland and Wildland/ Urban Interface, this may not be the case. Several factors can influence water availability.

As the wildland incident increases in size, the demands for water also increase. Residents in the affected wildfire areas often use garden hoses to wet down their surrounding vegetation and structures. As increasing numbers of fire engines, water tenders, and helicopters arrive on scene, they will be using large amounts of water from the same sources. All of these demands for water may exceed the local water company's storage capacity, resulting in lower hydrant pressures or in no water at all.

As a result of the fire, the local power lines may be shut off, damaged, or destroyed, or the local water company's pumping facilities may have been destroyed. Due to these types of situations, you and your crew may be asked to deliver water to fill helicopters or other engines, or to support wildland hose lays. You also may be asked to locate alternative water sources and to conduct drafting operations.

It cannot be stressed enough that an adequate and continuous supply of water must be available to protect the threatened structure(s) for the entire duration of the effort. Apparatus always should maintain at least 100 gallons of water for protection of the apparatus and the crew, should a quick retreat be necessary.

Note: Water supplies will be limited on most Wildland and Wildland/ Urban Interface zone fires, and the structural fire officer may need to find his/her own source of water.

STRUCTURAL AND SITE PREPARATION

After you have determined that a structure can be protected from the Wildland and Wildland/Urban Interface Fire, there are actions that engine company personnel can take. Listed here are some of the actions that you can take to enhance the survivability of the structure and the safety of your crew.

- Evacuate civilian personnel and animals. (Animals will require that you use your best judgment.)

- Remove combustible objects from the perimeter of the home (boats, campers, trash receptacle, etc.).

- Clear all flammable vegetation from around the structure to a distance of at least two to three times the anticipated flame lengths.

- Prepare the structure by closing windows, removing light curtains, closing interior doors to limit fire spread, turning off fans and coolers, discontinuing any gas/LPG services, leaving on electricity, making sure all entrance doors can be opened, etc. In addition, make sure that a porch light and a central interior light are left on.

- Use garden hoses to fill engine tanks and buckets.

- Pretreat the structure with Class A foam, if available.

- Ladder the roof. (Use homeowner's ladder, if it is safe. If you will be staying with the structure, use the fire department's ladders.)

- If the structure has an electric generator, start it.

- If portable pumps or alternative water supplies are available, prepare them for use.

- Close the garage door and disconnect the garage door openers, so that if you lose power you still can get in.

- Note all hazards, including power lines, septic tanks, terrain features, private bridges, and LPG tanks, roof-mounted satellite dishes, or any structure on a roof.

Just as in structural firefighting, sizeup is a continuous process. Fires of any type are not static; therefore, neither should the sizeup process be static. The ongoing review of sizeup factors is absolutely essential to a safe and effective operation from the arrival of the structural fire CO to the overhaul phase.

STRUCTURAL PROTECTION

It is important for the structural fire CO to remember that structural protection activities occur within the fire's perimeter or adjacent to it. Therefore, when positioning apparatus at the scene, the CO should take advantage of all manmade and natural barriers, such as structures, outbuildings, fuel breaks, and rock outcroppings that can be used as a safety zone to enhance crew survivability should fire behavior threaten the safety of the firefighters.

Apparatus Positioning

Many structures requiring protection may be located at the end of long lanes, the end of driveways, on cul-de-sacs, or in potentially hazardous topographical features such as canyons or saddles. Those should be taken into consideration prior to positioning and deploying your crew. Smoke may obscure the vision of apparatus operators, and residents may cause hazards to the apparatus as they flee the area. There are several key factors to remember when positioning the apparatus and deploying your crew safely:

- Note landmarks and hazards as you approach the scene.
- Back your engine in from the last turnaround if the driveway is short.
- Park engine so it does not block traffic.
- Avoid parking next to flammable vegetation, under power lines, near LPG tanks, or other potential sources of intense heat.
- Park engine to facilitate structural protection within reach of hoselines.
- Survey the area for hazards such as septic tanks.
- Review maps and survey area.
- Identify and communicate escape routes and safety zones.
- Monitor fire behavior.

Once at the scene of the assignment, the structural fire CO should back the apparatus into position. This will provide for the fastest possible evacuation of the unit and crew should it become necessary. There are no exceptions to this rule. Apparatus windows and doors should be rolled up and closed, and the motor must be left running.

Deployment for Structural Protection

Once the structural fire CO has positioned the engine for safety and ease of operations, he/she should direct the following actions to be taken by the crew:

- Check proper personal protective equipment (PPE).
- Brief the crew; use the Look Outs, Communications, Escape Routes, and Safety Zones (LCES) principles.
- Ensure that the occupants are advised to evacuate.
- Quickly survey structure and surrounding area.
- Advance two 1-1/2-inch hoselines in the direction the fire is coming from, one around each side of structure, not to exceed 200 feet.
- Ladder the side of the structure away from the fire.
- Advance a hoseline to the roof to extinguish any brands or small fires.
- Place garden hose in engine tank filler or other alternate water source.
- Use hoselines on the ground to suppress the fire or to steer the fire around the structure.
- Be prepared at all times to pick up and deploy as the threat passes.

Mobility

Never allow your company to become tied down. Limit your hoselines to 200 feet, and do not hesitate to leave them should your position become threatened. Maintain crew integrity to facilitate rapid communication if the order comes to retreat.

If you do retreat in a hurry, leave your hose and, if possible, take your fittings and nozzles. Most companies carry ample supplies of hose and can refit their unit readily. Your hose can be replaced; but your crew cannot be.

All deployed hoselines should be taken off the same side of the engine and should not block the egress of operating fire suppression personnel. The lines must not block the street and should never cross the front of an apparatus, in the event that lines must be left, and the apparatus relocated quickly.

The roof may be protected by the preplacement of a hoseline, or in some cases, the resident's garden hose. If the roof is of a defendable construction, small volumes of water easily will control any small fires that may occur. Depending upon the approaching fire situation, such lines may not need to be in place, but instead may be deployed in the event that they are needed.

A hoseline always should be available for protection of the apparatus. This line should be a minimum of 1-1/2 inches in diameter. This line needs to be available for the apparatus operator, and may be coiled on top of the apparatus or over the pump panel. Do not take time to reload your hose bed or roll up your hoses. You must remain mobile and must be able to deploy your hoselines rapidly.

In large-scale incidents, an engine may be deployed to lay out hoselines for the protection of structures ahead of the fire. This will allow engine companies to remove their nozzles, and reconnect them and their engine to the preplaced hoselines. One engine then can progress down the street at the same rate as the wildland fire. The tremendous savings in resources is obvious.

Confronting the Fire at the Structure

If you should find yourself in a **spotting situation,** the biggest problem will be the extinguishment of firebrands before they start a larger fire. If a spot fire occurs, it must be extinguished quickly; however, crews will need to use minimum amounts of water and will need to remember to keep moving. The structure is your primary consideration; continually survey all of it.

In some cases, brands may not be a problem, and instead your strategy may be to **contain the fire fully** (extinguish and/or control the fire) as it approaches the edge of the yard. This technique may involve the use of water or, in some cases, it may not. In those cases where it does not, the fire may be slowed significantly by the lack of fuel, and can be extinguished manually by shovels, brooms, etc. Survey the threatened structures continually. Do not concentrate on the approaching fire so much that you lose sight of your primary objective.

Partial containment is the method that would be used to modify or to diminish the fire as it approaches your assigned area. Assure that sufficient resources are available to achieve the desired results and to leave a safety margin of available water.

If it is not possible to contain the fire directly prior to the fire entering your area, it will be necessary to use a **partial containment** method. This method carries the highest risk to personnel; it is needed when the fire cannot be extinguished prior to approaching the structure. To use this method, the rear hoselines attack and split the fire from the rear of the structure. The lines then are moved to the front of the structure where they are used to control the fire at the sides of the building and to peel the fire away from the building while working toward the rear of the structure. As the main fire passes, hoselines are used to extinguish all spot and smoldering fires in the area of the structure and to check for any extension into the structure.

Should the fire be so large, or traveling so fast, that no direct attack can be mounted, a **no-containment-possible** mode may be selected. This is when the fire is permitted to pass by the structure without being challenged. All actions of your company will be directed to the structure. The objective will be to cool the structure to withstand the heat of the fire as it passes. Structural fire COs need to be aware that this is extremely dangerous to personnel, and that they will need to be ready to evacuate immediately. Identify a retreat zone that will provide safety for the crew and a defendable position for evacuated firefighters should this type of attack be anticipated.

As with any structural attack, these methods of defending a structure may be used in their purest sense, or they may be used in conjunction with each other. For instance, a **partial containment** mode may escalate to a **no-containment-possible** mode, just as an offensive structural fire attack frequently may become a defensive attack.

Retreating

At times it will become necessary to retreat due to the intensity of the fire, or because of equipment or apparatus failures. Take care when retreating. Other companies may be retreating at the same time with obstructed vision, and the potential for apparatus accidents is high. Additionally, you must be cautious of hazards that have been created by the fire since you placed your company.

SUPPRESSION OF WILDLAND FIRE

Many structural fire departments are becoming increasingly involved in the suppression of Wildland and Wildland/Urban Interface zone fires. There are two methods of attack:

1. **Direct attack**: The direct attack method generally works best on fires burning in light fuels, or on low-intensity fires accessible to firefighters, enabling them to work close to the fire's edge or perimeter.

   Direct attack usually begins by selecting an anchor point and advancing a 1-1/2-inch hoseline or handline directly around the fire's edge or perimeter. Flames may be knocked down by throwing dirt or by applying water to create a fire line. The fire line is constructed by scraping vegetation down to the mineral soil. There are two common direct-attack methods used to accomplish this tactic:

   - Begin at a secure anchor point, usually at the rear of the fire, and proceed around the flanks toward the head.

   - Advance hoselines from the rear up through the blackened area that already has burned over light fuels, splitting the head and working the flanks back to the rear. **This tactic works well on light fuels burning with low intensity. This tactic should not be used on medium or heavy fuels, or on residual burning and intensely burning fires.**

2. **Indirect attack**: A method of suppression where the control line is located a considerable distance away from the fire's active edge. Generally used on fires burning in heavier fuels, high-intensity fires, or when fires are inaccessible and too hot, making it potentially unsafe to allow operations on the fire's edge or perimeter.

   Indirect attack is accomplished by building a fire line some distance away from the fire's edge or perimeter, and burning the fuel between the fire line and the fire edge. Indirect attack takes advantage of natural or manmade barriers and allows the selection of final perimeter control. An engine company may be called upon to support this effort with hose lays to reinforce the fire line, fire line construction, or to patrol activities such as spot fires or hot spots along the fire perimeter.

Water Use

Even the best water systems may be compromised by excessive use for firefighting, or due to fire damage. Wise use of water is absolutely critical. Always try to save at least 100 gallons as a reserve for your engine. This will assist you in your efforts to provide protection for your apparatus and your crew should it become necessary.

Water will be a critical resource; always seize any opportunity to top off your apparatus tank. This may be done from water tenders, at handy hydrants, or even from a resident's garden hose. Approximately 15 gallons per minute (gpm) may be added to your tank while you are in a standby mode.

When applying water, use enough to do the job, but not too much to overdo it. While structural firefighters are keenly aware of the potential costs associated with water damage, excessive use of water in the Wildland and Wildland/Urban Interface can result in compromising the crew's safety.

In most cases, the wetting down of either structures or wildland in advance of the fire is viewed as a waste of time and, more importantly, of water. In the case of fire-associated winds and heat, the wet surfaces soon will dry out and be susceptible to ignition. This will result in the need to reapply water to the fuel surface to extinguish the fire. As this results in a double application of a valuable resource, water is much better used on surfaces that **are** on fire rather than on those that **might** catch fire.

However, it can be argued that wetting down structures prior to the approach of the main fire can have a positive effect. It is urged that this method be used only when available supplies of water are ample and when a continuous supply is dependable, particularly when using Class A foam.

PATROL AND MOPUP/OVERHAUL

Whether you are fighting a structural fire or a Wildland/Urban Interface Fire, you still will be required to mop up the incident. After the primary fire lines are constructed, many things need to be done to make the fire line safe and to extinguish the fire. The objective of mopup is to extinguish all fire embers or sparks to prevent them from crossing the fire line.

Mopup begins with the construction of the fire line. Ordinarily, mopup is composed of two actions: putting the fire out, and removing the fuel so that it cannot burn.

Structural fire apparatus may be assigned to patrol areas around the structure. The structural CO and his/her crew should continually monitor fire behavior and watch for the following hazards:

- offsite vegetation and terrain;
- downed power lines;
- damaged natural gas meters;
- LPG tanks used for heating or barbecues;
- pressure vessels;
- elevated fuel tanks;
- debris on the roadway;
- weakened bridges;
- hot spots next to the road, or smoky conditions;
- burning snags; and
- compromised structures.

Overhaul

It would be most discouraging to save a structure from the main burn, only to find that the structure later was destroyed by an ignition source that went undetected. Structural fire COs need to take the time to be certain that all ignition sources are totally cold, or no longer present a danger to the dwelling, prior to leaving the structure. Failure to do this may result not only in the loss of the structure, but also may tie up resources in greater numbers later, should the structure become involved. Take the time to do it right the first time.

Summary of Common Tactical Assignments

If the structural fire CO is arriving at an incident as a tactical resource, and if command is established for the incident, the CO will

- check in;
- obtain incident communication plan--noting assigned frequency;
- report to assigned location, deploy to support assigned functions;

- obtain briefing from supervisor (i.e., strike team leader, division/ group supervisor);
- provide a briefing to crew members;
- keep crew intact by carefully monitoring incident on the assigned frequency;
- maintain the chain of command;
- provide updates to supervisor on situation status:
  - position,
  - conditions,
  - progress on assigned tasks, and
  - needs;
- apply the principles and use of LCES;
- wear appropriate safety equipment; and
- report to supervisor when task is completed and resource is available for another assignment.

AIRCRAFT OPERATIONS

The use of fixed-wing and rotary aircraft can be important at the scenes of Wildland and Wildland/Urban Interface Fires. They must, however, be used wisely, and be coordinated with ground units, or they can be wasted or even counterproductive. Close communications between the ground units and the aircraft are absolutely essential.

Both types of aircraft can be used to make water, foam, and fire retardant drops. These drops can knock down a hotspot, provide structural fire protection, and can take the heat off of a threatened engine company crew. Additionally, aircraft can be used to perform reconnaissance and to coordinate operations from an overhead perspective.

Coordination in the use of aircraft between the ground and the air is absolutely essential. Aircraft must be made aware of intentional fire locations and areas where suppression units are operating. In providing locations to aircraft it is important to remember that they must be visible from the air, and must be recognized as landmarks by both the ground units and the air units.

Air tankers can lay a strip of fire retardant that can extinguish or remove the heat from fire fuels. Air tanker pilots are highly trained and can apply their retardants consistently in a highly accurate manner. However, their ability to get low and close, particularly in areas of rough terrain, is limited. As a general rule, the larger the aircraft, the less maneuverable it is.

Helicopters, on the other hand, are highly maneuverable; however, some can carry far smaller amounts of water or retardant than air tankers. These craft are excellent for working hotspots and can drop water and/or retardant easily at extremely low altitudes. These craft typically are used as reconnaissance platforms because of their ability to remain stationary for long periods of time.

Helicopters do create some hazards for those operating on the ground. These units can create vortices that can reach the ground. Such vortices take the form of a strong, turbulent wind, and can cause a fire to flare up or to cross a control line.

Retardant or water drops can injure personnel operating on the ground. Ground crews should stay clear of areas being operated by aircraft and always should protect themselves from potential flying debris or retardant. In some cases, retardant drops can hit with such force that they will drive a firefighter to the ground.

The use of aircraft can be limited by the proximity of power lines, cables, towers, and poles to the drop zone. Should ground crews even remotely feel that any of these safety considerations are being compromised, their existence should be pointed out immediately to the aircraft through the appropriate channels. High winds also can limit the use of aircraft. In addition to causing difficulties in low-level flying, winds can affect the accuracy with which the water/retardant is dropped.

DEBRIEFING AND DEMOBILIZATION

Demobilization is the process of releasing resources from the incident in a systematic, controlled manner. On a smaller incident, demobilization may be as simple as the Incident Commander (IC) identifying resources no longer needed for tactical assignment, and releasing them directly by radio. On major incidents, the Planning Section Chief is responsible for developing the Demobilization Plan, including cost effectiveness, proper resources remaining on site, timed release of resources, and mutual-aid release priorities.

In order to manage all of the resources at an incident effectively and to provide for the safety of all personnel operating at such incidents, it is important that no unit leave the incident without the authorization of the IC.

The structural fire CO is responsible for maintaining an accurate record and documenting his/her company's activity during the incident. Upon notification of demobilization, the structural fire CO may be expected to:

- Verify demobilization schedule with supervisor and debrief regarding the significant issues encountered at the incident.
- Ensure that Staging or the base camp is cleaned of any debris.
- Prepare and clean all equipment in preparation for another assignment.
- File any required reports and/or forms.
- Return issued equipment that was provided by agencies working at the scene.
- Follow the approved checkout procedure as established for the incident.
- Evaluate and critique the incident with crew.

Activity 5.1

Rescue and Evacuation

Purpose

To interpret specific assignments and to identify operational safety concerns.

Directions

1. Refer to the graphic and the scenario provided. Assume that you are assigned to rescue and evacuation.

2. As a small group, answer the following questions:

   a. Describe the tasks involved in this assignment.

   b. Describe deployment concerns.

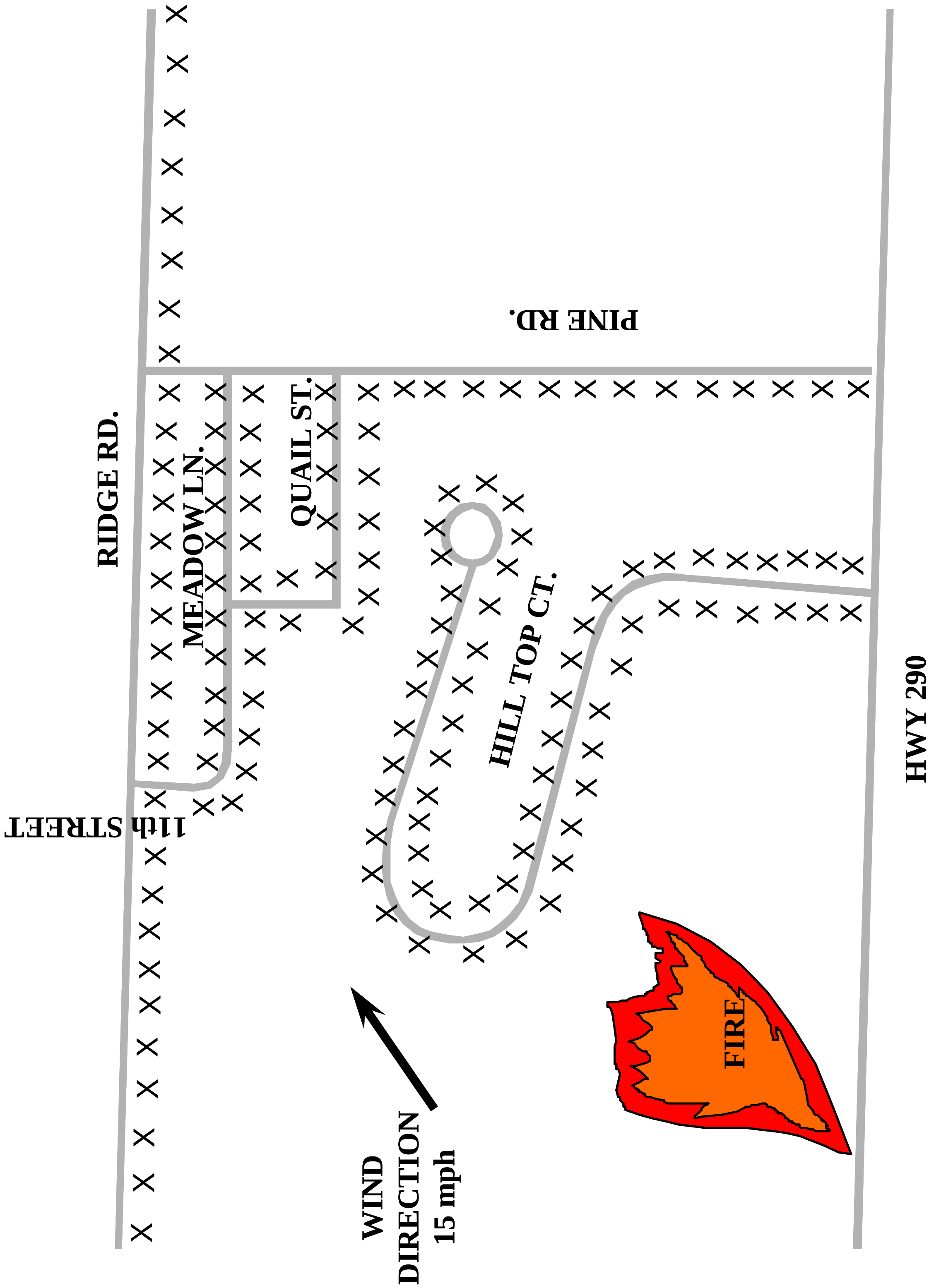
   c. List the most critical and applicable safety concerns.

   d. Describe your role in the Incident Command System (ICS).

Scenario

It is August 12 on a Saturday at 1330 hours; the temperature is 95°F (35°C). Relative humidity is at 10 percent, wind is out of the southwest at 10 to 15 mph. A 2-acre fire is burning along a road at the base of a south aspect, 10-degree slope, in an area covered with grass and forested with Pondersosa pines. You observe some torching and spotting occurring upon your arrival.

You are a CO and have been assigned by the initial attack IC to complete evacuation and effect rescue as necessary of civilians on Hilltop Court. The IC advised you to initiate action and let him/her know if you need additional resources.


PINE RD.
RIDGE RD.
MEADOW LN.
QUAIL ST.
HILL TOP CT.
11th STREET
HWY 290
FIRE
WIND
DIRECTION
15 mph

Activity 5.2

Structural and Site Preparation

Purpose

To interpret specific assignments and to identify operational safety concerns.

Directions

1. Based on the slide, assume that you are assigned to structural and site preparation.
2. As a large group, answer the following questions:
   a. Describe the tasks involved in this assignment.

   b. List the most critical and applicable safety concerns.

Activity 5.3

Structural Protection

Purpose

To interpret specific assignments and to identify operational safety concerns.

Directions

1. Use the same scenario used in Activity 5.1, and assume that you are assigned to structural protection.

2. As a small group, describe the following related to structural protection:

   a. Your strategy.

   b. Tactical assignments and resource assignments.

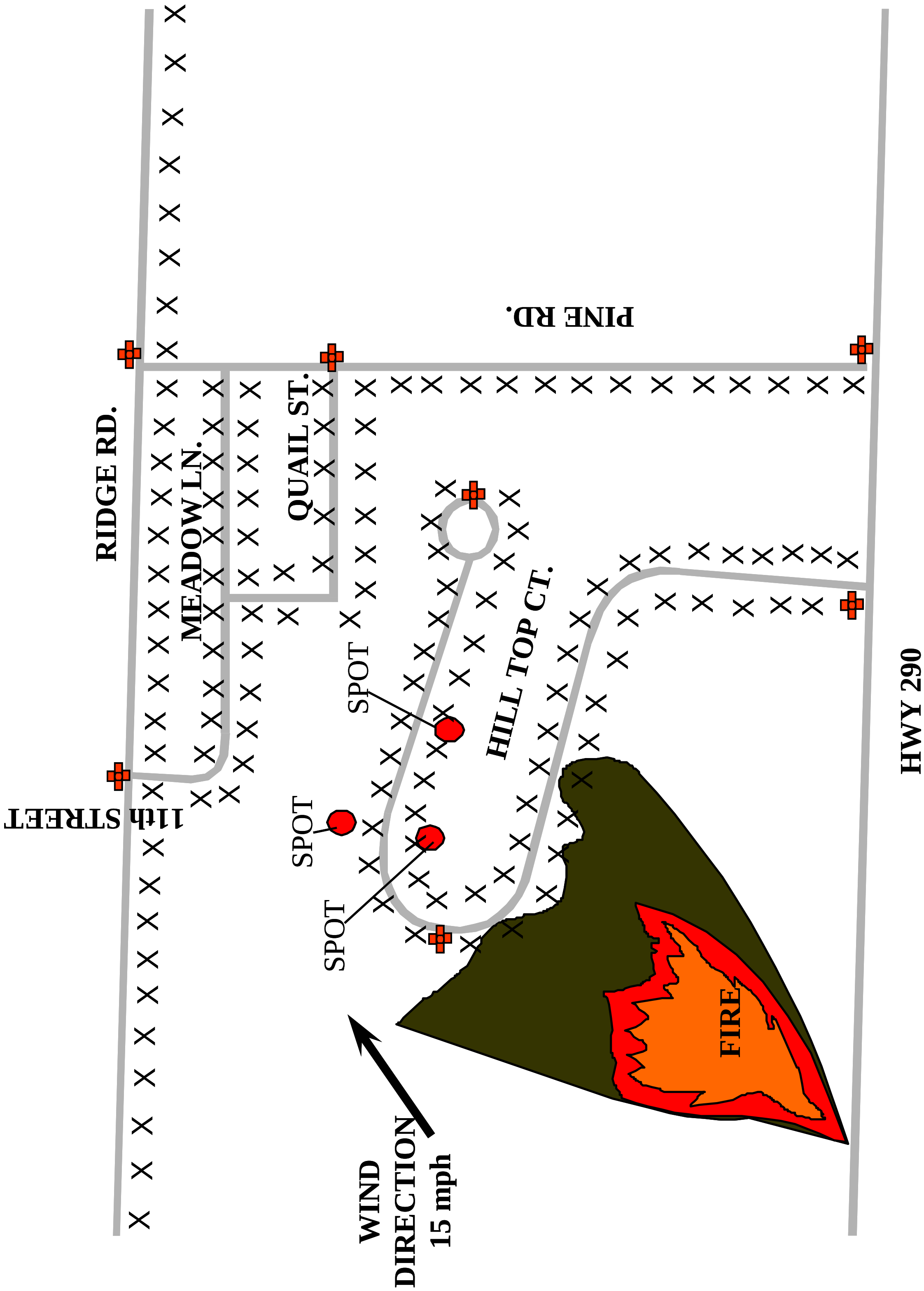
   c. ICS organization for the scenario.

   d. List the most critical and applicable safety concerns.

Scenario

It is August 12 at 1330 hours; the temperature is 95° F (35° C); relative humidity is at 10 percent, wind is out of the southwest at 10 to 15 mph. The 10-acre fire is burning up a 10 degree slope on a south aspect covered with grass and Ponderosa pines. It is threatening the homes along Hilltop Court, with spotting across the road and into the development. You are the CO and have been assigned structural protection on Hilltop Court. There are 45' between the houses.

The IC has deployed E-1, E-2, and E-3 to make a direct attack with a progressive hose lay on the right flank anchoring on Highway 290. He/She has Rotor 1, a type-2 helicopter, dropping water on the head of the fire and has asked you as the CO on E-4 to protect the structures on Hilltop Court. He/She has assigned E-5 and E-6 to assist you as directed.


PINE RD.
RIDGE RD.
MEADOW LN.
QUAIL ST.
11th STREET
HILL TOP CT.
SPOT
SPOT
SPOT
HWY 290
FIRE
WIND DIRECTION 15 mph

GLOSSARY

GLOSSARY

Aerial Fuels All live and dead vegetation located in the forest canopy or above the surface fuels, including tree branches and crowns, snags, moss, and high brush.

Anchor Point An advantageous location or point, usually a barrier to fire spread, from which to start constructing a fire line. It is used to minimize the chance of being flanked by the fire while the line is being constructed.

Area Ignition Igniting, throughout an area to be burned, several individual fires either simultaneously or in rapid succession and spaced so that they soon influence and support each other to produce a hot, fast-spreading fire throughout the area. Also called simultaneous ignition.

Aspect The direction a slope is facing, i.e., its exposure in relation to the sun.

Available Fuels Those fuels that will burn during a passage of a flaming front under specific burning and fuel conditions.

Backfiring When attack is indirect, intentionally setting fire to fuels inside the control line to contain a fire. Backfiring is a tactic that makes possible a strategy of locating control lines at places advantageous to the firefighter.

Barrier Any obstruction to the spread of fire; typically an area or strip devoid of flammable fuel.

Blackline Concept Fuels that remain between the main fire and a fire line are burned out to ensure safety of control forces and security of control lines.

Brush Fire A fire burning in vegetation that is predominately shrubs, brush, and scrub growth.

Burning Out Conducted when attack is direct, or parallel, and the control line touches points of the fire. Burning out is intentionally setting fire to fuels inside the control line to strengthen the line. Burning out is almost always done by the crew boss as a part of line construction. The control line is considered incomplete unless there is no fuel between the fire and the control line.

Burning Period	That part of each 24-hour period when fires will spread most rapidly. Typically, this is from about midmorning to about sundown, or late afternoon.
Canopy	The stratum containing the crowns of the tallest vegetation present (living or dead), usually above 20 feet.
Celsius	(Centigrade) A temperature scale with 0°C as the melting point of ice and 100°C as the boiling point of water.
Chain	A measuring instrument consisting of 100 wire links, each 7.92 inches long, or 792 inches, or 66 feet.
Chinook, or Chinook Wind	A foehn wind blowing down the eastern slopes of the Cascades, Rocky Mountains, and over the adjacent plains in the United States and Canada. In winter, this warm, dry wind causes snow to disappear with remarkable rapidity; hence it has been nicknamed the "snoweater." In hot, dry weather, Chinook winds can quickly extend fire weather conditions to the "extreme."
Cirrus	A form of high cloud, composed of ice crystals, which often does not obscure the sun.
Climate	The prevalent or characteristic meteorological conditions of any place or region, and their extremes.
Cloud	A visible cluster of minute water and/or ice particles in the atmosphere above the earth's surface.
Cold Front	The leading edge of a relatively cold air mass that displaces warmer air. The heavier cold air may cause some of the warm air to be lifted. If the lifted air contains enough moisture, cloudiness, precipitation, and even thunderstorms may result. In case both air masses are dry, and there may be no cloud formation. Following a cold front passage (in the Northern Hemisphere), often westerly or northwesterly winds of 10 to 20 mph, or more, continue for 12 to 24 hours.
Combustion	The rapid oxidation of combustible materials that produces heat energy.
Combustion Period	Total time required for a specified fuel component to be completely burned.

Compactness	The spacing between fuel particles. This can be especially important in the surface layer of fuels, where the amount of air circulation affects rate of drying, rate of combustion, etc.
Condensation	The process by which a vapor becomes a liquid.
Conduction	The transfer of heat between molecules in contact with one another.
Conflagration	A raging, destructive fire. Often used to denote such a fire with a moving front as distinguished from a fire storm.
Continuity of Fuels	The proximity of fuels to each other that governs the fire's capability to sustain itself. This applies to aerial fuels as well as surface fuels.
Contour Map	A map having lines of equal elevation that represent the land surface.
Control Line	An inclusive term for all constructed or natural fire barriers and treated fire edges used to control a fire.
Control Line Standards	The depth and width to which fuels must be treated or removed to control any portion of a wildfire perimeter.
Convection	Vertical air movements resulting in the transport of atmospheric properties. In meteorology, atmospheric motions that are predominantly vertical, i.e., usually upward.
Convection Column	The thermally produced ascending column of gases, smoke, and debris produced by a fire.
Convective Winds	All winds, up, down, or horizontal, that have their principal origins in local temperature differences.
Creeping	Fire burning with a low flame and spreading slowly.
Crown Closure	The spacing between tree crowns; usually expressed as the percent of area covered by tree crowns in the forest canopy region as viewed from above.
Crown Fire	A fire that advances from top to top of trees or shrubs. Crown fires are classed as passive, active, or dependent, to distinguish the degree of dependence on the surface fire.

Cumulonimbus The ultimate growth of a cumulus cloud into an anvil shape, with considerable vertical growth, usually fibrous ice crystal tops, and probably accompanied by lightning, thunder, hail, and strong winds.

Cumulus A principal, low cloud type in the form of individual cauliflower-like cells of sharp nonfiberous outline and less vertical development than cumulonimbus.

Defensible Space A fuel break adjacent to improvements in which you can safely defend improvements.

Dew Point The temperature to which air must be cooled, at constant pressure and moisture content, in order for saturation to occur.

Direct Attack A method of suppression that treats the fire, or all its burning edge, as a whole, by wetting, cooling, smothering, or by chemically quenching it or mechanically separating it from unburned fuel.

Diurnal Daily, especially pertaining to cyclic actions which are completed within 24 hours, and which recur every 24 hours.

Dry Bulb A name given to an ordinary thermometer used to determine the temperature of the air (to distinguish it from the wet bulb).

Dry Lightning Storm A lightning storm with negligible precipitation reaching the ground.

Duff A mat of partially decomposed organic matter immediately above the mineral soil, consisting primarily of fallen foliage, herbaceous vegetation, and decaying wood (twigs and small limbs).

Eddy A whirl or circling current of air or water, different and differentiated from the general flow.

Elevation The height of the terrain above mean sea level, usually expressed in feet.

Equilibrium Moisture Content (EMC) The level at which dead fuels neither gain nor lose moisture with time, under specific constant temperature and humidity. The water vapor pressure in the air is equal to the vapor pressure in the fuel. A fuel particle, at EMC, will have no net exchange of moisture with its environment.

Equilibrium Vapor Pressure — Occurs when there is no net gain or loss of water molecules between the air and a solid or liquid.

Evaporation — The transformation of a liquid to the gaseous state. Heat is lost by the liquid during this process.

Extreme Fire Behavior — Implies a level of wildfire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rates of spread; prolific crowning and/or spotting; presence of firewhirls; a strong convection column. Predictability is difficult because such fires often exercise some degree of influence on their environment, behaving erratically and sometimes dangerously.

Fahrenheit — A temperature scale on which 32°F denotes the temperature of melting ice, and 212°F the temperature of boiling water, both under standard atmospheric pressure.

Fine Fuels — Fuels that are less than one-fourth-inch in diameter such as grass, leaves, draped pine needles, fern, tree moss, and some kinds of slash which, when dry, ignite readily and are consumed rapidly. (Also called flash fuels.)

Fire Perimeter — The entire outer edge or boundary of a fire.

Fire Storm — Violent convection caused by a large continuous area of intense fire. Often characterized by destructively violent surface indrafts near and beyond the perimeter, and sometimes by tornado-like whirls.

Firebrand — Any source of heat, natural or manmade, capable of igniting wildland fuels. Flaming or glowing fuel particles that can be carried naturally by wind, convection currents, or by gravity into unburned fuels.

Firebreak — A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Firing Out — Also called firing. The act of setting fire to fuels between the control line and the main fire in either a backfiring or burning-out operation.

Fire Line	The part of a control line that is scraped or dug to mineral soil. Sometimes called fire trail.
Firewhirl	A spinning, moving column of ascending air which carries aloft smoke, debris, and flames. These range in size and intensity from a foot or two in diameter to small tornadoes.
Flanking	Attacking a fire by working along the flanks, either simultaneously or successively, from a less active or anchor point and endeavoring to connect the two lines at the head.
Flanks of a Fire	The parts of a fire's perimeter that are roughly parallel to the main direction of spread.
Flare-up	Any sudden acceleration of fire spread or intensification of the fire. Unlike blowup, a flare-up is of relatively short duration and does not radically change existing control plans.
Flash Fuels	Fuels such as grass, leaves, draped pine needles, fern, tree moss, and some kinds of slash that ignite readily and are consumed rapidly when dry. (Also called fine fuels.)
Flashover	Rapid combustion and/or explosion of unburned gases trapped at some distance from the main fire front. Usually occurs only in poorly ventilated topography. More commonly associated with structural fire behavior.
Foehn	(Pronounced "fern.") A type of general wind that occurs when stable, high pressure air is forced across and then down the lee slopes of a mountain range. The descending air is warmed and dried due to adiabatic compression. Locally called by various names such as Santa Ana, Mono, Chinook, etc.
Fog	A cloud at or near the earth's surface. Fog consists of numerous droplets of water which individually are so small that they cannot be distinguished readily by the naked eye.
Front	The transition zone between two different air masses.
Frost	Crystals of ice formed and deposited like dew, but at a temperature below freezing.

Fuel Break	A wide strip or block of land on which the native or preexisting vegetation has been permanently modified so that fires burning into it can be extinguished more readily. It may or may not have fire lines constructed in it prior to fire occurrence.
Fuel Moisture Content	The amount of water in a fuel, expressed as a percentage of the "oven-dry" weight of that fuel.
General Winds	Large-scale winds caused by high- and low-pressure systems but generally influenced and modified in the lower atmosphere by terrain.
Gradient Wind	A wind that flows parallel to the isobars or contours and has a velocity such that the pressure gradient, Coriolis, and centrifugal forces acting in the area are in balance. It does not occur at the earth's surface due to fractional influence, but occurs at a height of roughly 1,500 feet above mean terrain height. Nearly synonymous with "free air" winds.
Ground Fire	All combustible materials lying beneath the ground surface, including deep duff, roots, rotten buried logs, peat, and other woody fuels.
Gust	A sudden, brief increase in the speed of the wind.
Head of a Fire	The most rapidly spreading portion of a fire's perimeter, usually to the leeward or upslope.
Heavy Fuels	Fuels of large diameter such as snags, logs, and large limb wood that ignite and are consumed much more slowly than flash fuels. (Also called coarse fuels.)
High	An area of relatively high atmospheric pressure that has a more or less closed circulation; an anticyclone. Winds around a high move clockwise in the Northern Hemisphere, while spiraling out from the high toward lower pressure.
Horizontal Continuity	The horizontal distribution of fuels at various levels or planes.
Hotspotting	Checking the spread of fire at points of more rapid spread, or special threat. It is usually the initial step in prompt control with emphasis on first priorities.

Humidity The measure of water vapor content in the air.

Ignition The initiation of combustion.

Indirect Attack A method of suppression in which the control line is mostly located along natural firebreaks, favorable breaks in topography, or at considerable distance from the fire, and all intervening fuel is backfired or burned out. The strip to be backfired is wider than in the parallel method and usually allows a choice of the time when burnout or backfiring will be done.

Insolation Solar radiation received at the earth's surface.

Instability A state of the atmosphere in which the vertical distribution of temperature is such that an air particle, if given either an upward or downward impulse, will tend to move vertically away with increasing speed from its original level (unstable air).

Interface That line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Inversion A layer in the atmosphere where the temperature increases with altitude.

I-Zone See Interface.

Ladder Fuels Fuels that provide vertical continuity between strata. Fire is able to carry from surface fuels by convection into the crowns with relative ease.

Land Breeze A light nighttime breeze that originates over the relatively cool land surface and flows out over the warmer coastal waters.

Lightning A sudden visible flash of energy and light caused by electrical discharges from thunderstorms.

Litter The uppermost layer of loose debris composed of freshly fallen or slightly decomposed organic materials such as dead sticks, branches, twigs, and leaves or needles.

Local Winds — Small-scale convective winds of local origin caused by temperature differences.

Long-Range Spotting — Large glowing firebrands are carried high into the convection column and then fall out downwind beyond the main fire, starting new fires. Such spotting can easily occur 1/4 mile or more from the firebrands' source.

Low — An area of relatively low atmospheric pressure in which winds tend to move in a counterclockwise direction, spiraling in toward the low's center.

Precipitation — The collective name for moisture in either liquid or solid form large enough to fall from the atmosphere and reach the earth's surface.

Pressure Gradient — The change in atmospheric pressure per unit of horizontal distance.

Psychrometer — An instrument for measuring atmospheric temperature and humidity, consisting of a dry-bulb thermometer and a wet-bulb thermometer (bulb covered with a muslin wick); used in the calculation of dew point and relative humidity.

Rainfall — A term sometimes synonymous with rain, but most frequently used in reference to amounts of precipitation (including snow, hail, etc.).

Rain Gauge — An instrument for measuring precipitation.

Rate of Spread — The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire; or as rate of forward spread of the fire front; or as rate of increase in area, depending on the intended use of the information. Usually its (forward) rate of spread is expressed in chains or acres per hour.

Reburn — 1. Subsequent burning of an area in which fire has previously burned but has left flammable fuel that ignites when burning conditions are more favorable. 2. An area that has reburned.

Red Flag Warning — An ongoing or imminent critical fire weather pattern or condition. The "warning" is provided by the National Weather Service to weather forecast users to alert wildland fire services of conditions conducive to extreme fire behavior.

Relative Humidity The ratio of the amount of moisture in the air to the amount which the air could hold at the same temperature and pressure if it were saturated; usually expressed in percent.

Resistance to Control The relative difficulty of constructing and holding a control line as affected by resistance to line construction and fire behavior. (Also called difficulty of control.)

Ridge An elongated area of relatively high pressure extending from the center of a high-pressure region.

Roll Cloud A turbulent altocumulus-type cloud formation found in the lee of some large mountain barriers. The air in the cloud rotates around an axis parallel to the range. Also sometimes refers to part of the cloud base along the leading edge of a cumulonimbus cloud; it is formed by rolling action in the wind shear region between cool downdrafts within the cloud and warm updrafts outside the cloud. (Sometimes called rotor cloud.)

Running Behavior of a fire that is spreading rapidly, usually with a well-defined head.

Safety Island An area for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety island close at hand, allowing the fuels inside the control line to be consumed before going ahead.

Saturated Air Air that contains the maximum amount of water vapor it can hold at a given pressure and temperature (relative humidity of 100 percent).

Scratch Line An unfinished preliminary control line hastily established or constructed as an emergency measure to check or slow the spread of a fire.

Sea Breeze A daytime breeze in which cooler, higher pressure air from over coastal waters moves on shore to replace heated air rising off the warmer land mass.

Short-Range Spotting Firebrands, flaming sparks, or embers are carried by surface winds, starting new fires beyond the zone of direct ignition by the main fire. The range of such spotting is usually less than 1/4 mile.

Size and Shape — Fuel characteristics affecting the fuel moisture time lag, the amount of heat required for ignition and to sustain combustion, and the burnout time of fuels. The surface-area-to-volume ratio is a representation of size and shape.

Slash — Debris left after logging, pruning, thinning, or brush cutting; also debris resulting from thinning, wind, or fire. It may include logs, chunks, bark, branches, stumps, and broken understory trees or brush.

Slope Winds — Small-scale convective winds that occur due to local heating and cooling of a natural incline of the ground.

Slope Percent — The ratio between the amount of vertical rise of a slope and horizontal distance as expressed in a percent. One hundred feet of rise to 100 feet of horizontal distance equals 100 percent.

Smoldering — Behavior of a fire burning without flame and barely spreading.

Snag — A standing dead tree or part of a dead tree from which at least the leaves and smaller branches have fallen. (Often called stub, if less than about 20 feet tall.)

Spot Fire — Fire set outside the perimeter of the main fire by flying (or rolling) sparks or embers.

Spotting — Behavior of a fire producing sparks or embers that are carried by convection columns and/or the wind and which start new fires beyond the zone of direct ignition by the main fire.

Stability — A state of the atmosphere in which the vertical distribution of temperature is such that an air particle will resist vertical displacement from its level (stable air).

State of Weather — A brief description of current weather that expresses the amount of cloud cover, kind of precipitation, and/or restrictions to visibility being observed at a weather observation site.

Subsidence — An extensive sinking motion of air in the atmosphere, most frequently occurring in polar highs. The subsiding air is warmed by compression and becomes more stable. Of particular importance due to the heating and drying of the air, it is often the cause of very rapid drying of fuels in the smaller size classes.

Suppress a Fire To extinguish a fire or confine the area it burns within fixed boundaries.

Surface-Area-to-Volume Ratio The ratio of the surface area of a fuel to its volume, using the same linear unit for measuring volume; the higher the ratio, the finer the particle.

Surface Fire A fire that burns surface litter, debris, and small vegetation.

Surface Fuels All materials lying on, or immediately above, the ground, including needles or leaves, duff, grass, small dead wood, downed logs, stumps, large limbs, low brush, and reproduction.

Surface Wind The wind measured 20 feet above the average top of the vegetation. It is often a combination of local and general winds.

Temperature A measure of the degree of hotness or coldness of a substance.

Temperature Lapse Rate The amount of temperature change with altitude change, expressed as degrees Fahrenheit per 1,000 feet of rise or fall.

Thermal Belt An area of a mountainous slope that typically experiences the least variation in diurnal temperatures, has the highest average temperatures, and thus, the lowest average relative humidity.

Thermometer An instrument for measuring temperature; in meteorology, generally the temperature of the air.

Thunder The sound emitted by rapidly expanding gases along the channel of a lightning discharge.

Thunderstorm A storm invariably produced only by a cumulonimbus cloud, and always accompanied by lightning and thunder; usually attended by strong wind gusts, heavy rain, and sometimes hail. It is usually of short duration, seldom over two to three hours for any one storm.

Topography The configuration of the earth's surface, including its relief and the position of its natural and manmade features.

Torching Fire burning principally as a surface fire that intermittently ignites the crowns of trees or shrubs as it advances.

Vertical Arrangement The relative heights of fuels above the ground and their vertical continuity, which influences fire reaching various levels or strata. (Surface fuels versus aerial fuels, and their relationships to one another.)

Vertical Development of Column Depending on fire intensity and atmospheric conditions, the smoke or convection column might rise a hundred feet or many thousands of feet. A low-intensity fire with a low smoke column might be termed "two-dimensional," whereas a high-intensity fire with a well-developed convection column rising thousands of feet into the atmosphere can be termed a "three-dimensional" fire. (See Convection Column.)

Virga Wisps or streaks of water or ice particles falling out of a cloud but evaporating before reaching the earth's surface.

Visibility The greatest distance that prominent objects can be seen and identified by unaided, normal eyes. (Usually expressed in miles, or fractions of a mile.)

Warm Front The discontinuity at the forward edge of an advancing current (or mass) of relatively warm air which is displacing a retreating colder air mass.

Weather The short-term variations of the atmosphere in terms of temperature, pressure, wind, moisture, cloudiness, precipitation, and visibility.

Wet-Bulb Temperature The lowest temperature to which air can be cooled by evaporating water into it at a constant pressure when the heat required for evaporation is supplied by the cooling of the air. It is measured by the wet-bulb thermometer, which usually employs a wetted wicking on the bulb as a cooling (through evaporation) device.

Wet Line A fire control line, usually temporary, prepared by treating the fuels with water and/or chemicals which will halt the spread of the fire.

Wildfire An unplanned wildland fire requiring suppression action, or other action according to agency policy, as contrasted with a prescribed fire burning within prepared lines enclosing a designated area, under prescribed conditions. A free-burning wildfire unaffected by fire suppression measures.

Wildland Fuels	Any organic material, living or dead, in the ground, on the ground, or in the air, that will ignite and burn.
Wildland/Urban Interface	See Interface.
Wind	The horizontal movement of air relative to the surface of the earth.
Wind-Driven Wildfire	A wildland fire that is controlled by a strong consistent wind.
Windspeed Meter	A handheld device that indicates wind speed, usually in miles per hour.

APPENDIX A

NATIONAL WILDFIRE COORDINATING GROUP FIRELINE HANDBOOK

Fireline Handbook

January 1998

NWCG Handbook 3
PMS 410-1
NFES 0065

FIRE ORDERS

Fight fire aggressively but provide for safety first.
Initiate all action based on current and expected fire behavior.
Recognize current weather conditions and obtain forecasts.
Ensure instructions are given and understood.

Obtain current information on fire status.
Remain in communication with crew members, your supervisor, and adjoining forces.
Determine safety zones and escape routes.
Establish lookouts in potentially hazardous situations.
Retain control at all times.
Stay alert, keep calm, think clearly, act decisively.

Common Denominators of Fire Behavior on Tragedy Fires

- Most incidents happen on the smaller fires or on isolated portions of larger fires.
- Most fires are innocent in appearance before unexpected shifts in wind direction and/or speed results in "flare-ups" or "extreme fire behavior." In some cases, tragedies occur in the mop-up stage.
- Flare-ups generally occur in deceptively light fuels, such as grass and light brush.
- Fires run uphill surprisingly fast in chimneys, gullies, and on steep slopes.
- Some suppression tools, such as helicopters or air tankers, can adversely affect fire behavior. The blasts of air from low flying helicopters and air tankers have been known to cause flare-ups.

NWCG

Fireline Handbook

A Publication of the
National Wildfire Coordinating Group

Sponsored by
United States Department of Agriculture

United States Department of the Interior

National Association of State Foresters

Prepared by
Incident Operations Standards Working Team

January 1998

NWCG Handbook 3
PMS 410-1
NFES 0065

Additional copies of this publication may be ordered from:
National Interagency Fire Center, ATTN: Great Basin Cache Supply Office, 3833 S. Development Ave., Boise ID 83705.
Order NFES #0065.

NWCG FIRELINE HANDBOOK
January 1998

CONTENTS

APPENDIX B: ORDER NFES #2165

CHAPTER 1 - INITIAL ATTACK

CONTENTS

Definition of Initial Attack

Initial attack is the action taken by resources which are first to arrive at an incident. All wildland fires that are controlled by suppression forces undergo initial attack. The number and type of resources responding to initial attack varies depending upon fire danger, fuel type, values at risk and other factors. Generally, initial attack involves relatively few resources, and incident size is small.

Characteristics of an Initial Attack Incident

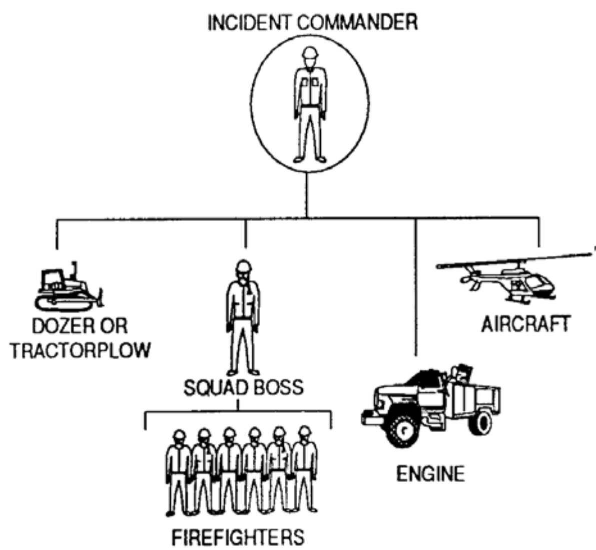
Resources vary from a single resource to several single resources, possibly a single task force or strike team.

Normally limited to one operational period - at least the contain phase. Mop up may extend into multiple periods.

Normally does not require a written incident action plan.

The initial attack incident commander is normally the most experienced firefighter on the scene and is responsible for performing all command and general staff functions.

Example of Initial Attack Organization



DUTIES OF INITIAL ATTACK INCIDENT COMMANDER

When a Fire is Reported

Obtain the following information from Agency Dispatch:

- Person reporting the fire--"John Citizen, Mill Road, 555-1234"
- Location of fire--"north slope Bald Mountain"
- Best access--"Farm Road off Smith Road"
- Landowner--"Smith"
- Jurisdiction(s) involved
- Size--"about 1 acre"
- Fuel type
- Rate of Spread--"creeping around on the ground"
- Suspected cause--"campers"
- Values to be protected --"neighbor's home within 1/2 mile"
- MOST RECENT FIRE WEATHER FORECAST.

  REMEMBER, NOAA WEATHER RADIO FORECASTS DO NOT REPLACE A FIRE WEATHER FORECAST, ONLY SUPPLEMENT IT.

Use Maps To:

- Determine and mark the location
- Determine the best route to the fire
- Locate values threatened

Fire Behavior
Pay particular attention to all fire behavior information, especially predicted fire weather.

Enroute to the Fire

Travel Safely! Don't speed!

Review Initial Attack Safety Checklist (page 7)

Consider what you know about the fire area

- Fuels and terrain
- Access
- Barriers to fire spread
- Ownership
- History of fires in the area
- Resources enroute
- Backup forces available?

Think about Fire Behavior

- Consider fuels, topography and weather
- How will this fire burn compared to others in similar areas?
- Is the fire danger increasing or decreasing?

Look for Local Weather Indicators

- Check the wind. Is it faster or slower than forecasted? Is it from the same direction?
- Are there whirlwinds, dust devils, or gusty winds that would indicate possible erratic fire behavior?
- Are unfavorable weather changes imminent?
- What impact are diurnal winds likely to have?
- IF WEATHER CONDITIONS ARE MUCH DIFFERENT FROM PREDICTED, ESPECIALLY WIND SPEED OF MORE THAN 5 MPH OR FROM A DIFFERENT DIRECTION, REQUEST A SPOT WEATHER FORECAST.

After Sighting the Smoke Column

- Verify expected fire behavior by observing the smoke column's volume, height, color, direction.

When Approaching the Fire Scene

- Watch for people leaving the fire area and write down vehicle license numbers and any other identifying features and information.
- Use caution in approaching scene.
- Determine escape routes.
- Look for alternate access routes.
- Look for evidence of where and how the fire may have started and protect origin.

Arriving at the Fire

FIRES SHOULD BE FOUGHT AGGRESSIVELY, BUT THE SAFETY AND PROTECTION OF PERSONNEL AND EQUIPMENT MUST BE THE FIRST CONCERN.

REMEMBER THE STANDARD FIRE ORDERS AND WATCHOUT SITUATIONS

- First arrival -- size up fire and report to dispatch.
- Do not cross the head of the fire unless it can be done safely.
- Vehicles should be parked in a safe, accessible location pointing away from the fire with windows closed, doors unlocked and keys left in the ignition.
- Make sure that all roads are open for traffic.

Step 1: Determine an initial attack plan immediately upon arrival at the fire. This should be done quickly and be based on your initial size-up of the fire. The intent is to get work started in suppressing the fire as soon as possible. Determine:

- Location of escape routes and safety zones.
- Special hazards such as burning snags, power lines, etc.
- Good anchor points such as roads, burned area, etc.
- Where to attack fire (head or flank).

- How to attack fire (direct or indirect).
- Type of control line needed.
- Are there existing barriers that can be used?
- When will the next units arrive?
- Additional resource needs.
- How will topography affect fire behavior?
- Locate and preserve point of origin.
- Give status report to dispatch.

Step 2: Brief the crew and begin work. Make sure crew understands their work assignment. PROMPT, DECISIVE ACTION DURING THE EARLY STAGES OF A FIRE OFTEN DETERMINES THE SUCCESS OR FAILURE OF THE INITIAL ATTACK.

When safe, begin the attack at the head of the fire to quickly stop the spread. Establish anchored control line. Exceptions to attacking the head:

- Fire intensity is such that work at the head of the fire is unsafe.
- Fire is burning toward a natural barrier that will check the spread.
- A high value resource must be protected along another portion of the fire perimeter.
- The fire is likely to burn into volatile fuels along another area of the fire perimeter that will result in an increased rate of spread.

Step 3: After resources have been deployed and control action started, continue assessment of the fire, and gather information for determining fire cause.

Step 4: Preview Initial Attack Safety Checklist (page 7) as needed or as conditions change.

Review and use the checklist while enroute to the fire, after control action has begun, and whenever there is a change in fireline conditions or predicted conditions.

INITIAL ATTACK SAFETY CHECKLIST

After your initial size up of the fire and/or transition from an initial attack IC, answer the following questions. Repeat this analysis whenever there is a change in conditions on the fire or a predicted change in fire conditions.

yes	no	Have you sized up the fire?
yes	no	Do you have a current *fire* weather forecast for fire location?
yes	no	Is the observed fire weather consistent with the forecast?
yes	no	Can you control the fire with the resources available (on the incident and/or soon to be on the incident) under expected conditions?
yes	no	Have you developed a plan to attack the fire? (Direct or indirect, anchor points, escape routes, head or flank attack, priority areas.) Have you communicated this to all personnel assigned to the incident, including new arrivals?
yes	no	Lookouts in place or you can see all of the fire area?
yes	no	Can you communicate with everyone on the fire and with dispatch?
yes	no	Escape routes and safety zones are established. If you are using the black, is it completely burned and without a reburn potential?
yes	no	Safety and the standard fire orders are being followed?
yes	no	Have you reported the status of the fire to dispatch?
yes	no	Will you control the fire before the next operational period?
yes	no	Do you have a complete list of what resources have been ordered for the fire?
yes	no	If the fire will not be controlled before the next operational period or the size of the organization exceeds the IC's capability to manage, have you informed agency headquarters?

If the answer is NO to any of the above questions, you must take corrective action IMMEDIATELY.

Assessment

View fire from a point where a complete picture of the fire can be obtained. On a small, slow moving fire, the entire assessment can be made very quickly while standing at or near the perimeter. On a large, and/or more rapidly spreading fire, a view from a high point or a helicopter may be needed. Use field observers as necessary. Consider the following:

- Safety--watch for danger areas and evaluate escape routes.
- Size of fire
- Length of fire perimeter
- Location of head
- Values to be protected ahead of the fire
- Weather
- Fire behavior—as expected?
- Fire intensity and rate of spread
- Fuel type--at location in proximity
- Topography
- Time of day

Evaluate Initial Attack Plan

- Is the initial attack plan working? If not, why?
- Are additional resources needed?
- How much time will it take to construct control line?
- Will changes in weather, fuel, or topography significantly impact fire behavior prior to control?
- Is rate of spread or intensity higher than expected? If so, advise dispatch.

If the initial attack plan is working, continue. If not change it and implement the changes. Inform agency dispatch if fire complexity exceeds your management capability. Ask for help if needed.

Status Reporting

At the earliest opportunity, the following information should be forwarded to the agency dispatch and continue to keep the dispatcher informed of any significant changes and progress on the fire.

- Fire name
- Actual location
- Access
- Fuel type
- Terrain
- Size of Fire
- Rate of spread
- Anticipated control problems

- Fire potential (how large will/may fire get)
- Cause (known, suspected)
- Values threatened
- Anticipated time of control
- Weather
- Resources on the scene
- Additional resource needs
- Fire behavior
- Specialty positions needed

Fire Control Strategies

The strategy(s) used to control a fire depends on the rate of spread, intensity, spotting potential, values at risk, size, type of available resources, and other factors. Anchor control lines to an existing barrier such as a road, creek, burned area, etc. to minimize the chance of being flanked by the fire. Attack may involve one or more of the following strategies:

Direct Attack

- Control efforts, including line construction, are conducted at the fire perimeter, which becomes the control line.
- Used when fire perimeter is burning at low intensity and fuels are light, permitting safe operation at the fire edge.
- Often used where high value resources or improvements are threatened.
- The burned area is kept to a minimum
- Where possible, keep one foot in the black.
- An anchor point is required.

Indirect Attack

- Control line is located along natural firebreaks, favorable breaks in topography, or at considerable distance from the fire. The intervening fuel is burned out.
- If indirect attack is necessary, the fire may be moving rapidly to extended attack. Be alert to this possibility.
- Applications include fast moving ground fires too intense for crew, crown fires, steep terrain, or areas with pre-planned or natural barriers.

Flanking Attack

Attacking a fire by working along the flanks either simultaneously or successively from an anchor point in an attempt to connect the control lines on each flank:

- May be either direct or indirect and the distance the control line is from the fire edge usually is dependent on fire intensity.
- The strip of unburned fuel between the line and fire edge is burned out as soon as possible during fireline construction.
- This method is used for moderately intense fires moving at a moderate rate of spread.

Fire Control Tactics

Principles of Fireline Location

Locate line, after consideration of the following:

- Provide for safety of personnel.
- Locate line adequate distance from fire so it can be completed, burned out and held with predicted rate of spread and fire behavior.
- Allow adequate time to permit forces to build lines and also do other needed work, such as snag falling and burning out, in advance of severe burning conditions.
- Make line as short and straight as practical, use topography to your advantage.
- Use easiest routes for control without sacrificing:

  Holding practicability.

  Too much area or resource value.
- Eliminate possible hazards from fire area and provide adequate safe distance between lines and hazards that must be left in the fire area.
- Avoid undercut lines and sharp turns in the line.
- Use existing natural and person-made barriers.
- Use heavy equipment, where appropriate, for line construction.
- Encircle area where spot fires are so numerous that they are impractical to handle as individual fires. Burn out unburned fuels.
- Consider environmental effects and agency policy.
- See Downhill/Indirect Fireline Construction Guidelines (Chapter 5-Firefighting Safety.)

Principles of Line Construction

- Make line no wider than necessary, consider height of vegetation.
- Clean all lines to mineral soil, where practical.
- Discard unburned line construction material outside of the fireline.
- Scatter charred or burning material inside burned area.
- Construct trenched lines on steep slopes to catch rolling material below the fire.
- Increase effectiveness of line width by cooling down adjacent fire with dirt or water.
- Cover uncharred, rotten logs and stumps just outside the line with dirt or wet down.
- Fall or line snags near line before burnout, if time permits.
- Build fireline as close to fire edges as conditions safely permit. Burn out fireline as control line proceeds.
- Keep one foot in the black, where possible.

Principles of Dozer and Tractor Plow Use

EQUIPMENT OPERATORS SHALL BE EQUIPPED WITH PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Assure that all personnel are aware of location of working equipment.
- Be certain all dozers or tractors used are in good mechanical condition, have approved spark arrestors, have safety canopy, have a clean belly pan and have been signed up under rental agreement, if required.
- Equipment operators have required communications with incident.
- Take advantage of favorable fuels and topography.
- Consider working equipment in tandem especially when working near a fast moving fire for increased production and safety.
- Buck logs and fall trees or snags in fireline as needed.
- Push flammable material to outside of line.
- Any burning material should be pushed well inside the fireline and scattered.

- Allow no one, other than the operator, to ride on equipment.
- During mop-up:

  ✓Rehab Lines - water bar where necessary.

  ✓Scatter large logs or hot piles into burned area.

  ✓Scatter piles on outside of line.

Principles of Water Use

- Use water sparingly when it is in short supply.
- Direct water at base of flame.
- Have hand tool personnel work with nozzle personnel to make most effective use of water, especially during mop-up.
- Require good communications between nozzle personnel and water source.
- Plan for ample water supply--request water tenders as needed.
- Coordinate so all units do not run out of water at once during critical period.
- Do not block roads.
- Keep engines pointed in a direction for quick escape.
- After direct attack with water, follow up with a fireline to mineral soil around the entire fire.
- Provide eye protection to the nozzle operator.
- Use foam or other water additives to increase effectiveness and save water.

Principles of Aerial Retardant Application

- Determine tactics (direct/indirect) and strategy based on fire size-up and resources available.
- Establish an anchor point and work from it.
- Use the proper drop height.
- Apply proper coverage levels.
- Drop downhill and down-sun when feasible.
- Drop into wind for best accuracy.
- Maintain effective communication between the ground and the air.

- Use direct attack only when ground support is available.
- Plan drops so that they can be extended or intersected effectively.
- Honestly evaluate and monitor retardant effectiveness and adjust its use accordingly.

Principles of Foam Use

- The addition of Class-A foam concentrate to water enhances water's natural ability to extinguish fires burning in Class-A combustibles only.
- Generally speaking, Class-A foams can be safely used on combustibles that leave an ember when consumed by fire.
- Class-A foams work by cooling combustibles below ignition temperature.
- Class-A foams reduce the surface tension of plain water which provides for deeper penetration into fuels.
- Mixture rates for Class-A foam may vary depending on the application from .1% to 1%.
- Class-A foams can be generated in dry or wet consistencies depending on the mixture rates and degree of aeration.
- Class-A foams may be introduced into water streams by any of the following methods: 1. Batch mixing directly into a water tank or water supply; 2. Through the discharge/intake side of the pump proportioning utilizing the Venturi principle; and 3. Positive pressurization which injects foam into the water stream.
- Class A foams are subjected to tests for approval of acceptable corrosion levels and to establish toxicity levels. Only approved foams should be used.

Burning Out

Setting fire inside a control line to consume fuel between the edge of the control line and the fire to strengthen the fireline (create a black line). Burning out removes the danger of fuel near the line burning at a later date when no one is around or when conditions are such that flare-ups near the line would spot across the line.

Helicopter Use

- Helicopters may be the first unit to arrive at the fire. They are often used to drop water, foam, or fire retardants. The initial attack incident commander should integrate this resource into the control action.

- Helicopters may be used for reconnaissance work.
- Helicopters may be used to transport equipment, supplies or personnel.

Principles of Mop-Up

- Start mop-up as soon as line construction and burnout are complete. Mop-up most threatening situations first.
- Allow fuel to burn up if it will do so promptly and safely.
- Mop-up entire area, if practical, on small fires.
- Mop-up on large fires far enough inside the fireline to be sure that no fire can blow out, spot, or burning materials roll over the fireline under the anticipated worst possible conditions.
- Fell only those snags which could result in spotting or fire spread across the line.
- Search for smoldering spot fires.
- Consider potential for problems from snags, punky logs, and fuel concentrations outside the control line.
- Search for and dig out burning fuels to reduce heat and danger of spotting.
- Trench below, block, or turn heavy logs, stumps, or material so they cannot roll.
- Feel with the back of your hands for possible smoldering spots close to the line (use care, go slow).
- Use water in conjunction with hand tools. In dry mop-up, stir and mix hot embers with dirt.
- Use water sparingly, but use enough to do the job. Match the amount of water to the job.
- When using water to mop up deep-burning fuels such as peat, duff, or needles, scrape or stir the fuel while applying water.
- Adding wetting agents or foam to water will greatly increase effectiveness of water, especially in deep burning fuels.
- Cold trailing

CHAPTER 2 - EXTENDED ATTACK

CONTENTS

Definition of Extended Attack:

An Extended Attack Incident is a wildfire that has not been contained/controlled by the Initial Attack Forces and additional firefighting resources are arriving, enroute, or being ordered by the Initial Attack Incident Commander.

Note: An Extended Attack Incident fits into the Type 3 Incident as regards complexity.

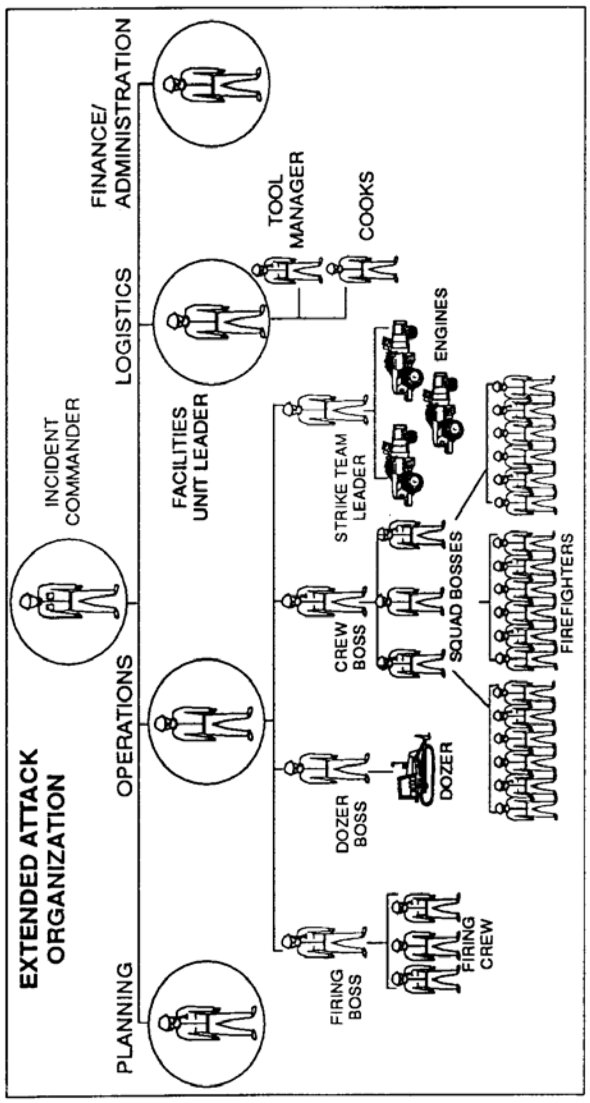
Characteristics of an Extended Attack Incident:

An Extended Attack Incident is normally characterized by:

- Usually less than 100 acres in size. In some rural/wildland areas where the values at risk are low and fuels are primarily 100 hours or less, the fire size could be significantly larger.
- Firefighting resources vary from several single resources to several Task Force/Strike Teams.
- The incident may be divided into divisions, but would not meet the Division Supervisor complexity in regards to span-of-control.
- The incident is expected to be contained/controlled in the first operational period. If not, it may transition into a more complex incident (Type 2 organization).
- Generally, a written Incident Action Plan may not be needed or prepared.
- Some of the Command and General Staff positions such as Operations, Planning, Logistics, Safety, and Liaison may be filled.
- Staging areas may be utilized and in some instances a small incident base established.

Example of an Extended Attack Organization

General staff positions filled as needed.



Transition from an Initial Attack Incident to an Extended Attack Incident

Early recognition by the Initial Attack IC that a fire will not be controlled by the initial attack forces is important. As soon as the Initial Attack IC recognizes that additional resources are needed or knows additional forces are enroute, the IC may need to withdraw from direct fireline suppression and must prepare for the transition to an Extended Attack IC mode of operation. The following items should be addressed by the Initial Attack IC when transitioning to an Extended Attack Incident:

Duties of Extended Attack Incident Commander (if all positions not filled)

- Establish an Incident Command Post (ICP) and check-in location(s) to receive, brief and assign incoming resources.
- Use an Incident Briefing Form (ICS 201) to:

  ✓Sketch a map of the fire and identify resource assignments.

  ✓Document the fire organization .

  ✓Keep track of all resources that are on scene, enroute, and ordered.

  ✓Document strategy, tactics, and current actions.

- Review Extended Attack Safety Checklist.
- Keep dispatch, or other higher level officer, informed of:

  ✓Status of the fire

  ✓Progress of the suppression effort

  ✓Additional resources needed

  ✓Weather conditions, especially changes

  ✓Special situations such as values threatened, etc.

- As additional resources arrive:

  ✓Divide the fire into areas of responsibility, such as right and left flank or Division A and Division B.

  ✓Assign individuals responsibility for these areas. At first these will usually be Single Resources Bosses, but as multiple single resources arrive consideration should be given to aggregating them into Task Forces with a Task Force Leader to reduce span-of-control (recommended no more than 1:5) and increase suppression efficiency.

- As the incident continues to escalate, there may be a need for:

  ✓An Operations Section Chief to directly supervise the suppression efforts.

  ✓A Logistics Section Chief to begin assessing logistical needs such as feeding, fuel, sleeping arrangements, special equipment, etc.

  ✓A Planning Section Chief to address the following incident planning needs:

    ★Establish formal check-in and resource status.

    ★Gather, record, and provide on-site information to firefighting personnel and dispatch.

    ★Take on-site weather and obtain weather reports and forecasts.

    ★Start written Incident Action Plan, if required by IC.

    ★Prepare maps.

    ★Assist in developing a Wildfire Situation Analysis

  ✓A Liaison Officer is especially important in multiple agency/jurisdiction incidents.

  ✓A Safety Officer

Control of the Fire or Transition to a Type 2 Incident

At some point the fire will be contained/controlled or a decision made to transition to a larger, more complex organization. Key indicators as to when to make this transition are:

- The fire will not be controlled in the first or next operational period.
- A written Incident Action Plan will be needed for the next operational period.
- Logistical support is needed. Establish an Incident Base or camps to feed, sleep, and supply personnel on the fire.
- There is a need to fill most or all of the Command and General Staff and support Unit Leader positions.
- Fire complexity exceeds capability of extended attack organization.

If the Extended Attack IC follows the above identified procedures, the efficiency of the suppression action will be optimized and the fire will either be controlled or the stage will be set for a smooth transfer of Command to the incoming Type 2 organization.

The primary objective of all IC's is to suppress the fire, but that is not always possible. When it is not, the IC's effectiveness (success) can be measured by how smoothly and efficiently the transfer of Command can be accomplished due to appropriate suppression action, ordering of needed resources (including support), adequate staffing, good planning, and complete documentation.

EXTENDED ATTACK SAFETY CHECKLIST

After your initial size-up of the fire and/or transition from an Initial Attack IC, answer the following questions. Repeat this analysis whenever there is a change in conditions on the fire or a predicted change in fire conditions.

YES	NO	Do you have a current fire weather forecast for the fire location?
YES	NO	Is the observed fire weather consistent with the forecast?
YES	NO	Can you control the fire with the resources available (on the incident or soon to be on the incident) under expected conditions?
YES	NO	Have you developed a plan to attack the fire? Direct or indirect, anchor points, escape routes, head or flank attack, priority areas. Have you communicated this to all personnel assigned to the incident, including new arrivals?
YES	NO	Lookouts or you can see all of the fire area?
YES	NO	Can you communicate with everyone on the fire and with dispatch?
YES	NO	Escape routes are established. If you are using the black, is it completely burned and without a reburn potential?
YES	NO	Safety and the standard fire orders are being followed?
YES	NO	Will you control the fire before the next operational period?
YES	NO	Have you reported the status of the fire to dispatch?
YES	NO	Do you have a complete list of what resources have been ordered for the fire?
YES	NO	Cost-share issues present?
YES	NO	Have all personnel on the fire been informed of the transition to an extended attack incident and any change of plans?
YES	NO	Fire complexity has exceeded management capability of extended attack organization.
YES	NO	Has this transition of command been documented in writing and through Dispatch?

IF THE ANSWER IS NO TO ANY OF THE ABOVE QUESTIONS, YOU MUST TAKE CORRECTIVE ACTION IMMEDIATELY.

CHAPTER 3 - TRANSITION

CONTENTS

Definition of Transition

There are many factors that determine the organizational complexity of an incident, such as size, location, threat to life and property, political sensitivity, jurisdictional boundaries, values-at-risk, fuel types, topography, agency policy, etc..

In situations where multiple agencies and jurisdictions are involved, the determination of organizational complexity and assignment of personnel should be agreed to jointly.

Wildfire Situation Analysis

If initial attack is unsuccessful and containment is not expected prior to the second burning period, the suppression action should be based on a wildfire situation analysis. It is the responsibility of the jurisdictional Agency Administrator, where required by agency policy, to ensure that a wildfire situation analysis is completed for all fires which are not expected to be contained before the next burning period. A wildfire situation analysis is a decision process and may require:

- **Identification of Evaluation Criteria**

  ✓Document the criteria used to evaluate suppression alternatives.

  ✓The criteria should be clearly stated and reflect such things as:

  ★Land and resource management objectives

  ★Environmental, political, and social concerns

  ★Potential suppression costs

  ★Resource damage

  ★Safety

  ★Local, regional, and national fire suppression activities and reinforcement capabilities

- **Development of Suppression Alternative**

  ✓Develop a sufficient number of alternatives to represent a reasonable range for the situation.

  ✓Each alternative must be practical and may include:

  ✓A concise strategic plan of control

  ✓Resources required

  ✓Probability of success

  ✓Consequence of failure

✓Estimates of time of control

✓Acres burned

✓Suppression costs

✓Resource damage

✓Property loss

- **Analysis of Suppression Alternatives**

  ✓Use the evaluation criteria to analyze alternatives.

  ✓Ensure that estimates of potential fire consequences are consistent with resource objectives, values, fire effects, and agency policy.

- **Approval, Documentation, and Notification**

  ✓Some agencies document this process in writing which is recommended. When written, it should be signed by the responsible A gency Administrator.

  ✓Inform the public and cooperators of the selected alternative, as appropriate.

- **Monitoring and Evaluation**

  ✓Evaluate the validity of the suppression decision, based on the current and predicted conditions at each strategy session.

  ✓Revise and update the analysis prior to the next operational period, if needed.

  ✓The Planning Section Chief is responsible for monitoring the <u>currency</u> of the wildfire situation analysis. If a revision is needed, advise the Incident Commander and the responsible Agency Administrator.

Agency Administrator's Responsibility for the Transition and Release of Incident Management Teams

The following guidelines are for the orderly transition of fire management responsibilities to incoming Incident Management Teams as well as the release of teams. Some information will need to be in writing and some may be verbal.

- **Assumption of Responsibilities**

  ✓The team in place is in charge until officially released. Release should not occur until incoming team members are briefed by their counterparts and ready to take full command of incident.

✓The suppression effort must continue during transition period.

✓The requesting unit should specify the expected time of arrival and expected time of transition to the incoming team.

✓The current Incident Commander should contact the local Agency Administrator in advance for location and time for Agency Administration briefing.

✓The requesting agency should accomplish the following prior to the arrival of the incoming team:

- ★Make contact with incoming Incident Commander prior to his or her arrival. Give IC an update on progress of fire and inquire if there are any special needs for the team.

- ★Determine ICP/Base location (see Chapter 10).

- ★Order support equipment, supplies, and initial basic support organization for the incident.

- ★Secure an ample supply of appropriate maps.

- ★Determine transportation needs of the team and obtain needed vehicles.

- ★Schedule agency administrator briefing time and location.

- ★Obtain necessary information for the administrator briefing (see Agency Administrator Briefing).

- ★Obtain necessary communications equipment and support for the incident.

✓It is the responsibility of the jurisdictional Agency Administrator to ensure that a wildfire situation analysis is completed for all fires which are not expected to be controlled before the second burning period.

✓The incoming team should be briefed by the existing Incident Commander at the ICP. The needed time for transition will depend upon incident complexity, expertise of the existing team, and/or other problems.

✓Complete a written Delegation of Authority, per agency policy, for the incoming Incident Commander to review.

Agency Administrator Briefing

This briefing should take place as soon as the incoming team is completely assembled. The Administrator (or designated representative) needs to provide at least the following information to the team:

General Information

- Overview
  - ✓Name and number of the incident
  - ✓Approximate size, location and land status
  - ✓Name of the current Incident Commander
  - ✓General weather conditions at the incident site
  - ✓Past and current fire behavior
  - ✓Fuel types
  - ✓Current tactics
  - ✓ICP and base locations
  - ✓Other incidents impacting strategy, resources and tactics
- Written Delegation of Authority to the incoming Incident Commander
- Recommended local participation in the team organization
- Information about existing or anticipated Unified Command organization (if any).
- Presence of agency evaluation team (if assigned)
- Names and skills of technical specialists assigned to the incident
- Local fire policy
- Land management direction, resource values, improvements, wilderness and roadless areas, cultural resources, rare and endangered species, etc.
- Priorities for control
- News media procedures
- Political considerations
- Agreements in effect
- Agency position on trainee assignments
- Other agencies already on the incident, agency representatives

- Desired date and time when team transition will occur
- Safety issues:
  ✓Accidents to date
  ✓Status of accident reports
  ✓Areas with existing or potential hazardous materials
- Operations (considered in I.C. briefing)
  ✓Strategy
  ✓Tactics
- Planning
  ✓Local unusual fire behavior and fire history in the vicinity of the incident
  ✓Legal considerations (current investigations in progress)
  ✓Pre-attack or resource protection plans available to the team
  ✓Local agency needs for release of in-place resources
  ✓Incident Status Summary (ICS-209) reporting requirements
  ✓Copy of the current Incident Status Summary
  ✓Training Specialist assigned or ordered
  ✓Status of current team
  ✓Status of local agency personnel
  ✓Agency capabilities for team operations support
  ✓Agency rest and rotation policies
  ✓Agency rehabilitation policies
  ✓Agency demobilization concerns
- Logistics
  ✓Transportation routes
  ✓Ordering system to be used
  ✓Procurement unit in place or ordered
  ✓Incident feeding procedures
  ✓Available sleeping facilities
  ✓Nearest burn center
  ✓Contacts with local law enforcement agencies
- Finance/Administration
  ✓Fiscal limitations and constraints
  ✓Any cost-share arrangements/agreements affecting the incident
  ✓Fiscal Officer(s) assigned, such as Comptroller, Contract-

ing Officer, Administrative Officer, etc.
✓Potential for claims
✓Comptroller needed or assigned

Local Incident Commander Briefing

The local Incident Commander must brief the incoming team upon their arrival. The incoming team should not assume command until thoroughly briefed and an exact hour of command transfer is determined. After briefing, team members will start phasing into their areas of responsibility, but will not assume full control until the predetermined time as agreed upon by the incoming and outgoing ICS. The local team may continue to work in various functions depending upon physical condition and direction received from the Agency Administrator.

IC/General Staff

- Incident map
- Time of ignition
- Point of origin
- Fuels (type, loading, moisture)
- Weather (current and predicted)
- Topography
- Fire behavior concerns
- Local hazards
- Review of existing control plan
- A copy of the current Incident Action Plan should be furnished to the team.
- Identification of any agency-specific resources currently assigned to the incident

Operations

- Safety
- Current strategy
- Tactics
- Aircraft use and availability

- Hand crew operations
- Dozer/tractor operation
- Engine operations (include city, county and rural cooperators)
- Helibase /helispot locations (map)
- Helibase crash fire protection
- Smoke conditions
- Effects on aircraft, vehicle traffic, observation
- Responsibilities for Initial Attack

Planning

- Resources currently available
- Resources already ordered
- Availability of aerial photos, usable maps
- Infrared requests
- Water availability
- Weather forecasting resources

Logistics

- ICP and Base/Camp sites
- Access routes to the fireline
- Communications resources
- Communications plan available
- Medical plan available
- Known security problems
- Feeding facilities available
- Sanitation facilities available
- Transportation resources available
- Traffic plan available
- Hazardous material management

Finance/Administration

- Status of rental agreements (private contractors, fire service organizations)
- Status of cost share agreements
- Status of current and anticipated claims
- Status of payroll function and time reports
- Cost to date

Release of an Incident Management Team

The release of an Incident Management Team is basically the reverse of the above transition process. The Agency Administrator must approve the date and time. The incoming local team should have had 24 hours off prior to assuming control.

- The Incident Commander should start phasing in the local team as soon as demobilization begins.

- The current team should not be released from the incident until fire management activity and work load is at a level that the incoming team can reasonably assume. Some considerations to assist in this determination are:

  ✓A transition plan should be prepared for the incoming Incident Management Team by the team being released.

  ✓Fire should be controlled or mopped up to a specified standard.

  ✓Unneeded line crews have been released.

  ✓Base/Camp shut down, reduced, or being shut down.

  ✓Planning Section Chief has prepared a rough copy of the fire report and narrative.

  ✓Finance/Administration Section Chief should have known finance problems resolved. Contact should be made with agency fiscal personnel.

  ✓Resource rehabilitation work is completed or to a point where the agency is satisfied with assuming remaining work.

  ✓Overhead performance ratings are completed.

  ✓The departing team should have an internal debriefing session prior to meeting with the Agency Administrator.

✓The Agency Administrator should debrief the departing team and prepare a written evaluation as soon as possible after release.

CHAPTER 4 - LARGE FIRES MANAGEMENT TEAMS (TYPE 1 & 2)

CONTENTS

Type 2 Organization

A Type 2 Organization is the first level at which most or all of the Command and General Staff positions are activated. Type 2 organization needs are commonly filled by a Type 2 Incident Management Team. The IC and Command/General Staff must function as a team handling many aspects such as:

- Supervising a large organization
- Multiple operational periods
- Gathering information to develop a written incident action plan
- Providing logistical support including the establishment and operation of a base and possibly camps
- All personnel should be fully qualified.

Transition from an Extended Attack Incident to a Type 2 Organization

As identified in the chapter titled Transition, the transition can be gradual by assimilation of staff until a Type 2 Incident Management Team is in place. When a Type 2 Team is brought in, usually a number of the Extended Attack personnel are incorporated into the Team organization.

Whatever route the transition takes, the success of the transition is dependent on how well the Extended Attack Organization has carried out their duties and how well the incoming Incident Management Team handles the transition. Some suggested pointers for the incoming organization are:

- Obtain a thorough Agency Administrator briefing prior to assuming command.
- Get a thorough briefing from the current IC and Staff. Retain and incorporate the current personnel into the incoming organization at least until the entire transition is complete.
- Keep in mind that the current IC and organization is in command until transfer of command is completed. (It is important that the current IC and organization also remember this).

Note: Be sensitive to the needs and feelings of the personnel you are replacing. Quite often they would prefer to continue to be in charge of the incident and you are to some extent intruders and a threat. Being sensitive to their feelings, listening to what they know about the situation, and continuing to use them in your organization will go a long way to ensuring a smooth transition.

- Incoming and outgoing IC's will decide the exact time of command change. Select a logical time to assume command, but do not assume command until thoroughly briefed and comfortable with the situation.

Note: When relieving an Extended Attack Organization, the Type 2 Team will assume responsibility soon after arrival of the support systems, but may leave the Operations Section in place until shift change for the next operational period.

Transition to a Type 1 Organization

At some point the fire will be contained/controlled or the decision will be made to transition to a Type 1 Organization, which is commonly a Type 1 Incident Management Team. In most cases, the evaluation and/or recognition of the need to replace a Type 2 Team with a Type 1 Team will be done by the Agency Administrator; however, the Type 2 Incident Commander should be vigilant to indicators that the incident is getting beyond the team's management capabilities, after the use of a complexity analysis.

If a Type 1 Team is brought in, the transition is again a very important phase. The process should be the same as when assuming command from the Extended Attack Organization. As with the Extended Attack IC, the Type 2 IC's effectiveness (success) can be measured by how smoothly and efficiently the transfer of command is accomplished.

Type 1 Organization

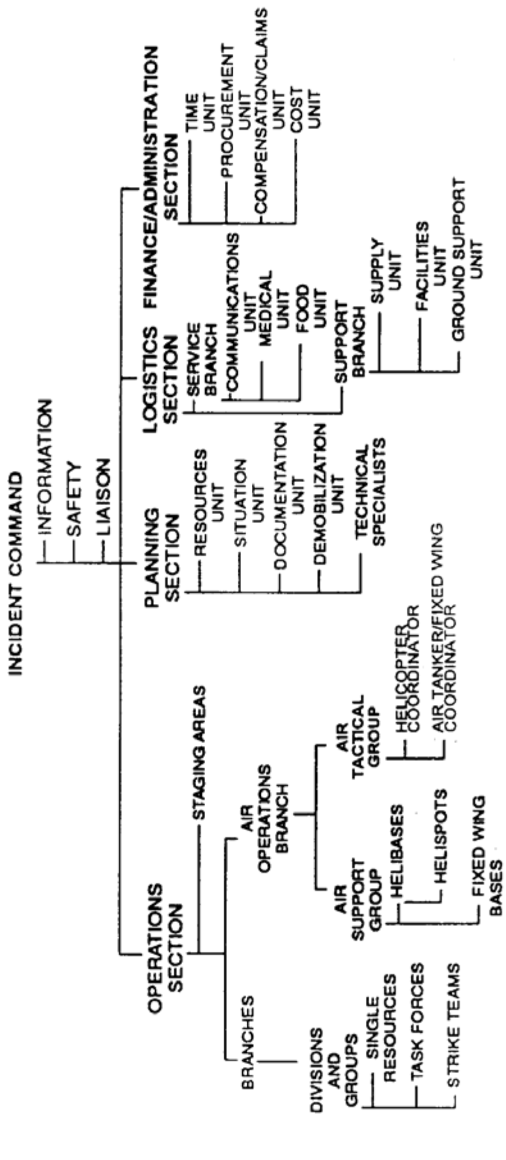
The primary difference between a Type 1 and a Type 2 Organization is a matter of size and complexity. The factors that affect the decision to go to a Type 1 operation are variable and depend to a large extent upon the needs and policies of the agency or agencies involved.

The Type 1 Organization has all of the characteristics of a Type 2 Organization plus:

- All Command and General Staff positions are filled with Type 1 qualified people.
- All divisions/groups are staffed with qualified Division/Group Supervisors.
- The number of divisions/groups may require that Branches be activated to address span-of-control needs.
- Operations personnel often exceed 500 per operational period and total personnel on the incident usually exceeds 1000.
- Aviation operations often involve several types and numbers of aircraft.

Organization Chart for Type 1 and Type 2 Incidents

Remember - Fill only those positions needed.



Multiple Incident Management/Complex

Most of the time an Incident Commander and/or Incident Management Team will be in command of only one (1) fire at a time; however, there are situations when conditions are such that it is more efficient or necessary for an Incident Commander to have command of multiple fires. There are some operational differences in managing a single large fire versus a number of smaller fires (some may be larger than single fires the IC normally commands), but the management principles are the same. As long as the "Components of ICS" (common terminology, modular organization, integrated communications, unified command structure, consolidated action plans, manageable span-of-control, predesignated incident facilities, and comprehensive resource management) are followed, the results should be similar.

A multiple incident management situation is organized and supported much like a single Incident situation with a single IC (or multiple, if a Unified Command is utilized) and a single Command and General Staff. Multiple fires managed by a single incident management team are commonly referred to as a "complex." How individual fires are handled operationally can vary depending on the conditions, situation, and personal preferences. Some examples of different approaches are:

- Each individual fire is designated as a division.
- Groups of fires are designated as a division.
- Some individual fires are designated as divisions and others are grouped into a division.
- In some cases, numbers, size, and complexity of fires may necessitate the establishment of branches to meet span-of-control considerations.

Managing multiple incidents with a single Incident Management Team is a common practice when multiple fires occur. Two keys to the success of managing multiple incidents are to:

- Maintain the integrity of the "Components of ICS".
- Recognize when the complexity of the situation has exceeded the abilities of the Incident Management Team and either bring in a more qualified team or assign an experienced additional team to divide the workload.

Area Command

If two or more Incident Management Teams are needed, consider establishing an Area Command. This is to ensure that scarce resources are being utilized according to priority, and jurisdictional objectives will be met through the respective Incident Action Plans and inter-incident coordination on all matters.

CHAPTER 5 - FIREFIGHTING SAFETY

Contents

General Responsibilities

FIREFIGHTER AND PUBLIC SAFETY IS THE FIRST PRIORITY OF THE WILDLAND FIRE MANAGEMENT PROGRAM.

REMEMBER AND FOLLOW:

- THE STANDARD **FIRE ORDERS** (INSIDE FRONT COVER)
- THE **WATCHOUT SITUATIONS** (INSIDE BACK COVER)
- THE **COMMON DENOMINATORS OF FIRE BEHAVIOR ON TRAGEDY FIRES** (INSIDE FRONT COVER)
- THE **DOWNHILL LINE CONSTRUCTION GUIDELINES** ON PAGE 47
- **LCES** (LOOKOUTS, COMMUNICATIONS, ESCAPE ROUTES, SAFETY ZONES)

Personal actions describe safety more effectively than written plans or rule books. Firefighters' actions tell what they consider important. Supervisors shall maintain accountability of assigned personnel as to exact location, personal safety, and general welfare at all times, especially when working in and around incident operations.

Supervision of other firefighters' work includes:

- Setting a personal example of safe behavior and enforcing established safe practices and procedures.
- Evaluating firefighters' physical and mental condition.
- Analyzing work situations to eliminate or avoid hazards. Discussing safety at the beginning of each new work assignment.
- Becoming immediately involved whenever injury occurs by ensuring that medical treatment is provided in a timely manner and investigating the accident with persons involved.
- Monitoring work to be sure it is done safely and efficiently.
- Providing leadership in taking corrective action aimed at eliminating causes of accidents and instilling a safe work attitude.
- Providing clear instructions and ensuring instructions are understood. Those instructions must be followed at all times, but if you feel unsafe or unsure, those instructions should be questioned for clarification.
- Protecting employees from reprisal for reporting unsafe conditions.

Firefighting Safety Guidelines

Observe the following basic safety principles on all fires, regardless of size or staffing.

Qualifications

- Assign to fireline assignments only those people who are properly qualified and physically fit for the job.

Clothing and Personal Protective Equipment (PPE)

- Wear hard hat while on the fireline.
- Wear 8" laced leather boots with slip-resistant soles.
- Wear flame-resistant clothing while on the fireline and when flying in helicopters. Do not wear clothing, even undergarments, made of synthetic materials which can burn and melt on your skin. Roll down sleeves to the wrist.
- Use leather gloves to protect hands.
- Use eye protection whenever there is a danger from material being thrown back in your face.
- Fire shelters will be carried when on the fireline.
- Use hearing protection when working with high noise-level firefighting equipment, such as helicopters, air tankers, chainsaws, pumps, etc.
- When operating chainsaws, operators shall wear chaps, gloves, hard hat, and eye and ear protection.

Foot Travel

- Carry firefighting tools safely--down at your side and on the downhill side. Never on your shoulder except for properly guarded power saws.
- Going to and from the fireline keep at least 10 feet apart and walk single-file.
- Walk, do not run.

LCES Checklist

In the wildland fire environment, Lookouts, Communications, Escape Routes, Safety Zones (LCES) is key to safe procedures for firefighters. The elements of LCES form a safety system used by firefighters to protect themselves. This system is put in place before fighting the fire: select a lookout or lookouts, set up a communication system, choose escape routes, and select a safety zone or zones.

LCES is a self-triggering mechanism. Lookouts assess, and reassess, the fire environment and communicate threats to safety to firefighters. Firefighters use escape routes to move to safety zones.

LCES is built on two basic guidelines: 1. Before safety is threatened, each firefighter must be informed how the LCES system will be used. 2. The LCES system must be continuously re-evaluated as conditions change.

□ **Lookouts**

Experienced/Competent/Trusted
Enough lookouts at good vantage points
Knowledge of crew locations
Knowledge of escape and safety locations
Map/Weather Kit/Watch/IAP

□ **Communications**

Radio frequencies confirmed
Backup and check-ins established
Update on any situation change
Sound alarm early, not late

□ **Escape Routes**

More than one escape route
Scouted: soils/rocks/steep/vegetation
Timed: slowest person/fatigue and temp factors
Marked: flagged for day or night

□ **Safety Zones**

Survivable without a fire shelter
Natural: clean burn/rock areas/water
Man-made: constructed sites/clearcuts/roads
Vehicles for escape
Scouted for size and hazards
Close enough considering escape time
Located to avoid hazardous terrain features
Upslope? = more heat impact = larger safety zone
Downwind? = more heat impact = larger safety zone
Heavy fuels? = more heat impact = larger safety zone

Safety Officer

A Safety Officer should be assigned to large or potentially hazardous fires to monitor and assess hazardous situations and develop measures for ensuring safety of personnel. Additional assistant Safety Officers should be assigned to section of fireline which warrants special safety considerations. If a Safety Officer is not assigned, the Incident Commander is responsible for these duties.

REMEMBER: EACH INDIVIDUAL, ESPECIALLY SUPERVISORS, HAVE AND MUST RECOGNIZE AND REDEEM THEIR SAFETY RESPONSIBILITIES

Safety Briefing

Incident Commanders, supervisors and firefighters must ensure that safety factors are covered with incident personnel at all operational briefings and that safety briefings occur throughout the fire organization.

Safety factors should include the following:

- Define assignment
- Identify the hazards
- Apply Standard Fire Orders, Watchout Situations, LCES
- Identify avoidance and mitigation measures to reduce risk
- Continue to analyze situation and make needed adjustments
- Address basic firefighter safety and health issues
- Communicate

REMEMBER AND FOLLOW THE "STANDARD FIRE ORDERS!!"

Firefighter Rehabilitation

Areas designed for resting, feeding, and sleeping should be located in a safe, shady area away from smoke, noise, running fire, falling trees and snags, rolling rocks, moving vehicles, aircraft, and packstock. Provide reasonable rest periods, especially at high elevations and on hot days.

Some reserve strength should be kept for emergencies. A lookout should be posted when a crew is resting near fireline.

Night Operational Periods

Every effort should be made to orient work crews scheduled for night operations during daylight hours and provide adequate lights and communication. A knowledgeable day operations representative should remain on site to properly orient and brief night operations crews.

Fire Behavior

Initiate all actions based on current and expected fire behavior.

Extreme Fire Behavior

Be alert to indicators of extreme fire behavior:

- Trees crowning out inside fireline
- Smoldering fires beginning to burn actively
- Approaching thunderheads with dark clouds beneath
- Presence of dust devils and whirlwinds
- Increased spotting
- Sudden calm
- High clouds moving fast in direction different from surface wind

Fire Weather Forecast

Forecasts reflecting general weather changes, as well as local weather affecting the immediate fire area, should be studied, understood, and used by overhead on the fire.

NOAA Weather Radio forecasts should not be substituted for fire weather forecasts. NOAA Weather Radio does not broadcast fire weather forecasts, only forecasts directed to the general public.

Spot weather forecast should be requested for fires that have potential for extreme fire behavior, exceed initial attack, or located in areas for which a Fire Weather Watch or Red Flag Warning has been issued.

Fire Weather Watch: a possible critical fire weather pattern, i.e., strong wind, dry lightning, dry cold front, low relative humidity.

Red Flag Warning: term used by fire weather forecasters to alert firefighters/managers to an ongoing or imminent critical fire weather pattern, i.e., strong wind, dry lightning, dry cold front, low relative humidity.

Fire Danger Rating

Request information on locally accepted National Fire Danger Rating Indices and components. Find out what this season's trends are doing compared to the historic average and historic maximums. Find out what the value of the index/component means locally.

Line Scouting

- When scouting or working ahead of a crew in brushy terrain, carry a cutting tool and clear any vegetation which might hamper escape.
- A lookout should be posted to warn of danger when personnel are scouting in unburned areas of dense vegetation.

Safety Flagging Standards

- Yellow-black striped ribbon denotes hazards

  ✓Remove the yellow-black striped ribbon when the hazard is abated. If feasible, write on the ribbon the nature of the hazard; i.e., "snags - 200 feet up slope".

- Lime green denotes safety zones and escape routes

Note: Firefighters should check with state and agency policy to verify flagging standards.

Line Construction

- Make sure of secure footing and follow safe working positions. Walk, DON'T run.
- Personnel or equipment should not work directly above one another or at close intervals when working on steep slopes.
- When danger of rolling rocks and logs, supervisors should:

  ✓Post a lookout to watch and warn crew of rolling materials.

  ✓Spread crew out farther than 10 feet apart.

  ✓Stagger crew so they are not working or walking directly below each other or close to working equipment.

- Brief crew on what to do when a warning for falling or rolling object is given.

  ✓Quickly move behind the protection of the nearest large tree or other stable barrier.

  ✓If such protection is not close, quickly move into an opening offering maximum upslope visibility, stand facing the oncoming rolling material, and be prepared to react instantly.

- Loose rocks along dozer breaks should be stabilized before crew works below them.

- Pass a burning or fire-weakened tree only on the uphill side, or above the lean, and watch it closely. Mark and communicate hazard to others.

- In fast-burning fuels, watch out for fast runs in any direction, at any time of the day or night. If cutting across the front involves difficult access and retreat, control by flank attack, starting at a safe anchor point. Have escape routes and safety zones identified.

- Watch below for spot fires from hot material rolling downhill.

- <u>Panic leads to trouble</u>. Keep a clear mind and act calmly.

Downhill/Indirect Line Construction Guidelines

Downhill/Indirect line construction in steep terrain and fast burning fuels should be done with extreme caution. Direct attack methods should be used whenever possible. The following guidelines should be followed:

- The decision is made by a qualified supervisor after evaluating the situation.

- Downhill line construction should not be attempted when fire is present directly below the proposed anchor point.

- The fireline should not lie in or adjacent to a chimney or chute that could burn out while crew is in area.

- Communication is established between the crew working downhill and crews working toward them from below. When neither crew can adequately observe the fire, communications will be established between the crews, supervising overhead, and a lookout posted where the fire can be seen.

- The crew must be able to rapidly reach a safety zone from any point along the line if the fire unexpectedly crosses below them.

- A downhill line should be securely anchored at the top. Avoid underslung line if at all possible.

- Line firing should be done as the line progresses, beginning from the anchor point at the top. Go as fast as is safe. The burned out area provides a continuous safety zone for the crew and reduces the likelihood of fire crossing the line.

- Be aware of and avoid the: "WATCHOUT SITUATIONS."

- Maintain full compliance with "THE STANDARD FIRE ORDERS."

Firing Equipment

- Firing equipment should be used only by trained personnel.
- Use only approved equipment and qualified personnel when firing from helicopters.
- Use no more than one part gasoline to three parts diesel (or heavier fuel) in flame thrower or drip torches. Observe manufacturers' recommendations.
- When operating ground based firing equipment that utilizes jellied gasoline, to avoid back splatter, do not direct the stream of burning material into the tops of nearby trees or tall brush.
- Properly ground firing equipment when fueling.
- Maintain constant radio communications between the firing operation and other appropriate fireline personnel.

Power Saws

- Stop motor when carrying, making adjustments, repairing, or cleaning a chainsaw.
- Use blade guards when carrying saw in rough country.
- Cool motor before refueling. Fill on bare ground and move a safe distance from fueling area before starting.
- Use proper safety equipment such as chaps, gloves, hard hat, eye and ear protection.

Snag Felling

Felling of snags or large trees (normally over 20 inches DBH) should be done by a qualified faller. Personnel felling trees less than 20 inches DBH should be given special training by qualified personnel.

- Select a clear escape route before starting the cut.

  ✓The area opposite the planned fall of the tree may be the most dangerous. An escape route at right angles to the planned direction of fall, preferably on the contour, should be chosen, unless special circumstances exist.

  ✓If possible, stand behind another tree of sufficient size to provide protection.

  ✓Watch for whiplashed branches and other broken tree parts.

  ✓Stay clear of the butt--be aware of a tree "kicking back" as it falls.

✓Watch for falling branches; continue to watch until all broken branches have fallen.

- Be aware of other nearby crews. Notify crew members not on the felling crew when tree felling will be occurring in their work area.
- Do not fell trees above other crews.
- When felling trees, station a lookout to watch and warn the sawyer of falling limbs and tops. Due to power saw noise provide the lookout with a system, such as portable air horn, to signal the sawyer in the event of danger.

Engine Operations

- All vehicles going to fires should stop for traffic lights and stop signs, even when using emergency warning lights, siren, and air horns. Watch for oncoming traffic.
- Mark vehicles parked on highway at fires by flags or warning lights in front and back to warn motorists of presence of equipment and personnel.
- An engine operator, a hose puller, and a nozzle operator are desirable for effective use of engines in performing fire suppression operations.
- Park engines on the side of road away from oncoming fire to reduce heat exposure on equipment and to allow other vehicles to pass. <u>Do not block road with your engine.</u>
- Engine will be positioned for a quick get-away.
- Engines should be attended at all times.
- Nozzle operators should wear eye protection.
- When fires make hot runs upslope, it is safer to draw back to the flanks and let the fire cross the road than to attempt a frontal assault.
- Adequate supervision and good communications, including hand signals, are necessary for safe, effective engine work. (See Appendix A for hand signals).

Dozer/Tractor-Plow Operations

- Load/unload equipment from the transport in a safe manner on a level, stable surface.
- Park transport in an area free of fuel. Clear an area if needed to protect parked equipment.
- Do not sit or bed down near equipment.
- Walk around equipment before starting or moving it.
- Lower the dozer blade and/or fire plow to the ground when the equipment is idling or stopped.
- Do not get immediately in front or behind equipment in operation.
- When working a dozer or tractor-plow unit, stay at least 100 feet in front or 50 feet behind.
- Allow no one but the operator to ride on the equipment.
- Never get on or off of moving equipment.
- Provide front and rear lights for equipment working at night or in heavy smoke.
- Provide lights and fluorescent vest to personnel working with dozer/tractor-plow units to ensure visual contact with the operator.
- Use hand signals for direction and safety. (See Appendix A for hand signals).
- Do not use a dozer or tractor-plow without a canopy, brush guard and radio communications.
- Operators will wear required safety clothing and carry a fire shelter.
- Be aware of different fuel types and their flammability.
- Watch out for wetlands, steep slopes, rocks, ditches, and other obstacles that might stop the equipment.
- Do not get too far ahead of a firing crew during firing operations.
- Anchor the line to a secure fire break and create a black line (burn out) until fire is completely enclosed.
- Tractor-plow operators should wear headgear protection for head, face, eyes, and ears while also providing radio reception and ventilation capabilities.

- Tractor-plow crew should consist of a minimum of two people.
- When dozer or plow is equipped with a hand-clutch lever, always take equipment out of gear when mounting or dismounting.

Personnel Transportation

- Overhead should have a driver whenever possible.
- All passengers in vehicles shall be seated and seat-belted with arms and legs inside vehicle.
- Personnel and unsecured tools will not be transported together.
- Driver must be qualified for the vehicle and operating conditions. If not, remove them from driving duties.
- When traveling to a fire, observe all traffic signals, safe speed limits, and safety rules.
- Driver should walk around vehicle to make sure all is clear before departure.
- Driver is responsible for arrangements to ensure that if chock blocks are provided, they are in place before loading, unloading, or when parked.
- When transporting personnel, the driver shall not leave his seat until the vehicle is securely chocked. NEVER load or unload personnel from an UNCHOCKED VEHICLE.
- Driver should conduct daily mechanical check of vehicle before driving. Unsafe equipment should be removed from service and reported to the Ground Support Unit for repair.
- Driver should use spotter outside of vehicle when backing or turning around.
- Recommend that vehicles be operated with headlights on at all times.

Helicopter Transportation

- Follow instructions of helicopter personnel at all times when around helicopter.
- Helicopter personnel will provide detailed briefings on helicopter safety procedures to all personnel prior to loading.
- Stay at least 50 feet away from small helicopters and 100 feet away from large helicopters, unless authorized by the pilot or other helicopter personnel.

- Always approach or leave from front or from side near front, in full view of pilot.
- Never approach or leave helicopter up slope from helicopter when rotors are turning.
- Do not watch landings, takeoffs, or hovering helicopters unless equipped with eye protection.
- Minimum required personal protective equipment (PPE) for helicopter flights include: hard hat w/chin strap, Nomex shirt and pants, leather boots, leather or Nomex gloves, and hearing protection.
- Keep safety harness fastened at all times, except when instructed to release it by pilot or helicopter crew member.
- When leaving the helicopter, stoop-walk immediately away to front or side until at least 50 feet away from the rotors.
- Stay away from tail rotors at all times, and see that others do likewise.
- Carry all tools horizontally at your side when around helicopters.
- Do not smoke within 50 feet of helicopter, fuel storage, or fueling equipment.
- Never stand directly beneath hovering helicopter unless trained in and performing sling load hookup operations.
- Show wind direction for landing helicopter with flag, hand signal, or other visual indicator.
- Keep helicopter facilities clear of unauthorized personnel, equipment, and loose objects (paper products, etc.)

Aerial Retardant Operations

Personnel can be injured by the impact of retardant dropped by aircraft. Clear personnel out of target area when drop is to be made. If an individual is unable to retreat to a safe place, the safest procedure to minimize injury from the drop is to:

- Hold on to your handtool away from your body.
- Lie face down, with head toward oncoming aircraft and hard hat in place. Grasp something firm to prevent being carried or rolled about by the dropped liquid.
- Do not run unless escape is assured.

- Get clear of dead snags, tops, and limbs in drop area.

- Working in an area covered by wet retardant should be done with caution due to slippery surfaces.

- Wash retardant off skin, if possible. May irritate.

Paracargo Operations

The danger zone is a strip 200 feet on each side of the flight path, 300 feet in the direction of approach, and 1,300 feet in the direction of the aircraft when it leaves the target. The following should be observed at all times:

- Mark target area with white or orange "T" in open or cleared area. Erect paper streamer on long pole to indicate wind direction.

- A person trained in paracargo operations should be in charge at drop site.

- All persons, vehicles, and animals should be cleared from the danger zone prior to arrival of the cargo aircraft.

- Camp should be at least 600 feet from target area and outside of danger zone.

- Allow no one in danger zone until drop is complete.

Power Line Hazards

If possible, the power company should deactivate lines in the fire area that may endanger firefighters. All personnel should be cautioned against directing water streams or aerial retardant into high-tension lines. They should also be made aware that the smoke may become charged and conduct the electrical current. Deactivated transmission and distribution lines may continue to pose a hazard due to induction.

- Identify, map, and discuss at briefings all electrical lines on the incident.

- When around power lines:

  ✓If a power line falls on your vehicle, DON'T leave vehicle until the power company arrives. If the vehicle is on fire or fire is near, jump clear, DON'T hang on, keep feet together and bunny hop away.

  ✓Minimize operation of heavy equipment under power lines.

  ✓DON'T drive under power lines with long antennas.

✓DON'T fuel vehicles under power lines.

✓DON'T stand near power lines during retardant drops.

✓DON'T go near or move downed power lines.

✓DON'T direct fire retardant or water on power lines.

✓DON'T stand or work in dense smoke near power lines.

Thunderstorm Safety

The mature stage of a storm may be marked on the ground by a sudden reversal of wind direction, a noticeable rise in wind speed, and a sharp drop in temperature. Heavy rain, hail, and lightning occur only in the mature stage of a thunderstorm. During a storm:

- Stay out of dry creek beds.
- Do not use radios or telephones.
- Put down all tools and remove caulk boots.
- Sit or lie down if in open country.
- Avoid grouping together.
- Do not handle flammable materials in open containers.
- Stay in your vehicle. Take shelter in vehicles if possible.
- Turn off machinery, electric motors.
- When there is no shelter, avoid high objects such as lone trees. If only isolated trees are nearby, the best protection is to crouch in the open, keep a distance of twice the height of the tree away. Keep away from wire fences, telephone lines, and electrically conductive elevated objects.
- Avoid ridge tops, hilltops, wide-open spaces, ledges, rock outcroppings, exposed shelters.
- Advise crew that if they feel an electrical charge - if their hair stands on end or their skin tingles - lightning may be about to strike. Drop to the ground immediately.

Safety While Protecting Structures From Wildland Fires

Structures exposed to wildland fire in the urban interface can and should be considered as another fuel type. Size-up and tactics should be based upon fuels, weather and topography, just as those criteria would be applied to a wildland fire.

- Be aware of possible toxic fumes and stay upwind and out of the smoke.
- Wear full protective clothing.
- Do not wet down ahead of fire-- conserve your water supply!
- Keep at least 100 Gal. of water reserve in your engine tank.
- Have a protector line for your crew and engine.
- Back your engine in, you may need to leave quickly.
- Use 1½ inch lines if possible.
- Do not lay long hose lays as it cuts mobility and may burn up a lot of hose.
- Use foam to coat the structure, if available and time permits.
- DO NOT park under power lines, next to propane tanks, in saddles, or in chimneys.
- DO NOT enter a burning structure unless you have been properly trained and equipped for that sort of activity.

The safety hazards that exist in a typical protection of structures from wildland fires assignment are significant. In addition to applying THE STANDARD FIRE ORDERS and avoiding THE WATCHOUT SITUATIONS, good judgment and planning are extremely important because of the presence of homeowners and their families, the media, pets and livestock, traffic, and unfamiliar combustibles. LCES-- Lookouts, Communications, Escape Routes, Safety Zones.

Structural "Watchout" Situations

- Electrical lines
- Wooden construction; shake roofs; overhanging eaves, porches and decks; and large windows
- Poor access, narrow one-way roads
- Inadequate water supply
- Natural fuels 30 feet or closer to structure
- Extreme fire behavior
- Strong winds, 25 mph or more
- Evacuation of residents necessary
- Structures located in chimneys, box or narrow canyons, on slopes of 30% or more and in continuous, flashy fuel types
- Propane tanks and other fuel storage

Suspected Hazardous Materials

Hazardous materials are being encountered with increasing frequency in wildfire situations. Hazardous materials may be industrial or agricultural chemicals, explosive substances, military ordnance, and drug labs, etc. Since many wildland fire personnel are neither trained nor equipped to identify and deal with hazardous materials, your primary responsibility is to prevent yourself and others from being adversely affected or injured.

If you encounter what you suspect may be hazardous materials, generally:

- Stay upwind, uphill, and avoid breathing smoke.
- Isolate the area - deny entry.
- Warn others in the immediate vicinity.
- Notify your supervisor of the potential problem so hazardous materials specialists can be brought in to evaluate and abate the problem.
- Unless properly trained, do not get involved. Remember, if you don't know, don't go, it may blow.

Incident Generated Hazardous Materials

Firefighters, supervisors, and agency representatives are not necessarily aware of the dangers of transporting hazardous materials. Many of these materials, used frequently on the fire job, are not considered hazardous by firefighters.

Petroleum products, especially gasoline, are prohibited from public transportation vehicles because of the obvious danger. Crews should not transport petroleum products on aircraft or on buses. Gasoline should be purged from all gas cans, chain saws, etc. before transport.

Other items such as ignition devices, fusees, explosives, and mineral spirits should not be placed on aircraft or other public transportation.

Supply & Ground Support Unit Leaders should be trained in handling of hazardous materials and should make provisions at the incident to cause petroleum containers to be purged and fusees to be left at the incident for safe return to the cache.

Supply & Ground Support Unit Leaders should be made aware of standard transportation rules regarding materials. For instance, oxidants, such as fertilizer, should not be transported with flammables. Be careful not to mix incompatible materials; i.e., ammonia should not be transported with chlorine. All packages and containers should be checked thoroughly for damage and leaks. Some spills can be more dangerous than expected.

Incident needs may require transportation of hazardous materials from base or camp to the fireline. Basic knowledge of how to safely handle a variety of flammables, oxidants, cleaners, etc. should be taught to all fire personnel.

Managing Vehicle Traffic in Severe Smoke

Smoke has the potential to cause severe safety hazards to vehicle traffic in the vicinity of active fires, especially at night. The following traffic-related items should be considered and addressed in local unit planning documents prior to an incident.

- Identification of roads open to the public that may be impacted by smoke which are important to the local traffic system.
- Identification of adequate equipment and trained personnel to control traffic. This may include warning signs, communications equipment (preferably not on the active fire frequency) and vehicles equipped with warning or flashing lights.

- Development of an emergency medical evacuation contingency plan including identification, location, and phone numbers of local hospitals and rescue units.

- Identification, location and phone numbers of local units that have law enforcement and traffic control responsibilities in the smoke impacted area. Review any local agreements with these agencies presently in force.

- Identification and phone numbers of radio and television stations that can issue traffic advisories for the smoke impacted area.

- Identification of alternate traffic routes as part of Incident Traffic Plan.

- Identification of traffic routes subject to temperature inversions as well as contributory factors such as fog and ice.

- When potential smoke-related problems are identified:

  ✓Advise the Agency Administrator that severe smoke exists.

  ✓Implement preplanned actions such as posting smoke warning signs.

  ✓Ensure proper equipment is ready and appropriate personnel are briefed on contingency plans and are available to control traffic.

  ✓Notify local law enforcement units of potential problem.

- Establish periodic patrols to monitor smoke impacted areas.

- When smoke-related traffic problems occur, first person on the scene must maintain traffic control until relieved. He or she should take immediate action to prevent injuries and damages by:

  ✓Establishing control points on both sides of the impacted area.. A minimum of 1,500' on both sides of the impacted area should be used.

  ✓Slowing or stopping traffic entering the area and advising drivers of alternate routes.

  ✓Assigning a person to keep a log of what actions are taken.

  ✓Ensuring warning signs are in place and any other preplanned actions have been implemented.

✓Notifying personnel who have been identified and equipped to direct traffic and notify other local units that have responsibilities for traffic control.

✓Implementing radio and television traffic advisories for the impacted area.

- Smoke moving unexpectedly into an area may be an indication of changing burning conditions. All traffic should be excluded until this change can be evaluated.

- When smoke-related traffic accidents occur, fire personnel on the scene should:

✓Make all efforts to assist and protect people.

✓Notify, if necessary, appropriate medical units and request assistance.

✓Notify appropriate law enforcement units.

✓Provide additional personnel for traffic control, if necessary.

✓Notify Agency Administrator who may assign local safety and tort claims personnel to the scene.

✓Assign an individual (preferably a law enforcement official) to record facts about the accident, including names, addresses and statements of witnesses (if given willingly). At a minimum, record license plate identification on all vehicles in the vicinity of the accident. Coordinate efforts with local law enforcement personnel.

✓Fire personnel at accident scene, if questioned by someone other than law enforcement officers, should only state that their involvement was in fire suppression activities in the vicinity.

✓Involved personnel should, immediately after being released from the accident scene, submit written reports of their actions and observations.

<u>Safety is a matter of common sense. Use it and you will keep yourself and others out of trouble and get the job done safely.</u>

REMEMBER: SAFETY IS NO ACCIDENT

Firefighter Entrapment

Entrapment: A situation where personnel are unexpectedly caught in a fire behavior-related, life-threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. An entrapment may or may not include deployment of a fire shelter for its intended purpose. These situations may or may not result in injury. They include "near misses."

Fire Shelter Deployment

Following the "Standard Fire Orders" and recognizing the "Watchout Situations" should prevent you from getting into a situation which requires a shelter deployment. When threatened by an unexpected change in fire behavior, follow proven escape procedures first before considering a fire shelter deployment.

When on the fireline, YOU MUST CARRY YOUR SHELTER WITH YOU AT ALL TIMES. It should not be stored in your pack. It should be in a location for quick access.

If you are a crew member, your supervisor will decide when and where to shelter deploy. When deciding to shelter deploy, supervisors must identify a safe area and provide adequate time for deployment to occur.

Choosing Deployment Area

- Natural firebreak, wide dozer line, low spots, stream bed, lee side of ridge top, uphill side of road, burned-over area. Low spots will have less heat and smoke exposure.
- Avoid areas with heavy brush, trees with low-hanging branches, logs, snags, flammable materials. Flammable materials include gasoline cans, supply boxes, packsacks, fusees and other firefighting gear.
- Keep away from narrow draws, chutes and chimneys as they tend to funnel smoke, flame and hot gas.

Shelter Deployment

- Crew must stay together.
- Clear an area 4 by 8 feet (larger if time allows) down to bare mineral soil.
- Keep a firm grip on shelter. Otherwise, you may lose it in the high winds generated by the approaching flame front.

- Position shelter so your feet are toward the approaching flame front. The foot end will become the hottest spot while in shelter and it is easier to hold down using your feet.

- Items to wear and take into the fire shelter:

Gloves	Without gloves, it will be very difficult to hold onto the shelter while inside.
Hardhat	Provides head protection.
Radio	Supervisors should maintain communication with those outside the area of shelter deployment.
Water	Drink water so you continue to sweat, which aids body cooling. **NEVER** wet clothing as your clothes will rapidly conduct heat.

- Leave hand tools outside shelter. Remove any hazardous items like gasoline and fusees, tossing them well away from deployment area.

- Never plan to share a shelter unless someone is without one.

While Inside Shelter

- You must protect your airway and lungs from the fire's hot gasses. Keep your nose pressed to the ground as much as possible. Use a dry bandanna to protect your airway. **NEVER USE A WET BANDANNA!**

- High winds should be expected as the flame front approaches and passes. It will take all your effort to hold down the shelter. Wear your gloves at all times while inside.

- Your shelter may have pinholes or cracks along the folds. These pinholes do not reduce your protection. No matter how big a hole or tear, you are still better off inside the shelter.

- Talk to each other. Remember, the noise can be deafening as the fire passes and you may not be able to hear anyone.

- Do not move unless it's absolutely necessary. Move by crawling turtle fashion, keeping the shelter edges close to the ground.

How Long to Stay Inside Shelter

- Once you commit yourself to the shelter, stay there no matter how hot it may get inside. It's much worse outside your shelter. **DO NOT PANIC!**
- There is no fixed time to stay inside the shelter. Leaving a shelter too soon can expose lungs to super-heated air or dense smoke.
- A drop in noise, wind, heat, and change in color are indicators that it's safe to leave the shelter. <u>Crew members should not leave their shelters until instructed to do so by your supervisor.</u>

Building Refuge

Seeking refuge in a building or structure is an option supervisors may want to consider for crew protection when a change in fire behavior prevents reaching an escape route or safety zone.

- Advise immediate supervisor (Strike Team Leader, Division/Group Supervisor, etc.) of the situation.
- If time allows, remove combustible materials (lawn furniture, wood piles, etc.) and vegetation away from structure and propane tank, shutting off gas.
- Close windows and heavy drapes, take down light curtains. Secure exterior doors.
- Bring into structure extinguishers and back pumps, charged hoseline if available.
- Fill all sinks, bathtubs, and any available buckets with water, soaking towels, etc., to put out small fires and to place against exterior door jams.
- **KEEP AWAY** from windows and exterior doors as fire passes.
- **STAY OUT** of basement and upper floors.

Vehicle Refuge

If you find yourself in a fire entrapment situation where a shelter deployment is not possible, using a vehicle for refuge may be an option.

- Park vehicle in an area void of vegetation, fire out around vehicle if there is time. Park behind a natural barrier or structure.
- DO NOT park on the downhill side of road, under power lines or over-hanging vegetation. Stay out of saddles or draws.
- Position vehicle in a direction which provides the area occupied by crew with maximum protection from approaching flame front.
- Set parking brake, leave motor running at high RPM, keep vehicle lights on.
- Roll up windows, DO NOT lock doors. Someone else may need to get in.
- Cover windows with fire shelters with reflective materials placed against window.
- YOU MUST PROTECT YOUR AIRWAY. Remain as low in vehicle as possible, use a dry bandanna to cover your nose and mouth.
- While inside vehicle expect:

  ✓Temperatures may reach 200 degrees F.

  ✓Smoke and sparks may enter the vehicle.

  ✓Plastic parts may start to melt and give off toxic gases.

  ✓Windows may start to crack.

  ✓Exposed skin may receive radiant heat burns.
- If the vehicle catches fire or windows blow out and you have to exit before the fire has passed:

  ✓Each crew member cover themselves with a fire shelter.

  ✓Exit the vehicle from the side away from the greatest heat.

  ✓Stay together and as low to ground as possible, moving away from vehicle.

  ✓Deploy shelter in a safe area.
- After fire passes, check for and treat injuries.
- Inspect vehicle for fire, extinguish if possible.

Injury/Fatality Procedures

SERIOUS INJURY	FATALITY
1. Give first aid - call for medical aid and transportation if needed.	1. Do not move the body unless it is in a location where it could be burned or otherwise destroyed. Secure accident scene.
2. Do not release victim's name except to authorities. NEVER BROADCAST VICTIM'S NAME ON AIR	2. Do not release victim's name except to authorities.
3. Do not allow unauthorized picture taking or release of pictures.	3. NEVER BROADCAST VICTIM'S NAME ON AIR. Do not allow unauthorized picture taking or release of pictures.
4. Notify Incident Commander who will:	4 Notify Incident Commander who will:
a. Assign a person to supervise evacuation, if necessary, and stay with the victim until under medical care. In rough terrain, at least 15 workers will be required to carry a stretcher.	a. Assign person to start investigation until relieved by appointed investigating team.
b. Assign person to get facts and witness statements and preserve evidence until investigation can be taken over by the Safety Officer or appointed investigating team.	b. Notify Agency Administrator and report essential facts. The Agency Administrator will notify proper authorities and next of kin as prescribed by agency regulations.
c. Notify the Agency Administrator.	c. If requested, assist authorities in transporting remains. Mark location of body on ground. Note location of tools, equipment, or personal gear.

First Aid

Prompt first aid must be given for all injuries. First aid facilities should be made available in proximity to the fireline and at incident base and camp(s). When activated, the Medical Unit is responsible for all medical emergencies involving assigned incident personnel. Each crew should carry a first aid kit and all supervisory personnel should be trained in basic emergency first aid. While help is on the way, be prepared to move the patient in case of unexpected fire movement.

Heat Stress Recognition

Heat stress disorders are divided into four categories. They are:

Heat Cramps - May be caused by lack of fitness or failure to replace salt lost in sweating.

- Symptoms are painful muscle cramps.
- Treat by resting and drinking lightly salted water or lemonade, tomato juice, or athletic drinks.

Heat Exhaustion - Caused by failure to replace water.

- Symptoms are weakness, unstable gait or extreme fatigue; wet, clammy skin; headache; nausea; collapse.
- Treat by drinking fluids and rest in a shaded area.

Dehydration Exhaustion - Caused by failure to replace water losses over several days.

- Symptoms are weight loss and excessive fatigue.
- Treat by increasing fluid intake and provide rest until body weight is restored.

Heat Stroke - Caused by total collapse of the body's temperature regulating mechanisms. REQUEST EMERGENCY MEDICAL ASSISTANCE AT ONCE AS HEAT STROKE IS A LIFE THREATENING MEDICAL EMERGENCY. BRAIN DAMAGE OR DEATH CAN RESULT IF TREATMENT IS DELAYED.

- Symptoms are hot, often dry skin; high body temperature(106°F or higher);mental confusion, delirium, loss of consciousness, convulsions.
- Treat by cooling the victim immediately, either by immersing in cold water or soaking clothing with cold water and fanning to promote cooling. Continue until temperature drops below 102° F. Treat for shock once temperature is lowered.

Carbon Monoxide Poisoning Recognition

Carbon monoxide (CO) is an odorless, tasteless, invisible gas by-product emitted from combustion of forest & range fuels, internal combustion engines, and a variety of other sources. In a wildfire, heavy concentrations of CO can co-exist with smoke. CO is absorbed by the body at a rapid rate for the first hour of exposure, after which the rate drops slightly for the next 4 to 8 hours. It takes about 8 hours in an uncontaminated environment to purge CO from the body.

To manage CO exposure:

- Monitor workers, particularly pump and chainsaw operators, for symptoms/behavior associated with CO exposure.

BLOOD CO LEVEL	SYMPTOM	BEHAVIOR
Moderate	Possible headache, nausea, and increasing fatigue.	Increasing impairment of alertness, vision discrimination, judgment of time, physical coordination. Becomes increasingly complacent.
High	Headache, fatigue, drowsiness, nausea, vomiting, dizziness, convulsions, cardio-respiratory difficulty.	Above behavior becomes more acute to extreme.

- Remove workers from work site to "CO free areas" when performance and safety are compromised by symptoms/behavior described above.

- When possible, select strategy and tactics which minimize worker exposure to smoke concentrations, i.e., indirect attack. Expect higher CO concentrations in the following:

  ✓Near an active flame front.

  ✓Working around heavy equipment, especially in ground support.

  ✓Heavy smoke concentrations during inversions or areas downwind of the fire.

  ✓Mop-up (prolonged exposure to low-moderate smoke level).

  ✓Topographic features which concentrate smoke, i.e., head of canyon, ravines, saddles or passes, depressions or basins.

  ✓Periodically rotate workers from work sites with moderate- high smoke levels to areas of less smoke or smoke free areas.

✓If necessary, order additional personnel to relieve crews assigned to high smoke level areas.

✓Instruct personnel to take breaks in smoke-free or low-smoke areas, when possible.

✓Locate incident base and camp(s) in areas free of smoke and air pollution to maximize recovery from CO exposure.

✓Encourage smokers to terminate or reduce smoking during fire assignment. Smoking significantly increases blood CO levels.

✓Restrict workers from driving a vehicle if they display the symptoms or behavior outlined above.

- Personnel who display the symptoms or behavior outlined above should be evaluated and determined fit for duty before their next work assignment.

Burn Injury Treatment
Good on-scene emergency treatment can help prevent a burn injury from getting worse, minimize complications, and improve a person's chance of serious burn.

- Remove person from heat source, extinguish with water.

- Provide basic first aid:
  ✓Maintain airway, breathing, circulation (ABCs)/
  ✓Treat for shock by keeping person warm and feet elevated.
  ✓Provide oxygen, if available and trained to administer.

- Assess degree of burn and area effected. Burns are rated as 1st, 2nd, or 3rd degree—

1st Degree	Affect skin's outer layer. Redness, mild swelling, tenderness, and mild to moderate pain.
2nd Degree	Extends through entire outer layer and into inner layer of skin. Blister formation, swelling, weeping of fluids, and severe pain.
3rd Degree	Extends through all skin layers and into underlying fat, muscle, and bone. Discoloration (charred, white or cherry red), leathery, parchment-like, dry appearance. Pain is absent.

- Treat Burn

  ✓Cut away only burned clothing. DO NOT remove clothing stuck to burned skin.

  ✓Apply cool, clean water over burned area to stop burning. DO NOT soak person or use cold water and ice packs as this will encourage hypothermia.

  ✓Cover burned area with sterile dressing, moisten with normal saline solution, and apply dry dressing on top.

- If person is burned severely or over large area of body:

  ✓Wrap in clean, sterile sheet followed by a plastic sheet.

  ✓Place inside sleeping bag or cover with insulated blanket.

- Monitor ABCs and keep burn areas moist.

- Avoid hypothermia and overheating (especially on hot days.)

Hypothermia results from a cooling of the body's core temperature. Key indicators of hypothermia are shivering, slurred speech, memory lapse, and cold hands and feet.

Burn Notification Procedures:

- Notify your immediate supervisor. Provide the following information:

  ✓Number of injured. DO NOT give out names over radio.

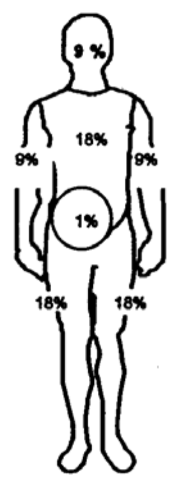
  ✓Location of injured.

  ✓Degree and severity of burn injury (e.g., 2nd and 3rd degree over 30% of upper body.)

- "Rule of Nine" for determining area burned:

Percentage of Body Surface Area

Head	9%
Front of Torso	18%
Back of Torso	18%
Left Arm	9%
Right Arm	9%
Left Leg	18%
Right Leg	18%
Perineum (Scrotum in males, vulva in females)	1%
	100%



CHAPTER 6 - COMMON RESPONSIBILITIES

Contents

Initial Off-Unit Assignment Information (Obtain before leaving home unit)

Fire personnel will be notified of an out-of-unit assignment by their respective agency. The following minimum information should be obtained before departing:

- Fire name
- Fire job assignment
- Reporting location
- Specific location of the fire
- Location of the check-in point
- Reporting time
- Travel instructions/chief of party
- Any special communications instructions
- Resource Order number and request number (if applicable)
- Unit designator (if applicable)

Check-in Procedures at Incident

There may be several locations for incident check-in. Check-in officially logs you in at the incident and provides important release and demobilization information. You only check in once. Check-in Recorders may be found at the following locations:

- Incident Command Post
- Base or Camp
- Staging Area
- Helibase
- If you are instructed to report directly to a line assignment, you should check-in with the Division/Group Supervisor.

Obtain Briefing & Brief Subordinates

After check-in, locate your incident supervisor and obtain your initial briefing. The items that you receive in your briefing, in addition to functional objectives, will also be needed by your subordinates in their briefing. The items include:

- Identification of specific job responsibilities expected of you for satisfactory performance.

- Identification of co-workers within your job function.
- Definition of functional work area.
- Identification of eating and sleeping arrangements.
- Procedural instructions for obtaining additional supplies, services and personnel.
- Identification of operational period work shifts.
- Clarification of any important points pertaining to assignments that may be questionable.
- Provisions for specific debriefing at the end of an operational period.
- A copy of the current Incident Action Plan.
- Use available "waiting time" to refresh training, improve organization and communications, check equipment.

Communications Discipline
It is extremely important that all incident personnel observe strict radio/telephone procedures and discipline in the use of all communication equipment. Radio codes should not be used in transmissions when more than one agency is involved. Use Clear Text.

Forms and Record Keeping
Most fires, especially large fires, managed under ICS rely heavily on the use of ICS forms to manage information and resources. Detailed information concerning forms will be found in Incident Command System Forms Manual (ICS 230-2). Some general instructions with regard to initiation and completion of forms are listed below:

- It is important to have legible forms. Print or type all entries on the form.
- When entering dates, use a month/day/year format, e.g., March 15, 19-- or 3/15/--.
- Use military 24-hour clock time when entering times.
- In most cases, times must be associated with dates to avoid any possible confusion. Enter date and time on all forms and notes.
- Fill in all blanks on the form. If information is not available or not applicable, enter N/A to let the recipient know that the information was not overlooked.

Unit Log (ICS Form 214)

All Command Staff, Section Chiefs, Branch Directors. Division/Group Supervisors, Unit Leaders, and Strike Team/Task Force Leaders are required to complete a Unit Log for each operational period on large fires under ICS management. A copy of this log must be filed with the Documentation Unit at the end of each operational period. The Unit Log contains facts relative to your activities on the incident. It is a good idea for each supervisor to review their employee's unit log each day.

Mobilization/Demobilization Activities

Preparation for demobilization begins with mobilization. Each individual or Chief of Party mobilized to an incident has responsibilities in the demobilization process. The following checklist identifies some of the key responsibilities:

Mobilization

- Obtain the Resource Order and request number from the dispatching office. If possible, obtain a copy of the Resource Order.
- Each individual or Chief of Party must ensure that all personnel comply with weight limitations (45 lbs. for personal gear in a soft frameless pack and 20 lbs. for web gear or briefcase, total weight not to exceed 65 lbs. per individual).
- Ensure manifest is complete and accurate with personnel and baggage weights entered separately.
- Check in. Each individual should ensure that all information needed to complete the Check-In list (ICS Form 211) is provided. Resource order and request numbers, manifest information, home base, departure point, method of travel, and other qualification blocks are especially important.

Demobilization

- Verify demobilization schedule with supervisor.
- Ensure that your base/camp sleeping area is clean.
- Clean and ready gear for another assignment and travel.
- File required forms and reports with the Documentation Unit and/or Finance/Administration Section.
- Return incident issued communications equipment to the Communications Unit.

- Return incident-issued work materials to the Supply Unit.
- Follow approved check-out procedures (ICS Form 221).
- Report to departure points ahead of schedule.
- Stay with your group until you arrive at your final destination.
- Evaluate performance of subordinates prior to release from the incident.
- Get feedback on overhead performance suggestions for improvement.
- Demobilization is an important function of each Command and General Staff position. Demobilization must be given adequate attention such as:

  ✓Actively participate in the planning, development and implementation of the demobilization plan and schedule.

  ✓Provide for a minimum advance notice of 24 hours when identifying resources that will be available for demobilization.

  ✓Ensure that there is no room for interpretation in identifying actual versus tentative demobilization information.

Recommended Fire Assignment Personal Equipment Checklist

On fire suppression assignments, individuals should be reminded that weight and bulk of personal gear is restrictive in transportation, handling, and storage.

- Generally the total weight limit per individual is 65 lbs. (45 lbs. for personal equipment and 20 lbs. for web gear or briefcase).
- Tags or markings are recommended for identifying personal gear.
- External frame packs shall not be used.

Individuals should be prepared to function for at least seven days with the personal equipment on hand. Incidental purchases while enroute, on approved Rest and Recuperation (R&R), and on return, will require cash or credit card. Always carry a photo identification card. Commercial airlines require photo ID to get boarding pass.

RECOMMENDED MINIMUM ITEMS

Personal Protective Equipment (PPE) required by your agency (e.g., fire shelter, flame resistant clothing, hard hat with chin strap, goggles, and headlight clips).

- Small pack sack and other web gear if you will be working on the fireline.
- Work gloves (leather)
- Leather boots, lace-up, heavy duty, non-slip sole, at least 8" high
- Jackets, 1 heavy, 1 light, of cotton, wool or flame-resistant material
- Agency-approved fire shirts and trousers
- Underclothes, non-synthetic fabric
- Handkerchiefs
- Personal toilet gear
- Watch
- Optional items may include sunglasses, writing paper, envelopes, stamps, notepad, pens and tobacco. Cameras are not recommended for fireline forces.
- Rain gear

Inappropriate Behavior

It is extremely important that inappropriate behavior be recognized and dealt with promptly. Inappropriate behavior is all forms of harassment including sexual and racial harassment and shall not be tolerated. When you observe or hear of inappropriate behavior you should:

- Inform and educate subordinates of their rights and responsibilities.
- Provide support to the victim.
- Develop appropriate corrective measures.
- Report the incident to your supervisor, if the behavior continues. Disciplinary action may be necessary.
- Document inappropriate behavior and report it to the employee's home agency.

- While working in and around private property, recognize and respect all private property.

Drugs and Alcohol

- Non-prescription unlawful drugs and alcohol are not permitted at the incident. Possession or use of these substances will result in disciplinary action.
- During off-incident Rest & Recuperation periods, personnel are responsible for proper conduct and maintenance of fitness for duty. Drug or alcohol abuse resulting in unfitness for duty will normally result in disciplinary action.
- Be a positive role model. Do not be involved with drug or alcohol abuse.
- Report any observed drug or alcohol abuse to your supervisor.

CHAPTER 7 - COMMAND

Contents

Organization Chart

INCIDENT COMMANDER

—Safety Officer

—Information Officer

—Liaison Officer

Agency Representatives

Position Checklists

Incident Commander

The Incident Commander is responsible for incident activities including the development and implementation of strategic decisions and for approving the ordering and releasing of resources.

- Ensure that safety receives priority consideration in the development of the Incident Action Plan.
- Obtain briefings from Agency Administrator and/or prior Incident Commander.
- Assess incident situation.
- Brief Command and General Staff.
- Approve the Incident Action Plan.
- Determine information needs.
- Approve requests for additional resources and requests for release of resources.
- Approve the use of trainees on the incident.
- Authorize release of information to news media.
- Ensure Incident Status Summary (ICS Form 209) is completed and forwarded to agency dispatch center(s).
- Approve Demobilization Plan.
- Conduct strategy meetings as needed.

- Determine effects of control actions on environmental and ecological processes.
- See that suppression plans consider all resource values.
- Foster an atmosphere free of discrimination, sexual harassment and other forms of inappropriate behavior.

Safety Officer

The Safety Officer, a member of the Command Staff, is responsible for monitoring and assessing hazardous and unsafe situations and developing measures for assuring personnel safety. The Safety Officer will correct unsafe acts or conditions through the regular line of authority, although they (Safety Officer) may exercise emergency authority, to stop or prevent unsafe acts when immediate action is required.

- Obtain briefing and operating procedures from the Incident Commander.
- Establish systems to monitor fire activities for hazards and risks. Take appropriate preventive action.
- Priority of recommendations will start with risks having the highest potential for death or serious injury and follow through to those of lesser degree.
- DIRECT INTERVENTION SHOULD BE USED TO IMMEDIATELY CORRECT A DANGEROUS SITUATION.
- Establish operating procedures for safety assistants.
- Evaluate operating procedures. Update or modify procedures to meet the safety needs on the fire.
- Participate in planning meeting.
- Review Incident Action Plans.
- Review and approve Medical Plan (ICS Form 206).
- Prepare the safety message included in the Incident Action Plan.
- Analyze observations from staff and other personnel.
- Place hazards and risks in priority for action.
- Present safety briefing to overhead. Safety briefing should emphasize hazards and risks involved in action plan components.
- Prepare accident report upon request of the Incident Commander.
- Ensure accidents are investigated.

- Prepare final Safety Report upon request of the Incident Commander.
- Maintain Unit Log (ICS Form 214).

Information Officer
The Information Officer, a member of the Command Staff, is responsible for the formulation and release of information about the Incident to the news media, local communities, incident personnel, other appropriate agencies and organizations, and for the management of all information officers assigned to the incident.

- Obtain briefing from Incident Commander.
- Contact the jurisdictional agency to coordinate public information activities.
- Obtain copies of current ICS-209's.
- Prepare initial information summary as soon as possible after arrival.
- Observe constraints on the release of information imposed by Incident Commander.
- Obtain approval for release of information from Incident Commander.
- Attend meetings to update information releases.
- Arrange for meetings between media and incident personnel.
- Provide escort service to the media and VIP's.
- Provide PPE for media and VIP's as appropriate.
- Respond to special requests for information.
- Organize an adequate staff, equipment, and facilities.
- Keep informed of fire developments and control progress through planning meetings and contact with other incident staff.
- Keep the Incident Commander informed of any potential issues involving the general public, news media, or other sources.
- Maintain Unit Log (ICS Form 214).

Liaison Officer

The Liaison Officer, a member of the Command Staff, is the point of contact for the assisting and cooperating Agency Representatives. This includes Agency Representatives from other fire agencies, Red Cross, law enforcement, public works, etc.

- Obtain briefing from Incident Commander.
- Provide a point of contact for assisting/cooperating Agency Representatives.
- Identify each Agency Representative including communications link and location.
- Respond to requests from incident personnel for inter-organizational contacts.
- Monitor incident operations to identify current or potential inter-organizational problems.
- Provide specific information on the incident relative to:

  ✓Type of assignments.

  ✓Anticipated duration on assignment or incident.

  ✓Shift change information if crews are to be replaced.

  ✓Expected demobilization schedule.
- Remain visible on the incident to incoming cooperators and assisting agencies.
- Maintain a current list of cooperating and assisting agencies assigned. Confirm resource list with Resource Unit Leader.
- Participate in planning meetings providing current resource status, limitations, and capability of other agency resources.
- Maintain Unit Log (ICS 214).

Agency Representative

An Agency Representative is an individual assigned to an incident from a cooperating or assisting agency or agencies. This individual may represent more than one agency.

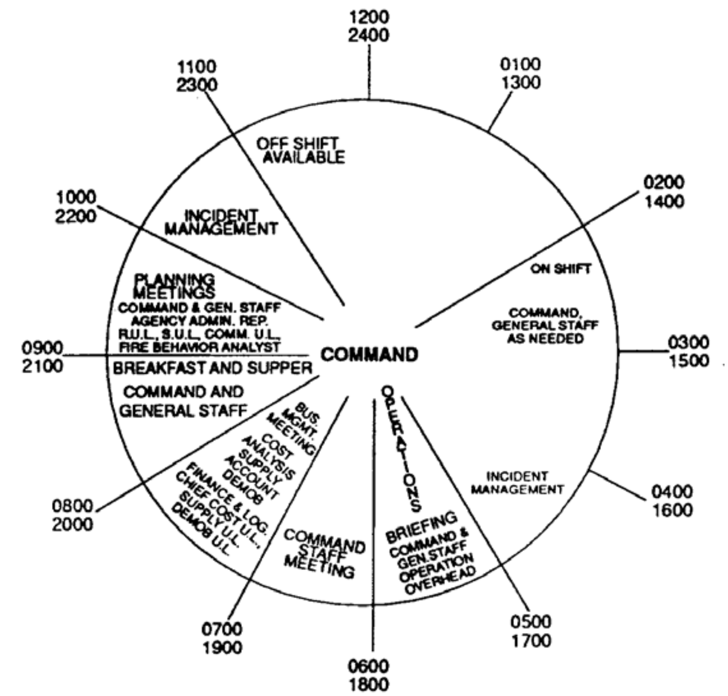
- Obtain briefing from Liaison Officer or Incident Commander.
- Establish a working location. Advise agency resources that a representative is assigned to the incident.

- Attend planning meetings as required.
- Provide input on the use of agency resources.
- Cooperate fully with Incident Commander and General Staff.
- Oversee the well-being and safety of agency personnel assigned to incident.
- Advise Liaison Officer of any special agency needs or requirements for resources assigned to the incident.
- Determine if any special reports or documents are needed and assure the completion of those needs.
- Report to agency dispatch or headquarters on a regular and prearranged basis.
- Ensure contact with any agency personnel that may have been hospitalized or otherwise separated from their assignment or unit.
- Ensure that all agency personnel and/or equipment are properly accounted for prior to your departure.
- Ensure that all required agency forms, reports and documents are completed prior to your departure from the incident.
- Have debriefing session with supervisor prior to departure.

Interagency Resource Representative

See Chapter 10 - Planning Section.

COMMAND AND GENERAL STAFF PLANNING CYCLE



CHAPTER 8 - OPERATIONS

Contents

Organization Chart

OPERATIONS SECTION CHIEF

- Staging Area Manager
- Operations Branch Director
  - Division/Group Supervisor
    - Task Force/Strike Team Leader
      - Firing Boss
      - Dozer Boss
        - Dozer/Tractor Plow Operator
      - Engine Boss
      - Crew Representative
      - Hand Crew
        - Squad Boss
          - Firefighter
- Air Operations Branch Director

Position Checklists

Operations Section Chief
The Operations Section Chief, a member of the General Staff, is responsible for the management of all operations directly applicable to the primary mission.

- Obtain briefing from the Incident Commander.
- Develop operations portion (ICS Form 215) of the Incident Action Plan with the Planning Section Chief.
- Brief and assign operations personnel in accordance with the Incident Action Plan.
- Supervise operations.
- Determine needs and request additional resources.
- Review suggested list of resources to be released and initiate recommendations for resource release.

- Assemble and disassemble strike teams and task forces assigned to operations.
- Report information about special activities, events and occurrences.
- Maintain Unit Log (ICS Form 214)

Operations Branch Director
The Operations Branch Director, when activated, is responsible for implementation of the portion of the Incident Action Plan applicable to the assigned Branch.

- Obtain briefing from the Operations Section Chief.
- Supervise Branch Operations.
- Develop alternatives for Branch control operations.
- Attend planning meetings at the request of the Operations Chief.
- Review Division/Group Assignment Lists within the Branch.
- Assign specific work tasks to Division/Group Supervisors.
- Resolve logistic problems reported by subordinates.
- Approve accident and medical reports.
- Maintain Unit Log (ICS Form 214).

Division/Group Supervisor
The Division/Group Supervisor is responsible for the implementation of the assigned portion of the Incident Action Plan.

- Obtain briefing from the Operations Section Chief or appropriate Operations Branch Director.
- Review the assignments with subordinates.
- Inform Incident Communications and/or Resource Unit of all status changes of resources assigned to the Division/Group.
- Coordinate activities with adjacent Divisions.
- Keep supervisor informed of situation and resources status.
- Resolve logistics problems within the Division/Group.
- Keep supervisor informed of hazardous situations and significant events.
- Ensure that assigned personnel and equipment get on and off line

in a timely and orderly manner.

- Maintain Unit Log (ICS Form 214).
- Approve and turn in time for all resources in division/group to the time unit.
- Evaluate performance of Task Force/Strike Team Leader

Task Force/Strike Team Leader

The Task Force/Strike Team Leader reports to a Division/Group supervisor and is responsible for performing tactical missions as assigned on a division or segment of a division. The Leader reports work progress, resource status, and other important information to a Division/Group Supervisor and maintains work records on assigned personnel.

- Obtain briefing from Division/Group Supervisor.
- Review assignments with subordinates and assign tasks.
- Travel to and from line with assigned resources.
- Monitor and inspect progress and make changes as necessary.
- Coordinate activities with adjacent strike team/task forces and single resources.
- Keep supervisor advised of situation and resource status.
- Retain control of assigned resources while off line (i.e., feeding, timekeeping, sleeping area assignment, etc.).
- Maintain Unit Log (ICS Form 214).
- Turn in time for resources to Division/Group Supervisor
- Evaluate performance of subordinates.

Single Resource Boss

A Single Resource Boss is responsible for supervising and directing a fire suppression module such as a hand crew, an engine, a dozer, a tractor-plow, a firing team, or one or more fallers.

- Obtain briefing from the Task Force/Strike Team Leader.
- Review assignments with subordinates and assign work tasks.
- Obtain necessary equipment and supplies.
- Review current and predicted weather conditions and brief subordinates of expected fire behavior.

- Provide for their welfare.
- Monitor work progress.
- Ensure adequate communications with supervisor and subordinates.
- Set up a backup chain of command to function when boss is absent.
- Keep supervisor informed of progress and any changes.
- Inform supervisor of problems with assigned resources.
- Brief relief personnel on the line at end of shift. Advise them of any changes in observed fire behavior and any changes in conditions that could effect personnel safety.
- Brief subordinates on safety items including escape routes and safety zones. Provide for their welfare.
- Return equipment and supplies to appropriate unit.
- Complete and turn in all time and use records on personnel and equipment.
- Maintain Unit Log (ICS Form 214).
- Turns time into Task Force/Strike Team Leader.

Crew Representative
A Crew Representative may be provided by sending agencies for each hand crew sent to a fire. The Crew Representative is responsible for the welfare of the crew and provides a contact between the crew and the appropriate Incident Command Organization.

- Look after the crew's welfare on and off the line.
- Maintain communications between the crew and the appropriate supervisors regarding the crew's safety and welfare.
- Report crew status to plans.
- As needed, maintains contact with crew's home base.
- Report the crew's performance and problems to sending agency's headquarters upon completion of the assignment.
- Coordinate with the Interagency Resource Representative if one is assigned.

Squad Boss

A Squad Boss is a working leader of a small group (usually not more than seven members), is responsible for keeping assigned personnel fully employed on assigned jobs, and is normally supervised by a Crew Boss.

- Understand exactly what the supervisor wants done.
- Ensure that personnel have proper safety equipment and tools and know how to care for and use them.
- Ensure that personnel have water and lunches.
- Keeps time when requested by supervisor.
- Look after the safety of assigned personnel.
- Report problems with personnel to supervisor.

Dozer/Tractor-Plow Operator

- Construct fireline with assigned equipment.
- Ensure that instructions are clear and understood.
- Perform all work safely (for self and other workers).
- Keep supervisor informed on progress of assignment and changes in fire behavior.
- Keep personal clothing and equipment in serviceable condition.
- Report all accidents, injuries, or hazardous conditions to supervisor.
- Maintain use records on equipment and ensures timely posting.

Firefighter

A firefighter is the basic resource used in the control and extinguishment of wildland fires and works either as an individual or as a member of a crew under the supervision of a higher qualified individual.

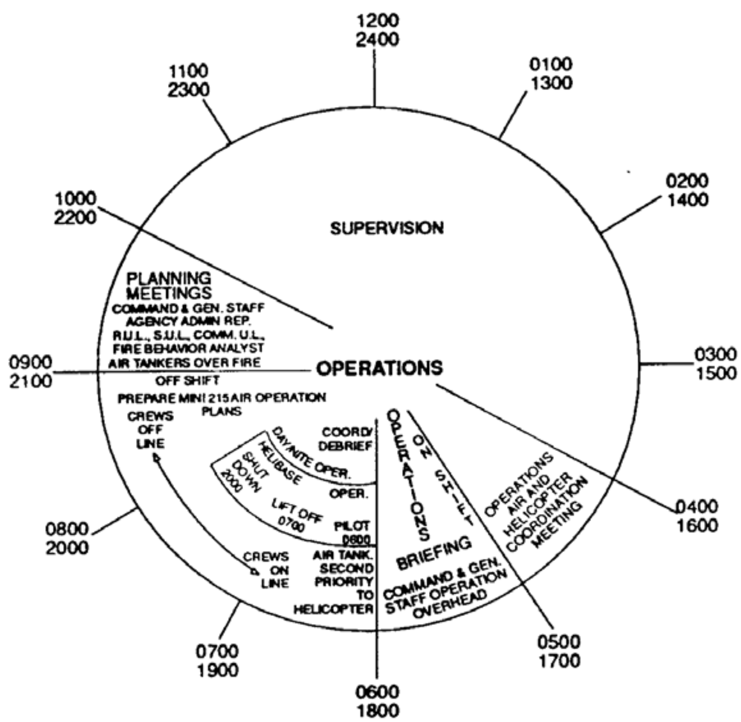
- Perform manual and semi-skilled labor as assigned.
- Ensure that objectives and instructions are understood.
- Perform all work in a safe manner.
- Keep personal clothing and equipment in serviceable condition.
- Report accidents or injuries to supervisor.
- Report hazardous conditions to supervisor.

Staging Area Manager

A Staging Area Manager is responsible for managing all activities within a Staging Area.

- Obtain briefing from Operations Section Chief or appropriate Operations Branch Director.
- Establish staging area layout.
- Determine and order support needed.
- Establish check-in function as needed.
- Post traffic plan for the Staging Area.
- Respond to requests for resource assignments.
- Report resource status changes as required.
- Maintain staging area in orderly condition.
- Maintain a Unit Log (ICS Form 214).

OPERATIONS PLANNING CYCLE



CHAPTER 9 - AIR OPERATIONS

Contents

ORGANIZATION CHART

AIR OPERATIONS BRANCH DIRECTOR

- Air Support Group Supervisor
  - Helibase Manager
    - Helicopter Manager(s)
    - Helispot Manager(s)
    - Take-Off and Landing Coordinator
    - Aircraft Base Radio Operator
    - Aircraft Timekeeper
    - Deck Coordinator
      - Loadmaster
      - Parking Tender
  - Fixed-Wing Base Manager for Temporary Base
    - Mixmaster
- Air Tactical Group Supervisor
  - Air Tanker-Fixed Wing Coordinator
  - Helicopter Coordinator

Position Checklists

Air Operations Branch Director

The Air Operations Director reports to the Operations Section Chief and is primarily responsible for preparing the air operations portion of the Incident Action Plan, for implementing its strategic aspects, and for providing logistical support to aircraft operating on the incident.

- Obtain briefing from Operations Section Chief.
- Request declaration (or cancellation) of temporary flight restriction.
- Participate in preparation of the Incident Action Plan.
- Provide Incident Action Plan and Air Operations Summary Worksheet (ICS Form 220) to the Air Support Group and Fixed Wing Bases.

- Determine coordination procedures for use by air organization with Operations Branches, Divisions, or Groups.
- Coordinate with appropriate Operations Section personnel.
- Supervise all Air Operations activities associated with the incident.
- Establish procedures for emergency reassignment of aircraft on the incident.
- Schedule approved flights of non-incident aircraft in the restricted airspace area.
- Inform the Air Tactical Supervisor of the air traffic situation external to the incident.
- Coordinate the use of incident aircraft for non-tactical assignments.
- Resolve conflicts concerning non-incident aircraft.
- Coordinate with Federal Aviation Administration.
- Update air operations plans.
- Report incidents or accidents and arrange for reinspection of the aircraft as necessary.
- Maintain Unit Log (ICS Form 214).

Air Support Group Supervisor
The Air Support Group Supervisor reports to the Air Operations Director and is responsible for supporting and managing helibase and helispot operations and for maintaining liaison with fixed-wing air bases.

- Obtain briefing from Air Operations Branch Director.
- Obtain copy of the Incident Action Plan.
- Participate in Air Operations planning activities.
- Request special air support items from appropriate sources through Logistics Section.
- Identify helibase and helispot locations.
- Coordinate requests for air logistical support.
- Maintain coordination with airbases supporting the incident.

- Obtain assigned ground to air frequency for helibase operations from Communications Unit Leader or Communications Plan (ICS Form 205).
- Inform Air Operations Branch Director of special aircraft and/or pilot restrictions.
- Ensure compliance with each agency's operations checklist for day and night operations.
- Obtain appropriate crash-rescue service for helibases and helispots.
- Provide helicopter fueling, maintenance and repair services.
- Maintain Unit Log (ICS Form 214).

Helibase Manager

- Obtain briefing from Air Support Supervisor.
- Obtain Incident Action Plan.
- Participate in Air Support Group planning activities.
- Report staffing and equipment needs to supervisor.
- Manage resources and supplies dispatched to helibase.
- Conduct briefings for helibase/helispot personnel and pilots.
- Ensure helibase is posted and cordoned.
- Ensure air traffic control operations are in effect.
- Manage retardant mixing and loading.
- Display organization and work schedule at each helibase, including helispot organization and assigned radio frequencies.
- Supervise manifesting and loading of personnel and cargo.
- Ensure dust abatement techniques are provided and used.
- Consider security at each helibase and helispot as appropriate.
- Manage appropriate crash-rescue services for the helibase and helispots.
- Request special air support items from the Air Support Supervisor.
- Receive and respond to requests for air logistical support.

- Maintain agency records and reports of helicopter activities.

Helicopter Manager

- Obtain briefing from helibase manager.
- Ensure fundamental helicopter safety rules are used.
- Administer contracts and verify helicopter and pilot qualifications.
- Supervise and provide leadership for all aspects of helicopter operations.
- Conduct appropriate briefings.
- Ensure adherence to communications procedures.
- Ensure that load calculations are accurate and meet operational needs.
- Conduct and supervise loading and unloading of personnel and cargo.

Helispot Manager

The Helispot Manager reports to the Helibase Manager and is primarily responsible for managing all activities at the assigned helispot.

- Obtain briefing from Helibase Manager.
- Inform Helibase Manager of helispot activities.
- Manage resources and supplies dispatched to helispot.
- Coordinate requests from Helibase Manager for air support.
- Ensure helispot air traffic control operations are in effect.
- Ensure agency crash-rescue services are available.
- Ensure adequate dust abatement.
- Supervise or perform retardant loading at helispot.
- Perform manifesting and loading of personnel and cargo.
- Maintain agency records and reports of helicopter activities.

Mixmaster

See Mixmaster under Fixed-Wing Base Manager.

Takeoff and Landing Coordinator

The Takeoff and Landing Coordinator reports to the Helibase Manager and is responsible for providing coordination of arriving and departing helicopters and movement around the helibase.

- Obtain briefing from Helibase Manager.

- Check radio system before commencing operation.

- Coordinate with radio operator on helicopter flight routes and patterns.

- Maintain communications with all incoming and outgoing helicopters.

- Coordinate with Deck Coordinator and Parking Tender.

Aircraft Base Radio Operator
The Aircraft Base Radio Operator reports to the Helibase or Fixed-Wing Base Manager and is responsible for establishing communication between incident assigned aircraft and airbases, Air Tactical Supervisor, Air Operations Director, and the Takeoff and Landing Controller.

- Obtain briefing from Base Manager.

- Obtain Air Operation Summary Worksheet (ICS Form 220).

- Notify Takeoff/Landing Coordinator of incoming aircraft.

- Verify daily radio frequencies with Base Manager.

- Maintain a log of all aircraft takeoffs and landings, ETA's, ETD's, and flight route check-ins.

- Establish and enforce proper radio procedures.

- Immediately notify supervisor of any overdue or missing aircraft.

- Understand crash/rescue procedures.

- Receive clearance from Air Tactical Supervisor before launching aircraft.

Aircraft Timekeeper
The Aircraft Timekeeper reports to the Helibase or Fixed-Wing Base Manager and is responsible for keeping time on all aircraft assigned.

- Obtain briefing from Base Manager.

- Record operation time of aircraft.
- Fill out necessary agency time reports.
- Obtain necessary timekeeping forms.

Deck Coordinator
The Deck Coordinator reports to the Helibase or Fixed-Wing Base Manager and is responsible for providing coordination at an aircraft landing area for personnel and cargo movement.

- Obtain briefing from supervisor.
- Establish emergency landing areas.
- Ensure crash/rescue procedures are understood by deck personnel.
- Establish and mark landing areas.
- Ensure sufficient personnel are available to safely load and unload personnel and cargo .
- Ensure deck area is properly posted.
- Supervise deck management personnel.
- Apply dust abatement when necessary.
- Ensure proper manifesting and load calculations are done.
- Ensure Air Traffic Control operation is coordinated with the Takeoff and Landing Coordinator.
- Maintain agency records.

Loadmaster (Personnel/Cargo)
The Loadmaster reports to the Deck Coordinator and is responsible for the safe operation of loading and unloading of cargo and personnel.

- Obtain briefing from Deck Coordinator.
- Ensure proper posting of loading and unloading areas.
- Perform manifesting and loading of personnel and cargo.
- Ensure sling load equipment is safe.

- Know crash/rescue procedures.
- Supervise loading and unloading personnel.
- Coordinate with Takeoff and Landing Coordinator.
- Ensure that appropriate hazardous materials regulations are enforced.

Parking Tender
The Parking Tender reports to the Deck Coordinator and is responsible for parking aircraft.

- Obtain briefing from the Deck Coordinator.
- Supervise activities at the landing area.
- Know and understand the crash/rescue procedures.
- Ensure landing area is properly maintained.
- Check personnel seat belts, cargo restraints and aircraft doors.

Fixed-Wing Base Manager (For Temporary Bases)
The Fixed-Wing Base Manager reports to the Air Support Group Supervisor and is responsible for all ground service operations at assigned base.

- Obtain the following information on each aircraft assigned to operating base:

  ✓Type of aircraft.

  ✓Owner and pilot.

  ✓Estimated time of arrival.

  ✓Any limitations on use.
- Secure a priority list of air missions and schedule all flights.
- Request necessary communications and operators through the Air Support Group Supervisor.
- Coordinate all flights with the Air Tactical Group Supervisor.
- Secure and provide all necessary ground facilities, supplies, and services required at operating base.

- Regulate movement of assigned aircraft, motor vehicles, and personnel on the airfield.
- Maintain necessary records on aircraft, equipment, and personnel assigned to operating base.
- Serve as liaison with airport management.
- Receive overhead, crews, and supplies and verify arrangements for transportation to assigned destinations.
- Be thoroughly familiar with and enforce all safety requirements of the operation.

Mixmaster
The Mixmaster reports to the Helibase or Fixed-Wing Base Manager and is responsible for preparing fire retardant for helicopters and air tankers at the rate specified and for the expected duration of job.

- Obtain briefing from supervisor.
- Check accessory equipment, such as valves, hoses and storage tanks.
- Supervise crew in loading retardant into aircraft.
- Make sure supply of retardants is kept ahead of demand.
- Attend to the safety and welfare of crew.
- Keep necessary agency records.

Air Tactical Group Supervisor
The Air Tactical Group Supervisor reports to the Air Operations Branch Director and is responsible for the coordination of fixed and/or rotary-wing aircraft operations over an incident.

- Obtain briefing from Air Operations Branch Director.
- Determine what aircraft are operating within area of assignment.
- Manage air attack activities based upon Incident Action Plan.
- Establish and maintain communications with Air Operations Branch Director, Air Tanker and Helicopter Coordinators, Incident Helibase, and Fixed-Wing Support bases.
- Coordinate approved flights of non-incident aircraft or non-tactical flights in temporary flight restriction (TFR).
- Receive and act on reports of non-incident aircraft violating temporary flight restriction (TFR).

- Make tactical recommendations to appropriate operation section personnel.
- Inform Air Operations Branch Director of tactical recommendations affecting the air operations portion of the Incident Action Plan.
- Report on incidents or accidents.
- Maintain Unit Log (ICS Form 214).

Air Tanker/Fixed Wing Coordinator
The Air Tanker/Fixed Wing Coordinator reports to the Air Tactical Group Supervisor and is responsible for coordinating assigned air tanker operations at the incident. The coordinator is always airborne.

- Obtain briefing from the Air Tactical Group Supervisor.
- Determine all aircraft including air tankers and helicopters operating within incident area of assignment.
- Survey incident area to determine situation, aircraft hazards and other potential problems.
- Coordinate the use of assigned ground-to-air and air-to-air communications frequencies.
- Ensure air tankers know appropriate operating frequencies.
- Determine incident air tanker capabilities and limitations for specific assignments.
- Coordinate with Air Tactical Group Supervisor and assign geographical areas for air tanker operations.
- Implement air safety procedures. Immediately corrects unsafe practices or conditions.
- Receive assignments, assign missions, schedule flights and supervise air tanker activities.
- Provide information to ground resources .
- Inform Air Tactical Group Supervisor of overall incident conditions including aircraft malfunction or maintenance difficulties.
- Inform Air Tactical Group Supervisor when mission is completed and reassign air tankers as directed.
- Report incidents or accidents.
- Maintain records of activities.

Helicopter Coordinator
The Helicopter Coordinator reports to the Air Tactical Group Supervisor and is responsible for coordinating tactical or logistical helicopter mission(s) at the incident.

- Obtain briefing from the Air Tactical Group Supervisor.
- Survey assigned incident area to determine situation, aircraft hazards, and other potential problems.
- Coordinate with Air Tactical Group Supervisor in establishing locations and takeoff and landing patterns for helibase(s) and helispot(s).
- Coordinate the use of assigned ground-to-air and air-to-air communications frequencies with the AirTactical Group Supervisor.
- Ensure that all assigned helicopters know appropriate operating frequencies.
- Coordinate geographical areas for helicopter operations with Air Tactical Group Supervisor and make assignments.
- Implement air safety procedures. Immediately corrects unsafe practices or conditions.
- Ensure that approved night flying procedures are in operation.
- Coordinate activities with Air Tactical Group Supervisor, Air Tanker Coordinator, Air Support Group, and ground personnel.
- Inform Air Tactical Group Supervisor when mission is completed and reassign helicopter as directed.
- Report incidents or accidents.
- Maintain records of activities.

Operations
Pre-plan aviation operations in advance to meet aircraft support needs. The following points should be considered when aircraft are used in fire operations:

Communications
Aircraft should not be used until communications (both ground-to-air and air-to-air) with contact and control personnel have been established and understood.

Pilot Briefing Checklist

- Overall plan for next day's strategy and tactics
- Smoke conditions
- Visibility limits at the fire and airports/fly with aircraft landing/taxi lights on
- Established flight routes, helispot locations, marking, etc.
- Flight path obstructions/wires, towers, etc.
- Topographic problems
- Working altitude (MSL)
- Local wind turbulence
- High wind predictions
- Known downdraft areas
- Other aircraft operations over the incident
- Temporary Flight Restrictions (TFR)
- Work schedules
- Flight and duty limitations
- Communications frequencies
- Parking areas
- Taxi ways
- Fueling procedures

Airport Facilities and Procedures

Facilities. Check out what facilities are available

- FAA towers, flight service stations (FSS), emergency tower operational needs
- Airport areas for assigned loading, unloading, and parking for retardant aircraft, helicopters, cargo, and transport aircraft
- Location for office space, phone communication facilities, ramp personnel for loading and unloading, eating and sleeping accommodations
- Other items such as crash trucks, major or minor repairs for

aircraft, forklifts, APU's and passenger stairs available for use.

Procedures. Meet with airport manager and Federal Aviation Administration (FAA), tower, or flight service station personnel who can assist operations and provide valuable information.

- Check out landing, take-off, taxiing procedures, and radio frequencies used at airport.
- Know lengths, altitudes, surface of runways, normal take-off and landing patterns, if lights available after dark, gross take-off and landing weights for single, tandem and dual tandem wheeled aircraft.

Air Traffic Operations
Following are factors to be considered in air traffic operations:

Enroute to the Fire

- Request a Temporary Flight Restriction (TFR) designation.
- Set up flight routes for all air traffic to and from fire considering the following:

  ✓Best route with least hazards for types of aircraft and missions to be accomplished.

  ✓Flying around special use airspace.

- Aircraft arriving 5 to 10 minutes away from fire should contact appropriate Air Traffic Operations over the fire.

Over the Fire. Operations Section Chief sets priorities of aircraft use on fire area working in conjunction with Air Tactical Group Supervisor.

Air Tactical Group Supervisor Guidelines

- Brief all pilots before arrival at the fire, if possible.
- Have air tankers orbit left hand pattern and report to Air Tanker Coordinator.
- Ensure that military training routes have been amended or adjusted for the fire area.
- Set mean sea level altitudes and orbit patterns for different type aircraft.
- Set check point areas on reporting into Temporary Flight Restriction (TFR).

- Maintain primary and secondary radio frequencies for all aircraft that are enroute or remain in fire area.
- Cancel or abort missions when safety of aircraft or pilots is in jeopardy.
- All aircraft shall fly with their landing/taxi lights on.

Records
It is important to keep the following records:

- Maintain a flight log to provide for flight following:

  ✓Flight manifests for personnel and cargo incoming or outgoing from airports, helibases, and helispots.

  ✓Receipts for fuel, oil, and other equipment used.

- A log for:

  ✓Flight hour limitation

  ✓Flight times

- Property accountability forms for property issued to pilots.

Time Recording:

Time for aircraft and personnel will be recorded and completed daily.

Report All Accidents Per Agency Policy and Procedures

Flight/Duty Hour Limitations

Check contract or furnishing agency for limitations. Most restrictive limitations will prevail.

Principles of Aerial Retardant Use

Main Principle: Call for retardant early in sufficient quantity, dropped from an effective altitude with absolute minimum time lapse between drops. Between each drop, follow up with aggressive ground suppression action.

Consider:

- Will drop be effective? If conditions allow, very early morning is most effective due to lower air temperatures and higher humidity.
- Will drop be safe for ground personnel?
- Can mission be accomplished during daylight?

- Type of fuels.
- Wind conditions (normally not over 30 mph).
- Fire behavior.
- Ability to follow up with ground action.
- If terrain prohibits use of large air tankers, consider using single engine air tankers and/or helicopters.
- Can pilot see target?
- Suspend drops when no longer effective or essential.
- Notify pilot if there are physical hazards in drop pattern, such as utility lines, towers, trees, other aircraft, etc.

CHAPTER 10 - PLANNING

Contents

Organization Chart

Planning Section Chief

- Resource Unit Leader
  - Status/Check-in Recorder
- Situation Unit Leader
  - Field Observer
  - Infrared Interpreter
  - Fire Behavior Analyst
    - Incident Meteorologist
      - Weather Observer
- Documentation Unit Leader
- Demobilization Unit Leader
- Interagency Resource Representative
- Human Resource Specialist
- Training Specialist

Position Checklists

Planning Section Chief

The Planning Section Chief, a member of the General Staff, is responsible for the collection, evaluation, dissemination, and use of information about the development of the incident, status of resources, and demobilization of the incident. Information is needed to understand the current situation, predict probable course of incident events, prepare alternative strategies and control operations for the incident, and provide for an orderly and economic demobilization of the incident.

- Obtain briefing from Incident Commander.
- Establish information requirements and reporting schedules for all ICS organizational elements for use in preparing the Incident Action Plan.
- Conduct planning meetings.
- Supervise preparation of Incident Action Plan (see Planning Process) and ensure sufficient copies are available for distribution through Unit Leader level.
- Assemble information on alternative strategies.
- Perform operational planning for Planning Section.

- Advise General Staff of any significant changes in incident status.
- Prepare and distribute Incident Commander's orders.
- Ensure that normal agency information collection and reporting requirements are met.
- Prepare recommendations for release of resources (for approval by the Incident Commander).
- Ensure that information concerning special environmental protection needed is included in the Incident Action Plan.
- Ensure demobilization plan and schedule are developed and coordinated with Command, General Staff and Agency Dispatchers.
- Establish a communications link between the agency demobilization organization and the incident demobilization unit.
- Maintain Unit Log (ICS Form 214).
- Instruct planning section units in distribution of information.

Resource Unit Leader
The Resource Unit Leader is responsible for establishing all incident check-in activities; the preparation and processing of resource status change information; the preparation and maintenance of displays, charts, and lists which reflect the current status and location of suppression resources, transportation, and support vehicles; and maintaining a master check-in list of resources assigned to the incident.

- Obtain briefing from Planning Section Chief
- Establish check-in function at incident locations.
- Ensure that all resources have checked in.
- Using the Incident Briefing (ICS Form 201), prepare and maintain the Command Post display (organization chart and resource allocation and deployment sections of display).
- Reassign initial attack personnel to incident positions.
- Establish contacts with incident facilities and maintain resource status information.
- Participate in planning meetings as required by the Planning Section Chief.
- Gather, post, and maintain current incident resource status including transportation, support vehicles, and personnel.

- Maintain master list of all resources checked in at the incident.
- Prepare Organization Assignment List (ICS Form 203) and Incident Organization Chart (ICS Form 207).
- Assemble and disassemble task force or strike teams as requested by Operations.
- Prepare Division Assignment Lists (ICS Form 204) after Planning Meeting.
- Provide resource summary information to Situation Unit as requested.
- Continually identify resources surplus to the suppression needs.
- Assign resources from the same geographic area to the same operational period and the same camp when possible.
- Maintain Unit Log (ICS Form 214).

Status/Check-in Recorder
Status/Check-in Recorders are used at each check-in location to ensure that all resources assigned to an incident are accounted for.

- Obtain briefing from Resource Unit Leader.
- Obtain work materials.
- Establish communications with the communication center.
- Post signs so arriving resources can easily find the check-in locations.
- Transmit check-in information to Resource Unit on regular, prearranged schedule.
- Forward completed Check-in Lists (ICS Form 211) to the Resource Unit.
- Prepare, post, and maintain Resource Status Cards (ICS Form 219).

Situation Unit Leader
The Situation Unit Leader is responsible for the collection and organization of incident status and situation information and the evaluation, analysis, and display of that information for use by ICS personnel and agency dispatchers.

- Obtain briefing from Planning Section Chief.
- Collect and analyze situation data.

- Obtain available pre-attack plans, mobilization plans, maps, and photographs.
- Obtain and analyze infrared data as applicable.
- Prepare predictions at periodic intervals or upon request of the Planning Section Chief.
- Post data on unit work displays and Command Post displays at scheduled intervals.
- Participate in planning meetings as required by the Planning Section Chief.
- Prepare the Incident Status Summary (ICS Form 209).
- Provide information on transportation system to Ground Support Unit Leader for the Transportation Plan.
- Provide photographic services and maps.
- Provide situation status information on request.
- Maintain Situation Unit records.
- Maintain Unit Log (ICS Form 214).
- Write narrative report on situation from initial attack to final demob.

Field Observer
The Field Observer is responsible for collecting situation information from personal observations at the incident, and providing this information to the Situation Unit Leader.

- Obtain briefing from Situation Unit Leader.
- Determine: location of assignment, types of information required, priorities, time limits for completion, methods of communication, method of transportation.
- Obtain Incident Action Plan for the operational period.
- Obtain necessary equipment and supplies.
- Perform such duties as:

✓Map perimeter of fire, location of hotspots, unburned islands, water sources, etc.

✓Observe rates of spread, weather conditions, improvements threatened, hazards, escape routes, safe areas, and progress of operations.

- Let Division Supervisor know you are in the area.
- Obtain situation information from operations personnel at end-of-shift and other times as appropriate.
- Identify possible facilities locations: access routes, road conditions and possible control line locations.
- Make weather observations as requested.
- Report immediately any condition observed which may cause danger or safety hazard to personnel.
- Prepare maps for use in Situation Unit, Command Post, and Incident Action Plan.
- Prepare information and post on Command Post displays as requested.

Infrared Interpreter
The Infrared Interpreter directs infrared mapping operations when assigned.

- Obtain briefing from Situation Unit Leader.
- Interpret imagery and plot findings on aerial photos or maps.
- Arrange for missions with infrared aircraft crew liaison including: objectives of flight, timing, areas needing particular attention, and imagery delivery.
- Keep abreast of aircraft or crew limitations.
- Keep the Planning Section currently advised of findings.
- Obtain direct communications with infrared crew liaison.

Fire Behavior Analyst
The Fire Behavior Analyst is responsible for collecting weather data, developing strategic and tactical fire behavior information, predicting fire growth, and interpreting fire characteristics for use by incident overhead.

- Obtain briefing from Situation Unit Leader.
- Manage weather data collection system, including Incident Meteorologist and Weather Observers.
- Establish weather security watch.
- Collect, review, and compile fire history, fuel data and information about topography and fire barriers.

- Provide weather information and other pertinent information to Situation Unit Leader for inclusion in Incident Status Summary Report (ICS Form 209).
- Participate in planning meetings as directed by Situation Unit Leader.
- Develop tactical fire behavior information in support of the Incident Action Plan.
- Prepare a written fire behavior forecast which includes safety considerations for each operational period.
- Attend operational briefings to answer questions related to fire behavior predictions, interpretations and safety.
- Monitor actual fire behavior to validate predictions, document behavior, and anticipate potential safety problems. Inform personnel of changes in predicted conditions.
- Provide site specific fire behavior predictions, as requested.

Incident Meteorologist
Furnishes detailed microclimatic forecasts essential to safe and effective operations.

- Obtain briefing from Fire Behavior Analyst.
- Obtain current and predicted fire weather.
- Identify local weather patterns and trends.
- Provide fire weather forecasts and briefings, as required, to meet the operational needs of the incident.
- Work with Fire Behavior Analyst in interpreting forecasts and relating them to local fire behavior.
- Provide site-specific forecasts for special operations.
- Provide meteorological data and consultation necessary to support the incident operations.
- Establish with the Fire Behavior Analyst, requirements for local fire weather observations.
- Identify need for portable weather stations.
- Collect all fire weather observations and forecasts for inclusion in the final fire package.

Weather Observer
The Weather Observer is responsible for collecting current incident weather information and providing the information to an assigned meteorologist, Fire Behavior Analyst, or Situation Unit Leader.

- Obtain briefing from Incident Meteorologist, Fire Behavior Analyst, or Situation Unit Leader.
- Obtain needed weather data collection equipment.
- Obtain appropriate transportation to collection site(s).
- Record and report weather observations at assigned locations and times.

Documentation Unit Leader
The Documentation Unit Leader is responsible for maintaining accurate and complete incident files, providing duplication services to incident personnel, and packing and storing incident files.

- Obtain briefing from Planning Section Chief.
- Establish and organize incident files.
- Establish duplication service and respond to requests.
- Retain and file duplicate copies of official forms and reports, including those generated by computers.
- Check on accuracy and completeness of records.
- Provide duplicates of forms and reports.
- Prepare incident documentation when requested.
- Maintain, retain and store incident files.
- Maintain Unit Log (ICS Form 214).

Demobilization Unit Leader
The Demobilization Unit Leader is responsible for the preparation of the Demobilization Plan and schedule and assists the Command and General Staff in ensuring an orderly, safe, and efficient movement of personnel and equipment from the incident.

- Obtain briefing from Planning Section Chief.
- Review and continually monitor incident resource records (ICS Briefing Form 201, Check-In-List Form 211, Resource Status cards Form 219, and Incident Action Plans) to determine probable size of demobilization effort.

- Obtain Incident Commander's demobilization objectives and priorities.
- Meet with Agency Representatives to determine:

  ✓Personnel rest, hygiene, and safety needs.

  ✓Coordination procedures with agencies.

  ✓Local and national demobilization priorities.
- Be aware of ongoing Operations Section resource needs.
- Obtain identification and description of surplus resources and probable release times.
- Determine finance, supply, and other incident check-out stops.
- Establish and post check-out procedures.
- Determine incident logistics and transportation capabilities needed to support the demobilization effort.
- Establish communications with appropriate off-incident facilities.
- Get approval of Demobilization Plan (ICS, PSC, Agency, etc.).
- Distribute plan and any amendments .
- Monitor and supervise implementation of Demobilization Plan.
- Maintain Unit Log (ICS Form 214).

Interagency Resource Representative
The Interagency Resource Representative may be assigned to, or requested by, an incident to serve as the sending area's representative for crews, overhead, and equipment assigned to an incident. Is responsible to the home unit to coordinate, through the incident team, the well being of all resources assigned from the home unit. This position will normally report to the Planning Section Chief.

- Secure and maintain a complete list of names, home agencies and units, Social Security numbers, etc. of all personnel assigned to the incident from the sending area.
- Establish contact with the Incident Management Team to provide information and assistance to the team during resource check-in and initial assignment.
- Coordinates activities with appropriate Agency Representatives.
- Establish a work location. Advise the team and assigned resources about that location.
- Whenever feasible, maintain daily contact with a representative of each appropriate resource.

- Provide assistance to appropriate personnel on time keeping, commissary, travel, accidents, injuries, personnel problems or emergencies, and other administrative needs.
- Maintain daily contact with the sending area to exchange information about the status of resources.
- Assist in resolving disciplinary cases as requested by the team or the sending area.
- Provide input as to the use of assigned resources.
- Assist the team in providing for the well-being and safety of assigned resources.
- Assist the team in determining the need for and preparation of special reports or documents.
- Assist the team in investigating accidents involving assigned personnel.
- Maintain contact with assigned personnel that have been hospitalized or otherwise separated from their unit.
- Assist the team in the completion of all required forms, reports, and documentation prior to the departure of assigned resources from the incident.
- Assist the team in the demobilization of assigned resources.
- Provide the sending unit with required paperwork and evaluations.

Human Resource Specialist
The Human Resource Specialist is responsible for monitoring civil rights and related human resource activities to assure that appropriate practices are followed. Work is normally conducted in a base camp environment but may involve tours of the fireline, other camps, and rest and recuperation (R&R) facilities.

- Establish contact with the Planning Section Chief to determine placement within the organization.
- Obtain briefing from the assigned supervisor.
- Arrange for necessary work space, materials, and staffing.
- Provide a point of contact for incident personnel to discuss civil rights and human resource concerns.
- Participate in daily briefings and planning meetings to provide appropriate civil rights and human resource information.

- Prepare civil rights messages to include in the Incident Action plan.
- Post civil rights or other human resource information on bulletin boards and other appropriate message centers.
- Monitor whether a positive working environment, supportive of cultural diversity, is maintained and enhanced for all personnel.
- Conduct awareness sessions as needed. Use civil rights or human resource videotapes when appropriate.
- Establish and maintain effective work relationships with agency representatives, liaisons, and other personnel in the Incident Command.
- Refer concerns about pay, food, sleeping areas, transportation, and shift changes to the appropriate incident staff, taking into account civil rights and human resource factors.
- Receive and verify reports of inappropriate behavior that occur on the incident.
- Take steps to correct inappropriate acts or conditions through appropriate lines of authority.
- Give high priority to informally resolving issues before the individuals leave the incident.
- Provide referral information if a complaint cannot be resolved during the incident.
- Conduct follow-up, as needed, depending upon the seriousness of the infraction.
- Prepare and submit reports and related documents.
- Participate in the final team debriefing.
- Maintain Unit Log (ICS Form 214)

Training Specialist
A Training Specialist may help achieve training opportunities on an incident. Training activities, to be effective, must be coordinated at all levels.

- Obtain briefing from Planning Section Chief.
- Identify training opportunities on the incident.
- Review trainee assignments and modify, if appropriate.

- Inform Resources Unit of trainee assignments.
- Brief trainees and trainers on training assignments and objectives.
- Make follow-up contacts on the job to provide assistance and advice for trainees to meet training objectives.
- Ensure trainees receive performance evaluation and completion of task book as assigned..
- Prepare formal report for trainees' home unit.
- Maintain Unit Log (ICS 214)

Planning Process

The checklist on the following page provides basic steps appropriate for use in almost any incident situation. Not all incidents require written plans. The need for written plans and attachments is based on incident requirements and the decision of the Incident Commander.

The Planning Checklist is intended to be used with the Operational Planning Worksheet (ICS Form 215). For more detailed instructions, see Planning Section Chief Position Manual (ICS 221-1). The Operations Section Chief should have a draft Operational Planning Worksheet (ICS Form 215) completed prior to the Planning meeting.

Incident objectives and strategy should be established before the planning meeting. For this purpose, it may be necessary to hold a strategy meeting prior to the planning meeting.

The planning process works best when the incident perimeter and proposed control lines are divided into logical geographical units. The tactics and resources are then determined for each of the planning units. Finally, the planning units are combined into segments or divisions, utilizing span-of-control guidelines.

Planning Process Checklist

Planning step	Primary Responsibility
1. Give briefing on situation and resource status.	Planning Section Chief
2. Review incident objectives.	Incident Commander
3. Plot control lines.	Operations Section Chief
4. Specify tactics for each "planning unit"	Operations Section Chief
5. Determine control force requirements and specify resources needed for each "planning units."	Operations Section Chief
6. Combine planning units into divisions and/or segments.	Operations Section Chief
7. Specify operations facilities and reporting locations. Plot these on map.	Operations Section Chief
8. Consider communications, medical, and transportation plan, and supply resources	Logistics Section Chief
9. Finalize Incident Action Plan	Planning Section Chief
10. Approve Incident Action Plan.	Incident Commander

Demobilization

The Incident Commander is responsible to the host agency for demobilization. Demobilization is an important part of total incident management and requires the attention of the Incident Commander and the Command and General Staff.

The Planning Section Chief must establish an adequate demobilization organization, in a timely fashion, to provide for an orderly and economic demobilization of the incident. The complexity of the incident, kinds and types of resources, and the level of resources involved (local, regional or national) dictates the size and expertise needed by the demobilization organization. Resources must be released, returned to their home units, rested, and rehabilitated as soon as possible so they will be ready for their next assignment.

The Demobilization Unit Leader must obtain input from a number of others to develop a complete plan. The IC and General Staff need to provide input and totally support the plan. The Agency Dispatcher must provide input from all coordination levels. If Area Command has been established, they should provide their input directly to the incident.

Principles of Demobilization

Demobilization is not a mirror image of mobilizing. When mobilizing, many individuals in widely separated places direct, coordinate, and provide transportation to get fire resources to a single point. Demobilization is the responsibility of a few people to return these same resources to their departure points or to new assignments.

Timing

Demobilization planning begins with collection of information regarding place of origin, method of travel, travel times, etc., at the time of check-in.

- Resource records must be complete showing place of origin, method of transportation to fire, home unit, and chief of party.

- Logistic capabilities must be assessed. May need additional records keeping personnel to catalog logistic capabilities and get additional information from planning, finance, agency dispatcher, vendors, etc.

Communications

Adequate communication between all key personnel and facilities involved in the demobilization effort is necessary for efficient demobilization. Communication lines should not compete with those used in the suppression effort.

Staffing

Staff the demobilization organization to fit the need of the plan. Staff early and adequately.

Teamwork

Demobilization functions better as a team effort. The Agency Dispatcher must be a member of the team. The involvement of all fire functions in the demobilization planning and execution is required.

Safety and Cost Effectiveness

Adequate rest prior to demobilization is important when long travel times are anticipated. Don't sacrifice safety and cost effectiveness for speed. Keep resources in incident facilities until priorities and transportation arrangements are confirmed.

Eliminate Confusion
Insist that Chiefs-of-Party and crew Representatives keep tight control during demobilization processing and travel

Demobilization Planning

The demobilization plan must show release priorities, release and processing procedures, responsibilities, and a schedule.

The preparation of the demobilization plan and schedule must involve personnel from all functions.

- **Planning**
  ✓Identification and description of surplus resources.
  ✓Names, quantities, and locations.
  ✓Destinations and method of travel to fire, Chiefs of Party, etc.

- **Safety**
  ✓Release priorities and personnel welfare.
  ✓Physical condition of personnel.
  ✓Probability of and fitness for a new assignment.
  ✓Adequacy of transportation.
  ✓Length of travel time and method.
  ✓Personal needs.

- **Finance/Administration**
  ✓Processing, legal and fiscal.
  ✓ADO payoff needs.
  ✓Time recording.
  ✓Claims
  ✓Contractual obligations.

- **Operations**
  ✓On-going suppression needs.
  ✓Personnel needs.
  ✓Equipment needs.
  ✓Home unit takeover.

- **Logistics**
  ✓Release priorities and logistics needs and capabilities.
  ✓Capabilities of local agency.
  ✓Transportation availability.
  ✓Facility needs and availability.
  ✓Communication limitations.
  ✓Capability of Supply to re-supply resources before leaving incident.

- **Agency Dispatcher**
  ✓Release priorities and facilitating arrangements.
  ✓Local or out-of-region situation.
  ✓Communication limitations.

- **Command**
  ✓Overall management.
  ✓Adequacy of planning effort.
  ✓Coordination of planning effort.
  ✓Environmental consideration and agency management direction.
  ✓Approval

Plan Distribution
Copies of complete approved demobilization plan will be distributed to all General Staff, Agency Dispatchers, Agency Headquarters, and to the responsible person at each processing or loading point at least 24 hours prior to first anticipated release.

Demobilization Responsibilities

General
Supervisory personnel need to inform their supervisor of any resources which will be surplus to needs as soon as identified.

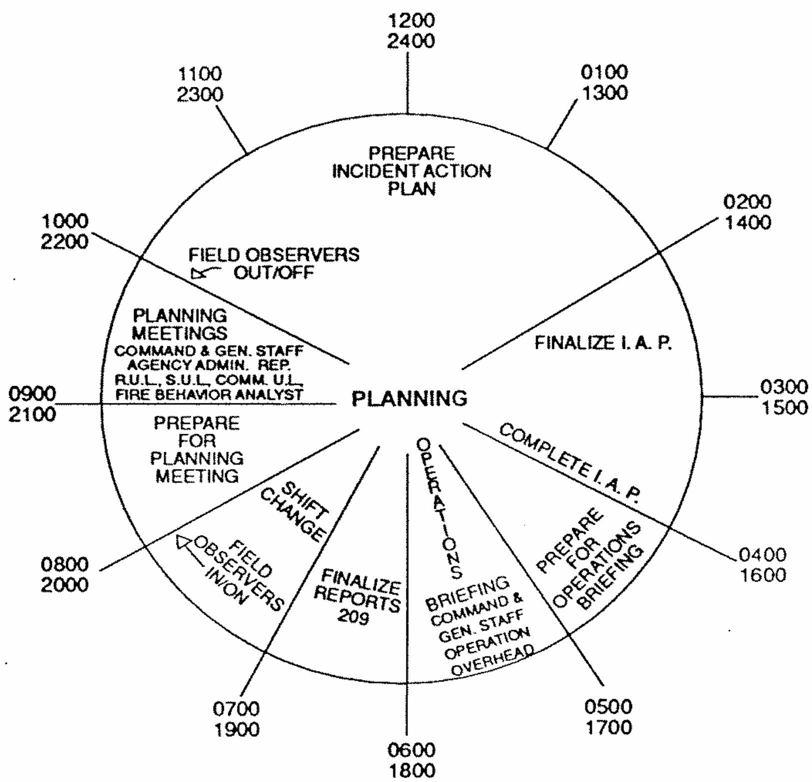
Operations Section
- Assesses condition of crews.
- Plans for anticipated resource need

Logistics Section
- Begin planning demobilization early . Work directly with Planning Section in plan development.
- Organize to handle physical demobilization of resources.
- Consider checkpoints or check stations for releasing resources.
- Coordinate the actual movement of resources with Agency Dispatcher servicing the fire.
- Arrange for transportation and personnel needs during processing out of facilities and transit to next destination.
- Notify Planning Section and Agency Dispatcher when released resources have actually departed.

Finance Section

- Determine method for paying crews.
- Alert needed fiscal personnel.
- See that all time reports are completed.
- Assist logistics in inspecting personnel and rental equipment before release.
- Forward time reports to appropriate office as rapidly as possible.

PLANNING CYCLE GUIDE



CHAPTER 11 - LOGISTICS

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Organization Chart

Logistics Section Chief

- Service Branch Director
  - Communications Unit Leader
    - Communications Technician
    - Incident Head Dispatcher
  - Medical Unit Leader
  - Food Unit Leader
- Support Branch Leader
  - Supply Unit Leader
    - Ordering Manager
    - Receiving and Distribution Manager
      - Tool and Equipment Specialist
  - Facilities Unit Leader
    - Security Manager
    - Base/Camp Manager
      - Facility Maintenance Specialist
  - Ground Support Unit Leader
    - Equipment Manager

Position Checklists

Logistics Section Chief

The Logistics Section Chief, a member of the General Staff, is responsible for providing facilities, services, and material in support of the incident. The Logistics Section Chief participates in development and implementation of the Incident Action Plan and activates and supervises the Branches and Units within the Logistics Section.

- Obtain briefing from Incident Commander.
- Plan organization of Logistics Section.
- Assign work locations and preliminary work tasks to Section Leaders.

- Participate in preparation of Incident Action Plan.
- Identify service and support requirements for planned and expected operations.
- Provide input to and review Communications Plan, Medical Plan, and approved Transportation Plan.
- Estimate section needs for next operational period.
- Ensure Incident Communications Plan is prepared.
- Advise on current service and support capabilities.
- Estimate future service and support requirements.
- Implement Demobilization Plan from Planning Section.
- Interface with all other Sections to ensure role as a Team player.
- Maintain Unit Log (ICS Form 214)

Service Branch Director
The Service Branch Director is responsible for the management of all service activities at the incident.

- Obtain briefing from Logistics Section Chief.
- Determine services needed to support operations.
- Participate in Logistics Section planning.
- Organize and supervise assignments for Service Branch personnel.
- Coordinate activities of Branch Units.
- Inform Logistics Chief of Branch activities.
- Resolve Service Branch problems.
- Maintain Unit Log (ICS Form 214).

Communications Unit Leader
The Communications Unit Leader, under the direction of the Service Branch Director or Logistics Section Chief, is responsible for developing plans for the effective use of incident communications equipment, and facilities; installing and testing of communications equipment; supervision of the Incident Communications Center; distribution of communications equipment to incident personnel; and the maintenance and repair of communications equipment.

- Obtain briefing from Service Branch Director or Logistics Section Chief.
- Advise on communications capabilities and imitations.
- Prepare and implement the Incident Communications Plan (ICS Form 205).
- Establish the Communications and Message Centers.
- Establish adequate communications over the incident.
- Set up telephone and public address systems.
- Establish appropriate communications distribution and maintenance centers within base/camp(s).
- Establish an equipment accountability system.
- Provide technical information, as required, on limitations and adequacy of communications systems in use, equipment capabilities, equipment available, and potential problems.
- Maintain records on communications equipment.
- Recover equipment from relieved or released units.
- Maintain Unit Log (ICS Form 214).

Incident Communications Center Manager (INCM)
The Incident Communications Manager is responsible to receive and transmit radio and telephone messages among and between personnel and to provide dispatch services at the incident.

- Obtain briefing from Communications Unit Leader.
- Establish communications procedures.
- Determine frequencies in use.
- Determine nets established or to be established.
- Determine location of repeaters.
- Establish message center procedures.
- Obtain and review Incident Action Plan.
- Set up Communications Center.
- Check out equipment.
- Receive and transmit messages internally and externally.

- Maintain files of Status Change Slips (ICS Form 210) and General Messages (ICS Form 213).
- Maintain a record of unusual incident occurrences.
- Maintain Unit Log (ICS Form 214).

Medical Unit Leader
The Medical Unit Leader is primarily responsible for the development of the Medical Emergency Plan, obtaining medical aid and transportation for injured or ill incident personnel, and preparation of reports and records. The Medical Unit may also assist Operations in supplying medical care and assistance to civilian casualties at the incident.

- Obtain briefing from Service Branch Director or Logistics Section Chief.
- Participate in Logistics Section/Service Branch planning.
- Determine level of emergency medical activities performed prior to activation of Medical Unit.
- Prepare the Medical Emergency Plan (ICS Form 206).
- Prepare procedures for major medical emergency.
- Declare major medical emergency as appropriate.
- Provide medical aid, supplies, and transportation.
- Prepare medical reports.
- Contact Compensation-for-Injury Specialist to establish coordination procedures.
- Provide space for Compensation-for-Injury Specialist as needed.
- Audit use of "over-the-counter" drugs being dispensed by the Medical Unit to discourage improper use or abuse.
- Maintain Unit Log (ICS Form 214).

Food Unit Leader
The Food Unit Leader is responsible for determining feeding requirements at all incident facilities; menu planning; determining cooking facilities required; food preparation; serving; providing potable water, and general maintenance of the food service areas.

- Obtain briefing from Service Branch Director or Logistics Section Chief.

- Determine method of feeding to best fit each incident.
- Obtain necessary equipment and supplies to operate food service facilities at Base and Camps.
- Prepare menus to ensure well-balanced meals.
- Provide sufficient potable water to meet food service needs.
- Ensure appropriate health and safety measures are taken.
- Keep inventory of food on hand, check in food orders.
- Maintain Unit Log (ICS Form 214).

Support Branch Director
The Support Branch Director is responsible for development and implementation of logistics plans in support of the Incident Action Plan. The Support Branch Director supervises the operations of the Supply, Facilities, and Ground Support Units.

- Obtain briefing from Logistics Section Chief.
- Determine level of service needed to support operations.
- Participate in Logistics Section planning.
- Organize and prepare assignments for Support Branch personnel.
- Coordinate activities of Branch Units.
- Inform Logistics Section Chief of Branch activities.
- Resolve Support Branch problems.
- Maintain Unit Log (ICS Form 214).

Supply Unit Leader
The Supply Unit Leader is responsible for ordering personnel, equipment, and supplies; receiving and storing all supplies for the incident; maintaining an inventory of supplies; and servicing non-expendable supplies and equipment.

- Obtain briefing from Support Branch Director of Logistics Section Chief.
- Participate in Logistics Section/Support Branch planning.
- Determine the type and amount of supplies needed to support incident.

- Arrange for receiving ordered supplies.
- Develop and implement safety and security requirements.
- Order, receive, store, and distribute supplies and equipment.
- Order personnel, supplies and equipment as requested.
- Maintain inventory and accountability of supplies and equipment.
- Service reusable equipment.
- Maintain Unit Log (ICS Form 214).
- Responsible for proper disposal of expendable supplies and hazardous wastes.

Ordering Manager
The Ordering Manager is responsible for placing all orders for supplies and equipment for the incident.

- Obtain briefing from Supply Unit Leader.
- Obtain necessary agency(s) order forms.
- Establish ordering procedures.
- Obtain name and telephone numbers of agency(s) personnel receiving orders.
- Identify incident personnel who have ordering authority.
- Check on what has already been ordered.
- Ensure order forms are filled out correctly.
- Place orders in a timely manner.
- Consolidate orders when possible.
- Identify times and locations for delivery of supplies and equipment.
- Keep Receiving and Distribution Manager informed of orders placed.
- Resolve ordering problems as they occur.

Receiving and Distribution Manager
The Receiving and Distribution Manager is responsible for receiving and distributing all supplies and equipment (other than primary resources) and the service and repair of tools and equipment.

- Obtain briefing from Supply Unit Leader.
- Organize physical layout of supply area.
- Establish procedures for operating supply area.
- Set up appropriate record system.
- Maintain inventory of supplies and equipment.
- Ensure reusable tools and equipment are returned to the supply area.
- Develop security needs for supply area.
- Submit necessary reports to Supply Unit Leader.
- Notify Ordering Manager and Finance Section of supplies and equipment received.

Tool and Equipment Specialist
The Tool and Equipment Specialist is responsible for sharpening, servicing, and repair of all hand tools.

- Obtain briefing from the Receiving and Distribution Manager.
- Determine number and kinds of tools ordered or on hand.
- Obtain necessary equipment and supplies.
- Set up tool storage and conditioning area.
- Establish tool inventory and accountability system.
- Maintain all tools in proper condition.
- Assemble tools in accordance with the Incident Action Plan.
- Expeditiously receive and recondition tools.
- Ensure safety practices are followed in tool conditioning area.

Facilities Unit Leader
The Facilities Unit Leader is responsible for the layout and operation of incident facilities (Base, Camp(s), and Incident Command Post). The Unit manages base and camp(s) operations. Each base/camp may be assigned a manager.

- Obtain briefing from the Support Branch Director or Logistics Section Chief.
- Participate in Logistics Section/Support Branch planning.

- Determine requirements for each established facility .
- Prepare layouts of incident facilities.
- Provide Base and Camp Managers.
- Provide sleeping facilities.
- Provide security services.
- Provide facility maintenance services: sanitation, lighting, clean up, and potable water.
- Maintain Unit Log (ICS Form 214).

Security Manager
The Security Manager is responsible for providing safeguards needed to protect personnel and facilities from loss or damage.

- Obtain briefing from Facilities Unit Leader.
- Establish contacts with local law enforcement agencies. Contact the Liaison Officer or Agency Representatives to discuss any special custodial requirements which may affect operations.
- Ensure personnel are qualified to manage security problems.
- Develop Security Plan for incident facilities.
- Coordinate security activities with appropriate personnel.
- Provide assistance in personnel problems or emergency situations through coordination with Agency Representatives.
- Provide security for all agency and personal property.
- Document all complaints and suspicious occurrences.

Base/Camp Manager
The Base/Camp Manager is responsible for appropriate sanitation, and facility management services in the assigned Base/Camp. The Base/Camp Manager's duties include:

- Obtain briefing from Facilities Unit Leader.
- Determine or establish special requirements or restrictions on facilities or operations.
- Obtain necessary equipment and supplies.
- Ensure that all facilities and equipment are set up and functioning properly.
- Supervise the set-up of sleeping, shower, and sanitation facilities.

- Ensure compliance with all applicable safety regulations.
- Provide all necessary facility maintenance services .

Facility Maintenance Specialist
The Facility Maintenance Specialist is responsible to ensure that proper sleeping and sanitation facilities are maintained; to provide shower facilities; to provide and maintain lights and other electrical equipment; and to maintain the Base, Camp and Incident Command Post facilities in a clean and orderly manner.

- Obtain briefing from the Base/Camp Manager.
- Obtain supplies, tools, and equipment.
- Supervise and perform assigned work .
- Ensure that all facilities are maintained in a safe condition.
- Disassemble temporary facilities when no longer required.
- Restore area to pre-incident condition.

Ground Support Unit Leader
The Ground Support Unit Leader is responsible for (1) transportation of personnel, supplies, food and equipment; (2) fueling, service, maintenance, and repair of vehicles and other ground support equipment; (3) support of out-of-service resources; and (4) developing and implementing Incident Transportation Plan.

- Obtain briefing from Support Branch Director or Logistics Section Chief.
- Participate in Support Branch/Logistics Section planning activities.
- Prepare a transportation plan for approval by the Logistics Section Chief (obtain traffic data from the Planning Section).
- Notify Resources Unit of all status changes on support and transportation vehicles.
- Arrange for, activate and document fueling, maintenance, and repair of ground resources.
- Maintain inventory of support and transportation vehicles (ICS Form 218).
- Collect use information (shift tickets) on all equipment, if equipment time recorder position not activated.
- Order maintenance and repair supplies (e.g., fuel, spare parts).

- Conduct incident road system survey to determine traffic management and maintenance requirements.
- Determine acceptable vehicle type and size class based on road standards and conditions.
- Mark and correct road system safety hazards and maintain incident roads.
- Assure driver familiarity with conditions. Coordinate with Safety Officer and Agency Representatives.
- Submit reports to Support Branch Director as directed.
- Sign drop points, water sources, road junctions, etc.
- Maintain Unit Log (ICS Form 214).

Equipment Manager
The Equipment Manager provides service, repair, and fuel for all apparatus and equipment; provides transportation and support vehicle services; and maintains records of equipment use and service provided.

- Obtain briefing from Ground Support Unit Leader.
- Obtain Incident Action Plan to determine locations for assigned resources, Staging Area locations, fueling, and service requirements.
- Provide maintenance and fueling according to schedule.
- Prepare schedules to maximize use of equipment.
- Provide transportation and support vehicles.
- Coordinate with Agency Representatives on service and repair as required.
- Inspect equipment condition and ensure coverage by equipment agreement.
- Determine supplies (e.g., gasoline, diesel, oil and parts) needed to maintain equipment in efficient operating condition).
- Maintain Support Vehicle Inventory (ICS Form 218).
- Maintain equipment rental records.
- Maintain equipment service and use records.
- Ensure all appropriate safety measures are followed.
- Ensure all equipment time reports are accurate and daily turned in to the Equipment Time Recorder.

Logistics Guidelines

General

- Keep incident facilities at a manageable size. Make maximum use of camps to avoid long walking or travel distances.
- Enforce rules of conduct at incident facilities.
- Provide bulletin boards throughout camp(s).
- Provide bathing and sanitation facilities.
- Release deficient and excess equipment and operators without delay.
- Maintain property accountability at all times.
- Prepare tools, water, and lunches in advance of operational period.
- Locate sleeping areas out of danger from vehicles, aircraft, and other equipment.

  ✓Keep them free of insects, animals, pests, and safety hazards.

  ✓Rope them off and sign.

  ✓Keep sleeping areas for inmate crews separate from other crews.
- Participate in the development of demobilization plan.
- Control dust.
- Give high priority to environmental protection when locating incident facilities.
- Coordinate locations with the Agency Administrator.
- Keep First Aid facilities easily accessible and clearly marked.
- Develop and post an evacuation plan.
- Inspect facilities for safety and fire hazards on a regular basis and take corrective action where needed.
- Consider need for computer support for resource ordering, and inventory; manage if provided for best efficiency/effectiveness.

Food Service
Compliance with Health and Sanitation requirements (OSHA, State, and local) is required in all situations.

- Proper supervision is important to meet food service sanitation requirements.
- All food service employees shall be neat and clean . They will wear clean caps and aprons at all times, and plastic gloves when serving meals (unnecessary when using tongs or long handled utensils).
- All employees cooking or handling food shall be free of communicable diseases.
- Disposable eating utensils should be used if possible.
- Food containers, cooking and eating utensils should be regularly washed in detergent soap solution and rinsed by immersion for at least two minutes in clean, hot water (at least 170° F).
- Never use galvanized containers for storage of moist or acidic foods.
- Lunches should be prepared, dated, and used daily. Never issue lunches held over from the day before unless properly refrigerated.
- Perishable foods, especially meat, poultry, fish, dressings, and salads containing meat or egg products should be carefully handled. Any foods allowed to stand at ordinary temperatures, even though precooked, are susceptible to formation of bacterial toxin which can cause food poisoning. Re-heating will not destroy this toxin. THESE FOODS SHOULD BE STORED UNDER REFRIGERATION (40° F or lower) UNTIL SERVED.
- Keep hot foods, particularly meat or meat products, hot (150° F) until served. (Keep hot foods hot and cold foods cold.)
- Never hold food in hot food containers from one feeding period to the next. Remove extra food immediately after each meal is served. Do not allow personnel to eat leftover or warmed over food.
- Do not store first aid materials or allow first aid treatment in the kitchen or serving area.
- Furnish Food Unit in advance with a daily schedule of meal time and numbers of personnel to be fed each meal.

- Vary menu daily. Provide plenty of fresh fruit, juices, and milk with all meals.

- First meal should be one that can be prepared quickly.

Water Supply
Select a known, safe water supply or haul it. Usually it is best to haul in water from a domestic water supply. Otherwise, ensure that it is:

- Adequate, tested, and safe.

- Protected from contamination.

Sanitation Guide

- Provide for trash and garbage collection points and plan for at least daily removal to prevent accumulations. Do not locate upwind of eating and sleeping areas.

  ✓Local environmental regulations must be met.

  ✓Suggested standards are one standard size (32 gallon) garbage can for every 20 persons in an eating area and one can for every 40 persons in other areas.

- Provide adequate toilet facilities and establish a regular inspection and maintenance schedule to keep them clean.

  ✓Locate toilets properly and treat to eliminate flies and insects.

  ✓Suggested standards are one toilet per 15-20 persons with daily or more frequently scheduled maintenance.

Transportation

- Use direction signs on roads to facilities and drop points.
- Sign drop points.
- Carefully plan for transportation of both personnel and tools to and from the fireline.
- Provide adequate rest for drivers.
- Isolate and sign fuel storage areas.
- Develop a vehicle control plan and strictly enforce it.

Communications

Preparation of a communications plan is the first step towards providing a workable communications system.

Set up Incident Communications in the following priority to meet safety and tactical resource management needs.

- Communications on fireline - tactical and command nets.

- Communications between fireline and incident base.
- Air operations - ground to air, air to air.
- Communications between incident communications center and the nearest available service center.
- In base/camp communications - Logistics net.
- Specialty systems, i.e., RTI (radio telephone interconnect) voice, Satellite (voice and data), land line telephone (voice and/or data), ADP capability, data transmission by radio.

Communications Plan. A Communications Plan should be prepared for each operational period and should include:

- Radio communications (ICS Form 205)
- Telephone facilities
- Number of lines
- Location of telephone

Key Points to Remember

- Installation takes time. Estimate and allow ample time when planning a system.
- Special equipment, such as a helicopter, may be needed.
- Special knowledge and skills are always needed.
- A Communications Technician has the skills to identify sites, make physical installations, and put the equipment in operation.
- It is desirable to have the input of local personnel with communications knowledge regarding alternate sites for repeater installation and what equipment has worked successfully in the past.

Operation of a fire communications system.

- Provide the simplest system that will meet requirements.
- Provide clear written and illustrated channel assignments and procedures. It is important to write instructions.
- Use competent, qualified Incident Dispatchers.
- Use clear text in all radio communications.

Frequency coordination.
It is very important to maintain system isolation and integrity within the

incident. Coordination at regional and national level is often important to maintain flexibility of all systems within National Incident Radio Support Caches. Frequencies are a limited resource and only those required to provide the incident with effective communications should be utilized.

Procurement

- Coordinate with Procurement Unit Leader in the Finance/Administration Section.
- Ensure that quality and quantity of purchases are as specified.
- See that orders do not exceed planned needs.
- See that all orders are recorded properly and consecutively on standard Fire Resource forms or appropriate ADP/computer system form.

Security

- Provide security against theft.
- Provide security for personal gear. Tags should be furnished and each item labeled with owner's name and agency location.

Factors to Consider When Locating and Laying out an Incident Base or Camp

The Logistics Section Chief should ensure that the following factors are included in the assessment of sites and the subsequent selection.

- Environmental constraints - temporary and permanent affects.
- Ownership of land; written agreement to use site
- Accessible from existing roads with right-of-way.
- Communication services available.
- Safety and sanitation, including freedom from smoke.
- Adequate space for facilities, equipment, and people.
- Proximity to fire - safety; travel time.
- Shelter from wind, sun, etc.
- Security for government and personal property.
- Public interference - proximity to and access by public.
- Water supply - how much, how far, etc.
- Existing facilities - usable, cost, protection needed, etc.
- Potential or planned use of additional camps.

- Physical limitations and capabilities:
- Size and shape, terrain, prevailing winds
- Existing roads.
- Present facilities.
- Activities that can be grouped together:
  ✓Command, Planning, Communications (out of main camp activity).
  ✓Toilets and wash areas.
- Areas which need to be isolated:
  ✓Sleeping areas.
  ✓Heliport and helispot.
  ✓Fuel/Fueling.
- Areas needing ready access to transportation and facilities:
  ✓Supply.
  ✓Tool and equipment area.
  ✓Kitchen.
  ✓First aid station.
  ✓Fuel storage.
- Kitchen Area:
  ✓Level with good drainage.
  ✓Dust abatement, water supply, shade, and lighting.
  ✓Rope off area.
  ✓Establish flow pattern.
- Wash and Showering Facilities:
  ✓Well drained.
  ✓Away from kitchen and well lighted.
  ✓Provide water, benches, basin, soap, towels, and garbage cans.
  ✓Establish separate facilities or time schedules for men and women.
  ✓Adequate gray water disposal.
- Toilets:
  ✓Provide adequate numbers throughout Base/Camp.
  ✓Arrange for at least daily service .
- Garbage disposal:

✓Garbage cans or containers should be located throughout camp.
✓Haul daily.

- Equipment Depot and Tool Storage Areas.
  ✓Adequate space near transportation.
  ✓Segregate tools in bins or stalls.
  ✓Tool reconditioning.
  ✓Parking and lighting.

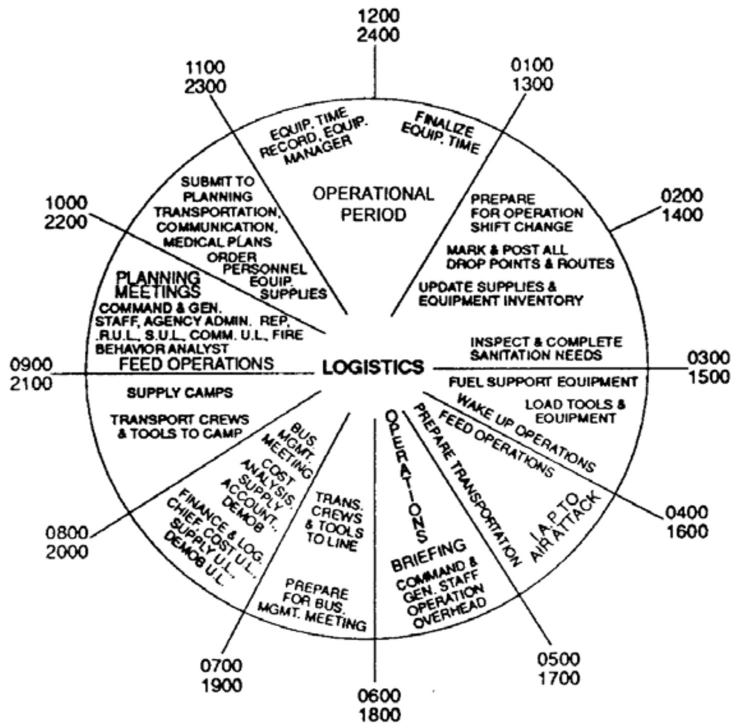
- Sleeping Areas.
  ✓Quiet, shaded, flat, and dry ground.
  ✓Marked and roped off.
  ✓Designate and supervise warming fires.
  ✓Free of snags or other hazards.

- Check-in and Timekeeping Areas
  ✓Place near entrance.
  ✓Tables, chairs, shelter, and lighting.
  ✓Signed.

- First Aid Station.
  ✓Quiet, shade, and dust free.
  ✓EMT may be provided.
  ✓Sign First Aid area.

- Incident Commander and Staff Area:
  ✓Located away from main camp activity.
  ✓Provide tables, chairs, light, and shelter.
  ✓Locate convenient to communications

LOGISTICS PLANNING CYCLE GUIDE



CHAPTER 12 - FINANCE/ADMINISTRATION

Contents

Organization Chart

Finance/Administration Section Chief

- Time Unit Leader
  - Personnel Time Recorder
  - Commissary Manager
- Procurement Unit Leader
  - Equipment Time Recorder
- Compensation/Claims Unit Leader
  - Compensation for Injury Specialist
  - Claims Specialist
- Cost Unit Leader

- In most situations the Equipment Time Recorder is assigned to and reports to the Procurement Leader; however, this is a skill position and can be assigned anywhere in the Incident Command organization. Some managers prefer to keep all time keeping under the Time Unit and assign the Equipment Time Recorder to the Time Unit Leader.

Position Checklists

Finance/Administration Section Chief

The Finance/Administration Section Chief is a member of the General Staff and is responsible for all financial and cost analysis aspects of the incident.

- Obtain briefing from Incident Commander.
- Attend briefing by responsible agency.
- Participate in planning meetings.
- Obtain copies of appropriate cooperative agreements.
- Determine need for commissary operation.
- Meet with assisting and cooperating agency representatives as required.

- Provide input on financial and cost analysis matters.
- Maintain daily contact with agency(s) administrative headquarters on financial matters, including any needed ADO payoff.
- Ensure that personnel time records are transmitted to home agencies according to policy.
- Participate in demobilization planning.
- Ensure that obligation documents initiated at the incident are properly prepared and completed.
- Brief agency administrative personnel on incident related business management issues needing attention and follow-up prior to leaving incident.

Time Unit Leader

The Time Unit Leader is responsible for personnel time recording and for managing the commissary operation.

- Obtain briefing from Finance/Administration Section Chief.
- Determine requirements for time recording function.
- Ensure that personnel time recording documents are prepared daily and comply with policy.
- Establish commissary operation as required.
- Submit cost estimate data forms to Cost Unit as required.
- Provide for records security.
- Ensure that all records are current or complete prior to demobilization.
- Maintain Unit Log (ICS Form 214).

Personnel Time Recorder

- Obtain briefing from Time Unit Leader.
- Establish and maintain a file for employee time reports within the first operational period.
- Initiate, gather, or update a time report for all personnel assigned to the incident for each operational period.
- Ensure that all employee identification information is verified on the time report.

- Post personnel travel and work hours, transfers, promotions, specific pay provisions, and terminations to personnel time documents.
- Post all commissary issues to personnel time documents.
- Ensure that time reports are signed.
- Close out time documents prior to personnel leaving the incident.
- Distribute all time documents according to agency policy.
- Maintain a daily log of excessive hours worked and give to Time Unit Leader.

Commissary Manager

- Obtain briefing from Time Unit Leader.
- Establish and maintain adequate commissary security.
- Request commissary stock through Supply Unit Leader (must have Finance/Administration Section Chief approval).
- Maintain complete record of commissary stock including invoices for material received, issuance records, transfer records, and closing inventories.
- Maintain commissary issue record by crews and submit records to time recorder during or at the end of each operational period.
- Use proper agency forms for record keeping. Complete forms according to agency specification.
- Ensure that records are closed out prior to demobilization.
- Ensure that commissary stock is returned.

Procurement Unit Leader

The Procurement Unit Leader is responsible for administering all financial matters pertaining to vendor contracts.

- Obtain briefing from Finance/Administration Section Chief.
- Work closely with Supply Unit Leader on incident needs.
- Work with local jurisdiction on plans and supply sources.
- Develop incident procurement procedures for local purchase.
- Prepare and sign contracts and agreements as needed.
- Draft memoranda of understanding.

- Establish contracts with local supply vendors as required.
- Interpret contracts/agreements and resolve claims or disputes within delegated authority.
- Coordinate with Compensation/Claims Unit on procedures for handling claims.
- Finalize all agreements and contracts.
- Complete final processing and send documents for payment.
- Coordinate cost data, in contracts, with Cost Unit Leader.
- Maintain Unit Log (ICS Form 214).

Equipment Time Recorder

- Obtain briefing from supervisor.
- Assist units in establishing a system for collecting equipment time reports.
- Post equipment time after each operational period.
- Prepare a payment document for equipment as required.
- Submit data to supervisor for cost effectiveness analysis as required.
- Maintain current posting on all charges or credits for fuel, parts, services, and commissary.
- Verify all time data with owner or operator of equipment.
- Complete all forms according to agency specifications.
- Close out forms prior to demobilization.
- Distribute copies per agency and incident policy.

Compensation/Claims Unit Leader

The Compensation/Claims Unit Leader is responsible for the overall management and direction of all Compensation-for-Injury and Claims Specialists assigned to the incident.

- Obtain briefing from Finance/Administration Section Chief.
- Establish contact with Safety Officer, Liaison Officer, and Agency Representatives.
- If possible, co-locate Compensation-for-Injury work area with the Medical Unit.

- Obtain a copy of the Incident Medical Plan.
- Coordinate with Procurement Unit on procedures for handling claims.
- Periodically review documents produced by subordinates.
- Obtain Demobilization Plan and ensure that Compensation-for-Injury and Claims Specialists are adequately briefed on Demobilization Plan.
- Ensure that all Compensation for Injury and Claims documents are up to date and routed to the proper agency.
- Maintain Unit Log (ICS Form 214).
- Coordinate with Interagency Resource Representative, if any are assigned.

Compensation For Injury Specialist

Compensation for Injury Specialist is responsible for administrative matters arising from serious injuries and fatalities occurring on the incident.

- Obtain briefing from Compensation/Claims Unit Leader.
- Collate Compensation-for-Injury operations with those of the Medical Unit when possible.
- Establish procedure with Medical Unit Leader for prompt notification of injuries or fatalities.
- Establish contact with Safety Officer and Agency Representatives.
- Obtain copy of Incident Medical Plan (ICS Form 206).
- Provide written authority for persons requiring medical treatment according to agency policy.
- Ensure that correct agency forms are used.
- Provide correct billing forms for transmittal to doctor and hospital.
- Keep informed and report on status of hospitalized personnel.
- Obtain all witness statements from Safety Officer and Medical Unit and review for completeness.
- Coordinate the analysis of injuries with the Safety Officer.
- Maintain log of all injuries occurring on incident.

- Coordinate with appropriate agency(s) to look after injured personnel in local hospitals after demobilization.

Claims Specialist
The Claims Specialist is responsible for handling all claims, other than injury, against the incident.

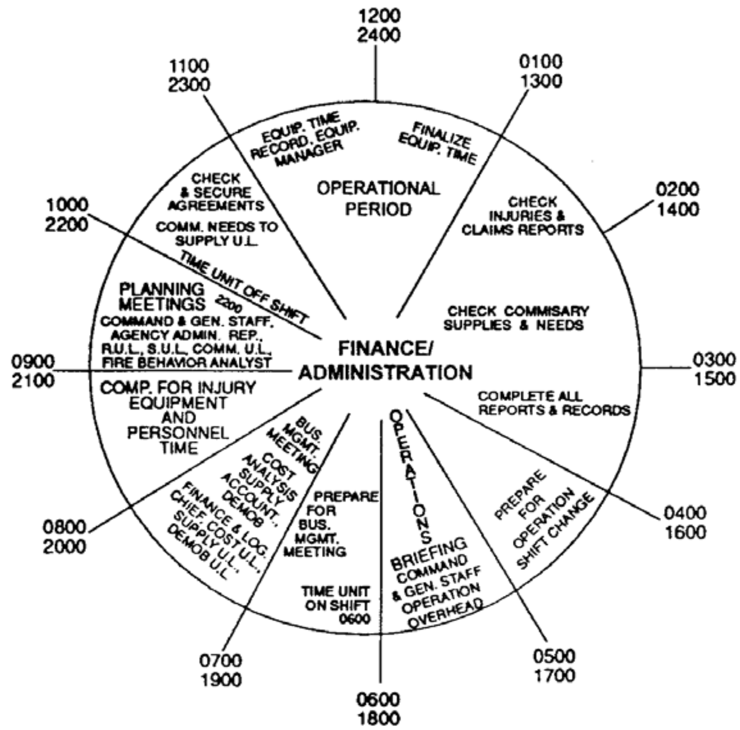
- Obtain briefing from Compensation/Claims Unit Leader.
- Develop and maintain a log of potential claims.
- Mitigate or resolve potential claims whenever possible.
- Initiate claim investigations.
- Ensure site and property in investigation are protected.
- Coordinate with investigation team as necessary.
- Obtain witness statements pertaining to claims.
- Review investigations for completeness and follow-up action needed by local agency.
- Keep the Compensation/Claims Unit Leader advised on existing and potential claims.
- Ensure use of correct agency forms.
- Maintain Unit Log (ICS Form 214).
- Request skilled investigation from appropriate agency, when needed.

Cost Unit Leader
The Cost Unit Leader is responsible for collecting all cost data, performing cost effectiveness analyses, providing cost estimates, and cost saving advice.

- Obtain briefing from Finance/Administration Section Chief.
- Coordinate with agency on cost reporting procedures.
- Obtain and record all cost data.
- Prepare incident cost summaries.
- Prepare resource-use cost estimates for Planning Section.
- Recommend cost savings to Finance/Administration Section Chief.
- Maintain cumulative incident cost records.

- Complete all records prior to demobilization.
- Provide reports to Finance/Administration Section Chief.
- Maintain Unit Log (ICS Form 214).

FINANCE/ADMINISTRATION PLANNING CYCLE GUIDE



GLOSSARY OF TERMS

This glossary contains definitions of terms frequently used in ICS documentation which are, for the most part, not defined somewhere else within the text of this Handbook.

AERIAL IGNITION DEVICE (AID): Inclusive term applied to equipment designed to ignite wildland fuels from an aircraft.

AGENCY DISPATCHER: A person working within a agency organization who processes resources to and from incidents.

AIR TANKER: Fixed-wing aircraft certified by FAA as being capable of transport and delivery of fire retardant solutions.

AIR TRANSPORTABLE MODULAR UNIT (ATMU): A weather data collection and forecasting facility consisting of four modules, weighing a total of 282 pounds and occupying 27.1 cubic feet of space when transported. Used by incident meteorologists on an incident.

ALLOCATED RESOURCES: Resources dispatched to an incident, that have not yet checked in.

ANCHOR POINT: An advantageous location, usually a barrier to fire spread, from which to start constructing a fireline. The anchor point is used to minimize the chance of being flanked by the fire while the line is being constructed.

AREA COMMAND: An organization established to: (1) oversee the management of multiple incidents that are each being handled by an incident management team (IMT) organization; or (2) to oversee the management of a very large incident that has multiple IMT's assigned to it. Area Command has the responsibility to set overall strategy and priorities, allocate critical resources based on priorities, ensure that incidents are properly managed, and that objectives are met and strategies followed.

ASSIGNED RESOURCES: Resources checked in and assigned work tasks on an incident.

ASSISTING AGENCY: An agency directly contributing tactical or service resources to another agency.

ATTACK TIME: The starting date, hour, and minute of the first suppression work on a fire.

AVAILABLE FUEL: (1) The portion of the total fuel that would actually burn under various environmental conditions. (2) Fuel available for use in a motor vehicle, aircraft, or other motorized equipment.

AVAILABLE RESOURCES: Resources assigned to an incident and available for assignment.

BACKFIRE: A fire set along the inner edge of a fireline to consume the fuel in the path of a wildfire and/or change the direction of force of the fire's convection column.

BARRIER: Any obstruction to the spread of fire. Typically an area or strip devoid of combustible fuel.

BERM: A ridge of soil and debris along the outside edge of a fireline, resulting from line construction.

BLIND AREA: An area in which neither the ground nor its vegetation can be seen from a given observation point.

BLOWUP: Sudden increase in fireline intensity or rate of spread of a fire sufficient to preclude direct control or to upset existing suppression plans. Often accompanied by violent convection and may have other characteristics of a fire storm.

BRANCH: The organizational level having functional or geographical responsibility for major parts of incident operations. The branch level is organizationally between section and division/group in the operations section, and between section and unit in the logistics section. Branches are identified by roman numerals or by functional name (e.g. service, support).

BREAKOVER: A fire edge that crosses a control line or natural barrier intended to confine the fire.

BROADCAST BURNING: Intentional burning within well defined boundaries for reduction of fuel hazard, as a resource management treatment, or both.

BUILDUP: (1) The cumulative effects of long-term drying on current fire danger. (2) The increase in strength of a fire management organization. (3) The accelerated spreading of a fire with time. (4) Towering cumulus clouds which may lead to thunderstorms later in the day.

BURNING CONDITIONS: The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

BURN OUT: Setting fire inside a control line to consume fuel between the edge of the fire and the control line.

BURNING INDEX: An estimate of the potential difficulty of fire containment as it relates to the flame length at the head of the fire. A relative number related to the contribution that fire behavior makes to the amount or effort needed to contain a fire in a specified fuel type. Doubling the burning index indicates that twice the effort will be required to contain a fire in that fuel type as was previously required, providing all other parameters are held constant.

BURNING PERIOD: The part of each 24-hour period when fires spread most rapidly; typically from 10:00 AM to sundown.

BURNING-INDEX METER: A device used to determine the burning index for different combinations of burning-index factors.

CALCULATION OF PROBABILITIES: Evaluation of all factors pertinent to probable future behavior of a going fire and of the potential ability of available forces to perform fire suppression operations on a specified time schedule.

CAMP: A geographical site(s), within the general incident area, separate from the incident base, equipped and staffed to provide sleeping, food, water, and sanitary services to incident personnel.

CHECK-IN: The process whereby resources first report to an incident. Check-in locations include: incident command post (resource unit), incident base, camps, staging areas, helibases, helispots, or direct to the line.

CHECK LINE: A temporary fireline constructed at right angles to the control line and used to hold a backfire in check as a means of regulating the heat or intensity of the backfire.

CLEAR TEXT: The use of plain English in radio communications transmissions. No Ten Codes or agency specific codes are used when using Clear Text.

CLOSED AREA: An area in which specified activities or entry are temporarily restricted to reduce risk of human-caused fires.

CLOSURE: Legal restriction, but not necessarily elimination, of specified activities such as smoking, camping, or entry that might cause fires in a given area.

COLD TRAILING: A method of controlling a partly dead fire edge by carefully inspecting and feeling with the hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

COMMAND STAFF: The command staff consists of the information officer, safety officer and liaison officer. They report directly to the incident commander and may have an assistant or assistants, as needed.

COMPACTS: Formal working agreements among agencies to obtain mutual aid.

COMPLEX: Two or more individual incidents located in the same general area which are assigned to a single incident commander or unified command.

CONDITION OF VEGETATION: Stage of growth or degree of flammability of vegetation that forms part of a fuel complex. Herbaceous stage is at times used when referring to herbaceous vegetation alone. In grass areas minimum qualitative distinctions for stages of annual growth are usually green, curing, and dry or cured.

CONFINE A FIRE: The least aggressive wildfire suppression strategy, typically allowing the wildland fire to burn itself out within determined natural or existing boundaries such as rocky ridges, streams, and possibly roads.

CONTAIN A FIRE: A moderately aggressive wildfire suppression strategy which can be expected to keep the fire within established boundaries of constructed firelines under prevailing conditions.

CONTROL FORCE: Personnel and equipment used to control a fire.

CONTROL LINE: An inclusive term for all constructed or natural barriers and treated fire edges used to control a fire.

CONTROL TIME: The time a fire is declared controlled.

COOPERATING AGENCY: An agency supplying assistance including but not limited to direct tactical or support functions or resources to the incident control effort (e.g. Red Cross, law enforcement agency, telephone company, etc.).

COYOTE TACTICS: A progressive line construction duty involving self-sufficient crews which build fireline until the end of the operational period, remain at or near the point while off duty, and begin building fireline again the next operational period where they left off.

CREEPING FIRE: Fire burning with a low flame and spreading slowly.

CROWN FIRE: A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.

CROWN OUT: A fire that raises from ground into the tree crowns and advances from tree top to tree top. To intermittently ignite tree crowns as a surface fire advances.

DEPUTY: A qualified individual who could be delegated the authority to manage a functional operation or perform a specific task. In some cases, a Deputy could act as relief for a superior. Deputies can be assigned to the incident commander, general staff, and branch directors.

DETECTION: The act or system of discovering and locating fires.

DIRECT ATTACK: Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

DISCOVERY: Determination that a fire exists. In contrast to detection, location and reporting of a fire is not required.

DISPATCH: The implementation of a command decision to move a resource or resources from one place to another.

DISPATCHER: A person who receives reports of discovery and status of fires, confirms their locations, takes action promptly to provide people and equipment likely to be needed for control efforts.

DISPATCH CENTER: A facility from which resources are assigned to an incident.

DIVISION: Divisions are used to divide an incident into geographical areas of operation. Divisions are established when the number of resources exceeds the span-of-control of the operations chief. A division is located within the ICS organization between the branch and the task force/strike team.

DOZER: Any tracked vehicle with a front mounted blade used for exposing mineral soil.

DOZER LINE: Fireline constructed by the front blade of a dozer.

DROUGHT INDEX: A number representing the net effect of evaporation, transpiration and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

DUFF: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil.

ELAPSED TIME STANDARDS: Maximum amounts of time allowed by administrative rule for given steps of fire suppression.

EMERGENCY MEDICAL TECHNICIAN (EMT): A health-care specialist with particular skills and knowledge in pre-hospital emergency medicine.

ENGINE: Any ground vehicle providing specified levels of pumping, water, and hose capacity but with less than the specified level of personnel.

ESCAPED FIRE: Fire which has exceeded or is expected to exceed initial attack capabilities or prescription.

EXTENDED ATTACK: Situation in which a fire cannot be controlled by initial attack resources within a reasonable period of time. The fire usually can be controlled by additional resources within 24 hours after commencing suppression action.

FALSE ALARM: A reported smoke or fire requiring no suppression; for example, brush burning under control, mill smoke, false smoke, etc.

FINE FUEL MOISTURE: The probable moisture content of fast-drying fuels which have a timelag constant of 1 hour or less; such as, grass, leaves, ferns, tree moss, pine needles, and small twigs (0-1/4").

FINGERS OF A FIRE: The long narrow extensions of a fire projecting from the main body.

FIRE ANALYSIS: Review of fire management actions taken on a specific fire, group of fires, or fire season in order to identify reasons for both effective and ineffective actions, and to recommend or prescribe ways and means of doing a more efficient job. Also called hot line review.

FIRE BEHAVIOR: The manner in which a fire reacts to the influences of fuel, weather, and topography.

FIREBREAK: A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

FIRE DANGER: Sum of constant danger and variable danger factors affecting the inception, spread, and resistance to control, and subsequent fire damage; often expressed as an index.

FIRE DANGER RATING: A fire management system that integrates the effects of selected fire danger factors into one or more qualitative or numerical indices of current protection needs.

FIRE EDGE: The boundary of a fire at a given moment.

FIRE EFFECTS: The physical, biological, and ecological impacts of fire on the environment.

FIRELINE: The part of a control line that is scraped or dug to mineral soil. Also called fire trail.

FIRE MANAGEMENT: Activities required for the protection of burnable wildland values from fire and the use of prescribed fire to meet land management objectives.

FIRE PLOW: A heavy duty plowshare or disc plow usually pulled by a tractor to construct a fireline.

FIRE-PROGRESS MAP: A map maintained on a large fire to show at given times the location of the fire, deployment of suppression forces, and progress of suppression.

FIRE RETARDANT: Any substance except plain water that by chemical or physical action reduces flammability of fuels or slows their rate of combustion.

FIRE SHELTER: An aluminized tent offering protection by means of reflecting radiant heat and providing a volume of breathable air in a fire entrapment situation. Fire shelters should only be used in life threatening situations, as a last resort.

FIRE TOOL CACHE: A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in wildland operations.

FIRE WEATHER FORECAST: A weather prediction specially prepared for use in wildland fire operations and prescribed fire.

FIRE WEATHER STATION: A meteorological station specially equipped to measure weather elements that have an important effect on fire behavior.

FLAMMABILITY: The relative ease with which fuels ignite and burn regardless of the quantity of the fuels. Preferred to "inflammability."

FLANKING FIRE SUPPRESSION: Attacking a fire by working along the flanks either simultaneously or successively from a less active or anchor point and endeavoring to connect two lines at the head.

FLANKS OF A FIRE: The parts of a fire's perimeter that are roughly parallel to the main direction of spread.

FLARE-UP: Any sudden acceleration in rate of spread or intensification of the fire. Unlike blowup, a flare-up is of relatively short duration and does not radically change existing control plans.

FLASH FUELS: Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, which ignite readily and are consumed rapidly when dry.

FLASHOVER: (1) Rapid combustion and/or explosion of unburned gases trapped at some distance from the main fire front. Usually occurs only in poorly ventilated topography. (2) Stage of a fire at which all surfaces and objects within a space have been heated to their ignition temperature, and flame breaks out almost at once over the surface of all objects within the space.

FOAM: The aerated solution created by forcing air into, or entraining air in water containing a foam concentrate by means of suitably designed equipment or by cascading it through the air at a high velocity. Foam reduces combustion by cooling, moistening and excluding oxygen.

FOLLOW-UP: The act of the first people who go to a fire by sending additional people or equipment to facilitate suppression. Also called reinforcement.

FREE BURNING: The condition of a fire or part of a fire that has not been slowed by natural barriers or by control measures.

FRICTION LOSS: Pressure loss caused by the turbulent movement of water or solution against the interior surface of fire hose, pipe, or fittings; normally measured in pressure loss per length of hose or pipe.

FUELBREAK: A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled.

FUELBREAK SYSTEM: A series of modified strips or blocks tied together to form continuous strategically located fuel breaks around land units.

FUEL MOISTURE CONTENT: The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212 degrees F.

FUEL MOISTURE INDICATOR STICK: A specially prepared stick or set of sticks of known dry weight continuously exposed to the weather and periodically weighed to determine changes in moisture content as an indication of moisture changes in wildland fuels.

FUEL TENDER: Any vehicle capable of supplying engine fuel to ground or airborne equipment.

FUEL TYPE: An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.

FUEL TYPE CLASSIFICATION: Division of wildland areas into fire hazard classes.

GENERAL STAFF: The group of incident management personnel reporting to the Incident Commander. They may each have a deputy, as needed. The General Staff consists of: Operations Section Chief, Planning Section Chief, Logistics Section Chief, and a Finance/Administration Chief.

GOING FIRE: Any wildfire on which suppression action has not reached an extensive mop-up stage.

GROUND FIRE: Fire that consumes the organic material beneath the surface litter ground, such as peat fire.

GROUP: Groups are established to divide the incident into functional areas of operation. Groups are composed of resources assembled to perform a special function not necessarily within a single geographic division. Groups, when activated, are located between branches and resources in the operations section. (See DIVISION)

HAND CREW: A number of individuals that have been organized and trained and are supervised principally for operational assignments on an incident.

HAZARD: A fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.

HAZARD REDUCTION: Any treatment of living and dead fuels that reduces the threat of ignition and spread of fire.

HEAD: Pressure due to elevation of water. Equals 0.433 pounds per square inch (PSI) per foot of elevation. Back pressure. (Approximately 0.5 PSI is required to lift water 1 foot in elevation.)

HEAD FIRE: A fire spreading or set to spread with the wind.

HEAD OF A FIRE: The most rapidly spreading portion of a fire's perimeter, usually to the leeward or up slope.

HEAVY EQUIPMENT TRANSPORT: Any ground vehicle capable of transporting a dozer, tractor or other heavy piece of equipment. Also called lowboy.

HEAVY FUELS: Fuels of large diameter such as snags, logs, large limbwood, which ignite and are consumed more slowly than flash fuels. Also called course fuels.

HELD LINE: All control line that still contains the fire when mop-up is completed. Excludes lost line, natural barriers not backfired, and unused secondary lines.

HELIBASE: The main location within the general incident area for parking, fueling, maintenance, and loading of helicopters. It is usually located at or near the incident base.

HELIBASE CREW: A crew of individuals who may be assigned to support helicopter operations.

HELICOPTER TENDER: A ground service vehicle capable of supplying fuel and support equipment to helicopters.

HELISPOT: A natural or improved takeoff and landing area intended for temporary or occasional helicopter use.

HELITACK: The utilization of helicopters to transport crews, equipment, and fire retardants or suppressants to the fireline during the initial stages of a fire. The term also refers to the crew that performs helicopter management and attack activities.

HELITACK FOREMAN: A supervisory firefighter trained in the tactical use of helicopters for fire suppression.

HELITANKER: A helicopter equipped with a fixed tank or a suspended bucket-type container that is used for aerial delivery of water or retardants.

HOLDOVER FIRE: A fire that remains dormant for a considerable time. Also called sleeper fire.

HOSE LAY: Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery.

HOT SPOT: A particularly active part of a fire.

HOT-SPOTTING: Checking the spread of fire at points of more rapid spread or special threat. Is usually the initial step in prompt control, with emphasis on first priorities.

HOTSHOT CREW: Intensively trained fire crew used primarily in hand line construction. (Type-1)

INCENDIARY FIRE: A wildfire willfully ignited by anyone to burn, or spread to, vegetation or property without consent of the owner or his/her agent. (Syn. ARSON FIRE)

INCIDENT: An occurrence, either human-caused or natural phenomena, that requires action or support by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

INCIDENT ACTION PLAN (IAP): Contains objectives reflecting the overall incident strategy and specific tactical actions and supporting information for the next operational period. The plan may be oral or written. When written, the Plan may have a number of attachments including: incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map. Formerly call shift plan.

INCIDENT BASE: Location at the incident where the primary logistics functions are coordinated and administered. (Incident name or other designator will be added to the term "Base.") The Incident Command Post may be collocated with the Base. There is only one Base per incident.

INCIDENT COMMAND POST (ICP): Location at which primary command functions are executed. The ICP may be collocated with the incident base or other incident facilities.

INCIDENT COMMAND SYSTEM (ICS): A standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries.

INDIRECT ATTACK: A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks or fuelbreaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions.

INFRARED (IR): A heat detection system used for fire detection, mapping, and hotspot identification.

INFRARED GROUNDLINK (IR): A capability through the use of a special mobile ground station to receive air-to-ground IR imagery at an incident.

INITIAL ATTACK: The actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further extension of the fire.

JUMP SPOT: Selected landing area for smokejumpers.

JURISDICTIONAL AGENCY: The agency having land and resource management responsibility for a specific geographical or functional area as provided by federal, state or local law.

KNOCK DOWN: To reduce the flame or heat on the more vigorously burning parts of a fire edge.

LEAD PLANE: Aircraft with pilot used to make trial runs over the target area to check wind, smoke conditions, topography and to lead air tankers to targets and supervise their drops.

LEAPFROG METHOD: A system of organizing workers in fire suppression in which each crew member is assigned a specific task such as clearing or digging fireline on a specific section of control line, and when that task is completed, passes other workers in moving to a new assignment.

LITTER: The top layer of forest floor, composed of loose debris of dead sticks, branches, twigs, and recently fallen leaves or needles; little altered in structure by decomposition.

LOOKOUT: (1) A person designated to detect and report fires from a vantage point. (2) A location from which fires can be detected and reported. (3) A fire crew member assigned to observe the fire and warn the crew when there is danger of becoming trapped.

MESSAGE CENTER: The Message Center is part of the Incident Communications Center and is collocated or placed adjacent to it. It receives, records, and routes information about resources reporting to the incident, resource status, and administrative and tactical traffic.

MOBILIZATION CENTER: An off-incident location at which emergency service personnel and equipment are temporarily located pending assignment, release, or reassignment.

MODULAR AIRBORNE FIREFIGHTING SYSTEM (MAFFS): A manufactured unit consisting of five interconnecting tanks, a control pallet, and a nozzle pallet, with a capacity of 3,000 gallons, designed to be rapidly mounted inside an unmodified C-130 (Hercules) cargo aircraft for use in cascading retardant chemicals on wildfires.

MOP-UP: Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe, or to reduce residual smoke.

MULTI-AGENCY COORDINATION (MAC): A generalized term which describes the functions and activities of representatives of involved agencies and/or jurisdictions who come together to make decisions regarding the prioritizing of incidents, and the sharing and use of critical resources. The MAC organization is not a part of the on-scene ICS and is not involved in developing incident strategy or tactics.

NATIONAL INTERAGENCY INCIDENT MANAGEMENT SYSTEM (NIIMS): An NWCG-developed program consisting of five subsystems which collectively provide a total systems approach to all-risk incident management. The subsystems are: The Incident Command System, Training, Qualifications and Certification, Supporting Technologies, and Publications Management.

NATIONAL WILDFIRE COORDINATING GROUP (NWCG): A group formed under the direction of the Secretaries of Interior and Agriculture to improve the coordination and effectiveness of wildland fire activities, and provide a forum to discuss, recommend appropriate action, or resolve issues and problems of substantive nature.

NET VALUE CHANGE (NVC): The sum of the changes in the value of natural resources affected by a fire. The basis for computing NVC is each resource's fire-induced value change (pluses and minuses) as computed and expressed on a per unit basis.

NORMAL FIRE SEASON: (1) A season when weather, fire danger, and number and distribution of fires are about average. (2) Period of the year that normally comprises the fire season.

OPERATIONAL PERIOD: The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational Periods can be of various lengths, although usually not over 24 hours.

ORTHOPHOTO MAPS: Aerial photographs corrected to scale such that geographic measurements may be taken directly from prints. They may contain graphically emphasized geographic features and may be provided with overlays of such features as water systems, facility location, etc.

OUT-OF-SERVICE RESOURCES: Resources assigned to an incident but unable to respond for mechanical, rest, or personal reasons.

OVERHEAD: Personnel assigned to supervisory positions, including Incident Commander, Command Staff, General Staff, Branch Directors, Supervisors, Unit Leaders, Managers, and staff.

PARACARGO: Anything intentionally dropped, or intended for dropping, from any aircraft by parachute, by retarding devices, or by free fall.

PATROL: (1) To travel over a given route to prevent, detect, and suppress fires. (2) To go back and forth vigilantly over a length of control line during and/or after construction to prevent breakovers, suppress spot fires, and extinguish overlooked hot spots. (3) A person or group of persons who carry out patrol actions.

PATROL UNIT: Any light, mobile unit with limited pumping and water capacity.

PLANNING MEETING: A meeting held regularly throughout the duration of an incident, to select specific strategies and tactics for incident control operations and to plan for needed service and support. On larger incidents, the planning meeting is a major element in the development of the Incident Action Plan.

PLOW LINE: Fireline constructed by a fire plow, usually drawn by a tractor or other motorized equipment.

PRESCRIBED BURNING: Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allows the fire to be confined to a predetermined area, and produce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives.

PRESUPPRESSION: Activities in advance of fire occurrence to ensure effective suppression action. Includes planning the organization, recruiting and training, procuring equipment and supplies, maintaining fire equipment and fire control improvements, and negotiating cooperative and/or mutual aid agreements.

PROGRESSIVE HOSE LAY: A hose lay in which double shutoff wye (Y) valves are inserted in the main line at intervals and lateral lines are run from the wyes to the fire edge, thus permitting continuous application of water during extension of the lay.

PROGRESSIVE METHOD OF LINE CONSTRUCTION: A system of organizing workers to build fireline in which they advance without changing relative positions in line.

PROTECTION BOUNDARY: The exterior perimeter of an area within which a specified fire agency has assumed a degree of responsibility for wildland fire control. It may include land in addition to that for which the agency has jurisdiction or contractual responsibility.

RADIO CACHE: A cache may consist of a number of portable radios, a base station and, in some cases, a repeater stored in a predetermined location for dispatch to incidents.

RATE OF SPREAD: The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

REBURN: (1) Repeat burning of an area over which a fire has previously passed, but left fuel that later ignites when burning conditions are more favorable; (2) An area that has reburned.

REINFORCED RESPONSE: Those resources requested in addition to the initial attack resources.

RELATIVE HUMIDITY (RH): The ratio of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated. The ratio of the actual vapor pressure to the saturated vapor pressure.

RESCUE MEDICAL: Any staffed ground vehicle capable of providing medical services.

RESISTANCE TO CONTROL: The relative difficulty of constructing and holding a control line as affected by resistance to line construction and by fire behavior. Also called difficulty of control.

RESISTANCE TO LINE CONSTRUCTION: The relative difficulty of constructing control line as determined by the fuel, topography, and soil.

RESOURCES: (1) Personnel, equipment, services and supplies available, or potentially available, for assignment to incidents. Personnel and equipment are described by kind and type, e.g., ground, water, air, etc., and may be used in tactical, support or overhead capacities at an incident. (2) The natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.

RISK: (1) The chance of fire starting as determined by the presence and activity of causative agents. (2) A causative agent. (3) (NFDRS) A number related to the potential number of firebrands to which a given area will be exposed during the rating day.

ROUGH: The accumulation of living and dead ground and understory vegetation, especially grasses, forest litter, and draped dead needles, sometimes with addition of underbrush such as palmetto, gallberry, and wax myrtle. Most often used for southern pine types.

RUNNING FIRE: Behavior of a fire spreading rapidly with a well defined head.

SAFETY ZONE: An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

SCORCH HEIGHT: Average heights of foliage browning or bole blackening caused by a fire.

SCRATCH LINE: An unfinished preliminary control line hastily established or constructed as an emergency measure to check the spread of fire.

SECONDARY LINE: Any fireline constructed at a distance from the fire perimeter concurrently with or after a line already constructed on or near to the perimeter of the fire. Generally constructed as an insurance measure in case the fire escapes control by the primary line.

SECTION: That organizational level with responsibility for a major functional area of the incident, such as: operations, planning, logistics, finance/administration. The Section is organizationally between Branch and Incident Commander.

SEGMENT: A geographical area in which a task force/strike team leader or supervisor of a single resource is assigned authority and responsibility for the coordination of resources and implementation of planned tactics. A segment may be a portion of a division or an area inside or outside the perimeter of an incident. Segments are identified with arabic numbers, i.e.,A-1, etc. and are not to be used as radio designators.

SIMPLE HOSE LAY: A hoselay consisting of consecutively coupled lengths of hose without laterals. The lay is extended by inserting additional lengths of hose in the line between pumps and nozzle. Also called single hose lay.

SLASH: Debris resulting from such natural events as wind, fire, or snow breakage; or such human activities as road construction, logging, pruning, thinning, or brush cutting. It includes logs, chunks, bark, branches, stumps, and broken understory trees or brush.

SLASH DISPOSAL: Treatment of slash to reduce fire hazard or for other purposes. (Preferred to Brush Disposal).

SMOKEJUMPER: A specifically trained and certified firefighter who travels to wildland fires by aircraft and parachutes to the fire.

SMOLDERING: A fire burning without flame and barely spreading.

SNAG: A standing dead tree or part of a dead tree from which at least the leaves and smaller branches have fallen. Often called a stub, if less than 20 feet tall. (see also STUB)

SPAN OF CONTROL: The supervisory ratio of from three-to-seven individuals, with five-to-one being established as optimum.

SPEED OF ATTACK: Elapsed time from origin of fire to arrival of the first suppression force.

SPOT BURNING: A modified form of broadcast slash burning in which the greater accumulations of slash are fired and the fire is confined to these spots. Sometimes called "Jackpot Burning" or "Jackpotting."

SPOT FIRES: Fire ignited outside the perimeter of the main fire by a firebrand.

SPOTTING: Behavior of a fire producing sparks or embers that are carried by the wind and which start new fires beyond the zone of direct ignition by the main fire.

SPREAD COMPONENT: Part of the National Fire Danger Rating System (NFDRS). A rating of the forward rate of spread of a head fire.

STAGING AREA: Locations set up at an incident where resources can be placed while awaiting a tactical assignment on a three (3) minute available basis. Staging Areas are managed by the Operations Section.

STRATEGY: The general plan or direction selected to accomplish incident objectives.

STRIKE TEAM: Specified combinations of the same kind and type of resources, with common communications, and a leader.

STRIP BURNING: (1) Burning by means of strip firing. (2) In hazard reduction, burning narrow strips of fuel and leaving the rest of the area untreated by fire.

STRIP FIRING: Setting fire to more than one strip of fuel and providing for the strips to burn together. Frequently done in burning out against a wind where inner strips are fired first to create drafts which pull flames and sparks away from the control line.

SUPPRESSANT: An agent that extinguishes the flaming and glowing phases of combustion by direct application to the burning fuel.

SUPPRESSION: All the work of extinguishing or confining a fire beginning with its discovery.

SUPPRESSION CREW: Two or more firefighters stationed at a strategic location for initial action on fires. Duties are essentially the same as those of individual firefighters.

SURFACE FIRE: Fire that burns loose debris on the surface, which include dead branches, leaves, and low vegetation.

TACTICS: Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

TASK FORCE: Any combination of single resources assembled for a particular tactical need, with common communications and a leader. A Task Force may be pre-established and sent to an incident, or formed at an incident.

TEST FIRE: A prescribed fire set to evaluate such things as fire behavior, detection performance, control measures.

TRACTOR PLOW: Any tractor with a plow for constructing fireline by exposing mineral soil. Also as a resource for typing purposes, a tractor plow includes the transportation and personnel for its operation.

TRENCH: A small ditch often constructed below a fire on sloping ground (undercut or underslung line) to catch rolling material.

TYPE: Refers to resource capability. A Type 1 resource provides a greater overall capability due to power, size, capacity, etc., than would be found in a Type 2 resource. Resource typing provides managers with additional information in selecting the best resource for the task.

UNDERCUT LINE: A fireline below a fire on a slope. Should be trenched to catch rolling material. Also called underslung line.

UNIFIED COMMAND: In ICS, unified command is a unified team effort which allows all agencies with jurisdictional responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies. This is accomplished without losing or abdicating authority, responsibility, or accountability.

UNIT: The organizational element of an incident having functional responsibility for a specific activity in the planning, logistics, or finance/administration activity.

WATER TENDER: Any ground vehicle capable of transporting specified quantities of water.

WET WATER: Water with added chemicals, called wetting agents, that increase water's spreading and penetrating properties due to a reduction in surface tension.

WETTING AGENT: A chemical that when added to water reduces the surface tension of the solution and causes it to spread and penetrate exposed objects more effectively than the untreated water.

WILDFIRE: A fire occurring on wildland that is not meeting management objectives and thus requires a suppression response.

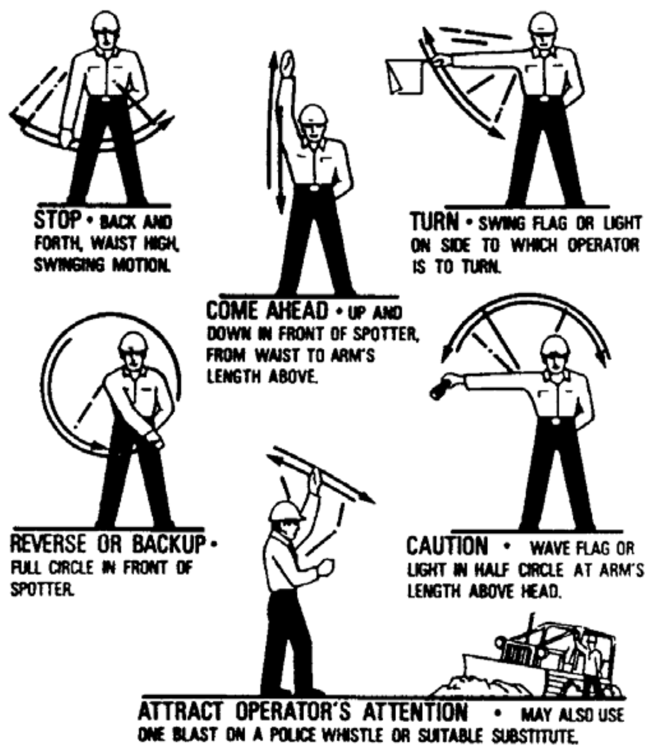
WILDLAND: An area in which development is essentially nonexistent, except for roads, railroads, powerlines, and similar transportation facilities. Structures, if any, are widely scattered.

APPENDIX A

GENERAL OPERATIONAL GUIDES

Contents

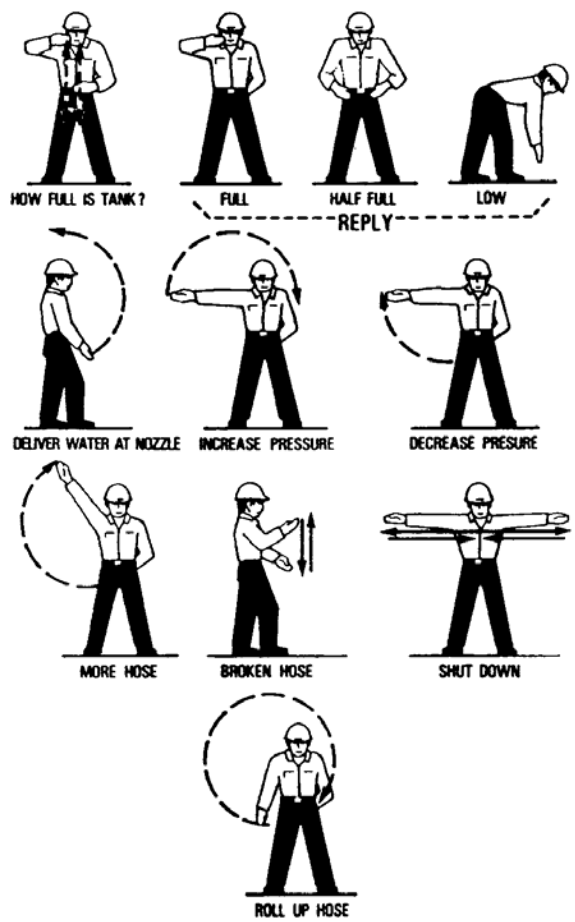
DOZER/TRACTOR HAND SIGNALS



Dozer Operator Signals

- **Want dozer helper to come to dozer - gun motor once**
- **Can't see spotter - gun motor twice**

WATER USE HAND SIGNALS



HELICOPTER HAND SIGNALS

Helispot Location and Construction

A helispot is a natural or improved take-off and landing area intended for temporary or occasional helicopter use. It may or may not have road access.

Points to consider in locating and constructing helispots are:

- Locate on exposed knobs and ridges, allowing takeoff and landing from all directions.
- Choose a spot where a dropoff exists for helicopter takeoffs. The higher the elevation, the more important the dropoff. A helicopter making a vertical takeoff uses more power, must be downloaded, and may not have an adequate margin of safety if power loss or other problems occur during takeoff.
- Locate helispot so takeoffs and landings can be made into the prevailing wind. This becomes more important with higher elevations and little to no dropoff.
- Remove all brush and trees around the landing pad for the minimum distances shown below by helicopter type to accommodate overall length, rotor blade diameter, and safety allowance. Observe local policy regarding environmental impact of cutting trees and vegetation.

  —Type 3 & 4 - 75 foot diameter.

  —Type 2 - 90 foot diameter.

  —Type 1 - 110 foot diameter

  —Clear brush and trees below the landing area level.
- Construct a level touchdown pad to the dimensions and firmness shown below by helicopter type.

  —Type 3 & 4 - 15'x15' to support 6,000 pounds.

  —Type 2 - 20'x20' to support 12,500 pounds.

  —Type 1 - 30'x30' to support 12,500 pounds.
- **Level or Bottom-Land Locations:**

  —A vertical takeoff should not be considered safe at any elevation. A helicopter must be at least 300 feet above the ground to auto-rotate or glide back to the ground in the event of power failure.

  —Takeoff should be into the prevailing wind.

  —A safe takeoff path should be 300 feet long and slightly downhill with room to maneuver when forward flight is gained at end of takeoff path.

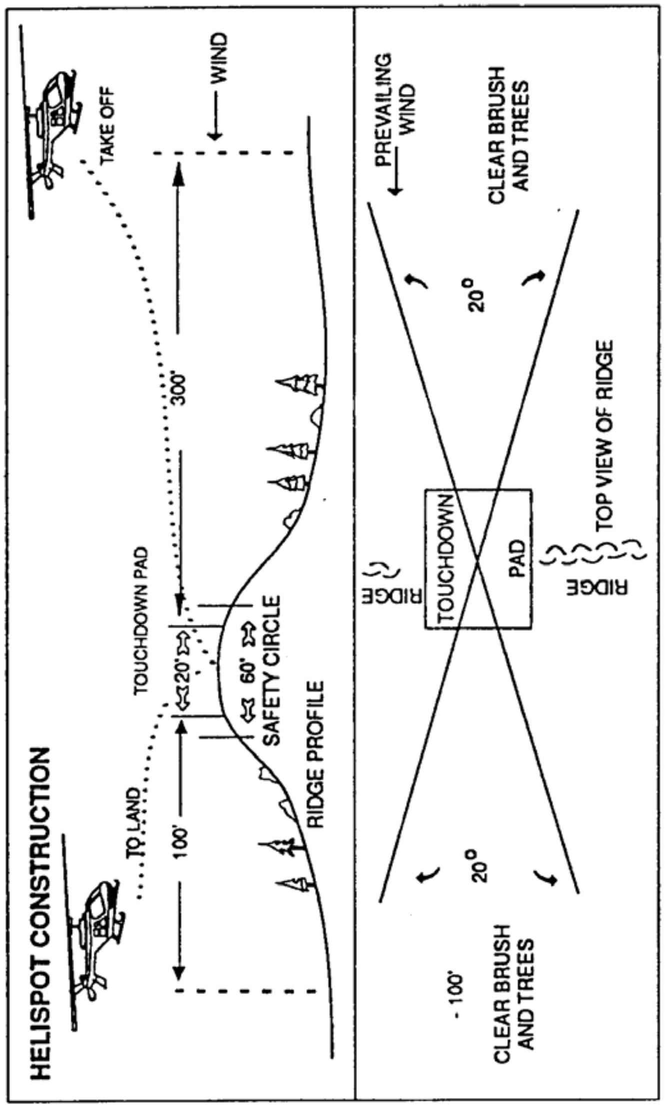
- **Lakes and wide streams.** Areas adjacent to lakes or streams make a good base of operations for helicopters, but there is still a need for at least 300 feet of clear area over which to gain flying speed and a safe landing pad.
- **Canyon Bottoms**

  —Beware of "dead air" holes.

  —Be sure canyon does not have a down draft from a neighboring ridge.

  —In deep canyons, a long forward run is needed to climb out of canyon or enough width in the canyon to allow the helicopter to circle safely.
- **Meadows:** Beware of meadows with high grass, which tends to dissipate the helicopter ground cushion and hide logs, rocks, or swampy areas. Dry grass can also be a fire hazard.
- **Roads or Truck Trails:** Choose turnouts or parking areas that have some dropoff. If no dropoff areas are available, be certain road is long and wide enough for takeoff. When using roads or turnouts ensure adequate traffic control.

Helispot Construction Diagram



Portable Pumps/Hydraulics

When considering the use of portable pumps and hose lays during fire suppression activities it is important to size-up the situation and do some hydraulics calculations to determine where and when to use a portable pump. Some items to consider are pump capability needed, adequacy of water source, and the type of hose lay to use.

In determining what pumping capability is needed it is necessary to consider such things as friction loss due to length and size of hose and number of fittings (appliances) used; desired nozzle pressure; number of nozzles; tip size of nozzles; and head pressure.

Formula for Determining Pump Pressure

NOTE: ALL REFERENCES TO PRESSURE (ENGINE/PUMP PRESSURE, NOZZLE PRESSURE, HEAD GAIN OR LOSS, FRICTION LOSS, ETC.) ARE POUNDS PER SQUARE INCH (PSI).

EP = **(NP) + or - H + (FL + A)** where:

EP = Engine/pump pressure at the discharge side of pump.

NP = Nozzle pressure which is the pressure delivered to the nozzle.

> Remember: The larger the nozzle tip the more EP (engine/pump pressure) is needed to maintain a given nozzle pressure.

H = Head. Add (+) if pumping uphill and subtract (-) if pumping downhill.

> Remember: One PSI will raise water about 2 feet in elevation. Consequently, for every 2 foot drop in elevation about one PSI will be developed.

FL= Friction Loss

> Remember: The smaller the hose the greater the friction loss and the larger the hose the lower the friction loss. For example, a 1" hose has about six times the friction loss as a 1 ½" hose.

A = Number of appliances used in the hose lay such as in-line T's, gated wyes, etc.

> Remember: Each appliance increases the FL (friction loss) and decreases NP (nozzle pressure) by about 5 PSI. DO NOT COUNT THE NOZZLES AS APPLIANCES.

Reminders in Using Portable Pumps and Hose Lays

- A pump can be ruined in minutes if proper operational procedures are not followed.
- Friction loss is greater in smaller hoses than in larger hoses.
- Keep your pump as close to your water source elevation as possible as the maximum vertical suction lift (water source to the pump) for most pumps is 20 feet.
- Protect your pump from sucking up sand, silt, or gravel by using a screen protector and putting the suction hose intake in a pail or on a shovel.
- Minimum working nozzle pressure is about 25 PSI, but the recommended minimum is 50 PSI.
- Use a "Check and Bleeder" or "Gated Y" near the pump on the discharge side when pumping uphill to prevent draining your hose lay by backflow when the pump is not running.

Drafting Guidelines

- Maximum attainable = 29.4 feet
- Excellent pump = 28.0 feet
- Good pump = 26.0 feet
- Worn pump at high elevation = 5.0 feet

Expected Output of Commonly Used Portable Pumps

- All calculations were made using 1 l/2" Hose, and Forester Nozzle with 3/16" Tip, and a Nozzle Pressure of 50 PSI.

Pump Type	Operating PSI	Maximum Lift, Feet
Waterous Floto-Pump	150	200
Gorman Rupp 62 ½	190	280
Mark 3	250	400

Atmospheric/Barometric Pressure Factors

Atmospheric Pressure at Sea Level	= 14.7 lbs./square inch (Use 15.0)
Atmospheric Pressure Variation Per 1000 Feet of Elevation	= 0.5 lbs./square inch
Barometric Pressure at Sea Level	= 29.92 inches of Hg (Hg is mercury)
One (1) inch of Hg	= 13.5 inches of water
	= 1.12 feet of water
	= 0.491 PSI (use 0.5)
One (1) pound of pressure (PSI)	= 2.302 ft. of Water Head (use 2.0 ft.)
	= 2.04 inches of Hg
One (1) foot of Water Head (Column of Water)	= 0.434 PSI (use 0.5)

Weight/Volume of Water

One (1) cubic foot of water	= 7.481 gallons
	= 62.4 pounds
One (1) U.S. gallon	= 8.34 pounds
	= 0.83 Imperial gallons
	= 3.79 Liters
	= 231 cubic inches
One (1) Imperial gallon	= 1.2 U.S. gallons

Friction Loss By Hose Size and Type

	Friction Loss in lbs./100 feet of Hose				
	Hose Size (Inside Diameter) and Type				
Flow (GPM)	**1/2" GH**	**3/4" HP**	**1" CJRL**	**1 ½" CJRL**	**1 ½" Linen**
5	22	3			
10	75	13	3		1
15	155	25	6	1	2
20		42	10	1	4
25		62	15	3	6
30		86	20	4	8
40		140	34	6	13
50		215	50	8	20
60			70	11	28
70			90	15	37
80			115	19	47
90			140	23	59
100			170	30	72

- Abbreviations are:
  - **—GPM** = gallons per minute
  - **—GH** = garden hose
  - **—HP** = high pressure
  - **—CJRL** = cotton jacketed, rubber lined
  - **—CSRL** = cotton-synthetic jacketed, rubber lined
- Friction reducing agents which reduce losses in a given hose diameter and the hose size, weight, and cost while retaining performance are available and under evaluation.

Flow-discharge of Nozzles in Gallons-per-Minute GPM)

Head (PSI)	Head (ft)	Tip Orifice size (inches) and nozzle gun			
		1/8	**3/16**	**1/4**	**3/8**
10	23	2	3	6	13
20	46	2	5	8	19
30	69	3	6	10	23
40	92	3	7	12	27
50	116	3	7	13	30
75	173	4	9	16	36
100	231	5	10	19	42
125	289	5	12	21	47
150	346	6	13	23	52
200	462	7	15	26	60
250	577	7	17	30	66
300	693	8	18	32	73

Pump Pressure for 50 PSI Nozzle Pressure

1 inch Hose (CJRL, CSJRL, & SJRL)

Length of Hose In Ft.	Nozzle Above Pump In Ft	Tip Sizes				
		1/8	**3/16**	**1/4**	**5/16**	**3/8**
100	0	51	52	55	62	75
	100	94	95	98	105	118
300	0	52	56	65	86	121
	100	95	99	108	129	164
	200	139	143	152	173	208
500	0	53	60	75	110	167
	100	96	103	118	153	210
	200	140	147	162	197	254
	300	183	190	205	240	297
1,000	0	56	70	110	170	282
	100	99	113	153	213	325
	200	143	157	197	257	369
	300	186	200	240	300	
	400	229	243	283	343	
	500	273	287	327	387	
	600	316	330	370		
Discharge (GPM)		3.00	7.00	12.00	19.00	28.00
PSI Loss/100 ft.		0.30	1.80	4.70	11.0	23.0

Pump Pressure for 50 PSI Nozzle Pressure

1½ inch Hose (CJRL, CSJRL, & SJRL)

Length Hose In Ft.	Nozzle Above Pump In Ft.	Tip Size In Inches				
		1/8	3/16	¼	5/16	3/8
100	0 100	51 94	51 94	51 94	52 95	53 96
300.00	0 100 200	51 94 138	52 95 139	53 96 140	56 99 143	60 103 147
500	0 100 200 300	51 94 138 181	53 96 140 183	55 98 142 185	60 103 147 190	66 109 153 196
1000	0 200 400 600	51 138 224 311	55 142 228 315	59 146 232 319	68 155 241 328	82 169 255 342
2000	0 200 400 600 800	52 139 225 312 298	59 146 232 319 405	67 155 241 328	84 171 257 344	114 201 287 374
3000.00	0 200 400 600 700	53 140 226 313 356	64 151 237 324 367	75 162 248 335 378	100 187 273 360 403	146 283 319
Discharge (GPM)		3	7	12	19	28
PSI Loss/100 ft		<0.1	<0.1	0.1	1.5	3.1

Data on 100 Foot Lengths of Uncoupled Hose

Type of Hose	Inside Dia. (in)	Proof Pressure (PSI)	Max Dry Weight (lb)	Water (gal)	Weight Water (lb)	Max Total Wgt. (lb)
Garden hose	5/8	125	28	1.6	13	41
High Pressure	¾	425	50	2.3	19	69
CJRL	1	300	28	4.1	34	62
CSJRL	1	450	22	4.1	34	56
SJRL	1	450	9	4.1	34	43
Linen,Unlined	1	300	10	4.1	34	44
CJRL	1 ½	300	33	9.2	77	110
CSJRL	1 ½	450	26	9.2	77	103
SJRL	1 ½	450	15	9.2	77	92
Linen,Unlined	1 ½	300	15	9.2	77	92

•Abbreviations used:

CJRL = Cotton Jacketed, Rubber-Lined
CSJRL= Cotton-Synthetic Jacketed, Rubber-Lined
SJRL = Synthetic Jacketed, Rubber-Lined

Foam Use

Low expansion foams have proven to be valuable in the suppression of fire by increasing the effectiveness of water.

- Foam can be used effectively with regular nozzles, but is most effective with air aspirating nozzles or a compressed air foam system (CAFS).
- Foam has the ability to adhere to and cool fuels for a much longer period of time than water.
- Rates of application (including width and depth) depend upon wind, temperature, fuel moisture, and fuel loading.
- In general, enough foam is required to fully coat exposed fuels and to sufficiently raise fuel moistures.

Mixture rates

- A 0.3 mixture (0.3 gallons of foam concentrate to 100 gallons of water) is the average recommended for most situations regardless of the system being used (compressed air, air aspirating nozzles, or regular nozzles). However, mixture rates may vary from .1 of 1% used during mop up to a full 1% for structure protection.

  Note: More concentrate may be required if the water has a high mineral content, but should never exceed 1%.

Mixture rated by application and type of equipment			
Application	Foam to water mixture in %		
Application	Compressed Air System	Air Aspirating Nozzle	Regular Nozzle
Direct Attack	0.3	0.3-0.5	0.3-0.5
Indirect Attack	0.3	0.3-0.5	0.3-0.5
Mop-up	0.3	0.3-0.5	0.3-0.5
Structures	0.3	0.3-0.5	0.5

Direct Attack

- Place foam directly at the base of the flame.
- Use foam to coat burning materials. Leave a foam blanket over hot fuels to continue wetting the fuels.
- When attacking the fire edge, also apply foam onto adjacent unburned fuels.

Indirect Attack

- Apply the foam directly in advance (within 5 feet) of the person setting the backfire. Some fuels require application about 5 minutes prior to firing.
- The foam line should be at least two and a half times as wide as the average flame height.
- Coat all sides of fuel when possible.
- The foam line can be reinforced and widened on the up wind side once the original control line has been established and backfiring or burn-out has begun.

Mop-up

- For best penetration, apply foam as you would a water stream.
- Use a high pressure wet water mist to create a frothy foam for close in mop-up. This works extremely well on pitchy or punky material, duff, and litter.
- A mop-up wand is very effective with foam for deep-seated fires in stumps, landings, log decks, etc.
- "Forester" nozzles also work well with foam in mop-up.

Pre-treatment

- Foam is most effective when applied shortly before heat exposure. Apply foam enough in advance of the fire to allow penetration, yet not so long that the foam evaporates and dissipates. In general, foam applied by a compressed air system will last about (1) hour and foam applied by an air aspirated nozzle about 30 minutes in hot weather.
- High quality foaming agents will leave at least ½ inch of foam on all surfaces.
- Make the foam line two and one half times (2 ½) as wide as the flame length when creating a foam line for backfiring or burning out.
- When coating unburned fuels, use a wet foam that will penetrate and soak fuels down to the soil.
- Foam is most effective when applied immediately prior to ignition.
- Coat exposed vertical fuels as high as the system being used will reach.
- Use a foam that clings to a vertical surface when protecting

trees, snags, log decks, telephone poles, etc. Sufficient time must be allowed to thoroughly coat these fuels. Apply foam in a radius 2 ½ times the height of standing objects to be protected.

- Apply foam to the outside walls, eaves, roofs, columns, or other threatened surfaces when protecting structures. Loft foam from a great enough distance to avoid foam breakdown.

Safety

- Maintain communications between the nozzle operator and the engine with radio or hand signals.
- Avoid contact with skin and clothes.
- Gloves and eye protection should be worn.
- If foam gets into eyes, irrigate with water immediately.
- Follow the safety guidelines on the foam container.
- The use of Compressed Air Foam Systems (CAFS) requires special training.

Fireline Explosives

Advantages

- Rapid line construction with minimal personnel needs.
- Work well in steep, difficult terrain where fuels are light to moderate.
- Brush and debris is scattered rather than piled next to the line.
- Soil is loosened to facilitate line improvement and hotspotting.
- Line width is easily varied by the number of strands of explosive used.
- Produce a more environmentally acceptable fireline.

Disadvantages

- Limited availability of trained and experienced personnel.
- Requires that all personnel working on the fire be accounted for and removed from the blasting area.
- Transporting the explosives presents unique problems.
- The need to provide security.
- Are becoming more expensive.

Note: Productivity Comparison Charts for Explosives appear later in this Appendix.

Hazmat Materials Checklist for Incident Base Management

- Be able to identify what materials may be classed as hazardous.
- Be familiar with transportation and storage of HazMat
- HazMat storage areas need to be selected and posted clearly in camp settings.
- Know local HazMat contacts and waste disposal sites, etc.
- The Supply Unit Leader needs to know that this position has the responsibility of HazMat while in a camp setting as well as items being demobed.
- It's critical that Supply Unit Leaders are in communication with Cache personnel <u>when</u> <u>ordering</u> and <u>returning</u> hazardous materials. Cache Demob Specialists can be resource ordered or contacted for the proper handling and returning of any hazardous materials.
- The Demob Plan needs to include specific instructions by the Supply Unit Leader for returning all hazardous materials to:

  ✓Cache(s)

  ✓Local host agency(s)

  ✓Local HazMat contractors

  ✓Hazardous waste disposal site

Use of Inmate Crews on Fires

Some states have access to inmate labor for fire operations. Situations may arise where inmates are used on fires involving personnel from many agencies. <u>Although each state has specific rules governing the use of inmates, the following guidelines will</u> apply in most situations. Check with the inmate crew liaison officer, the officer-in-charge, or the appropriate agency representative for more specific information in your area.

- Crews on fireline are supervised by forest crew supervisors, resource boss or higher carded.
- Inmate crews are usually limited to use within the state where they are based although some states have interstate agreements with neighboring states.
- Contact with inmates should be done through the corrections officer-in-charge in camp.
- Contact with inmates should be done through the forest crew supervisor on the fireline.

- Inmates are the responsibility of the corrections officer-in-charge.
- Keep relationships with inmates on a business basis. Do not play cards with, carry messages for, bring gifts to, accept gifts from, make purchases for, etc., the inmates.
- The officer-in-charge or other inmate camp representative may act as liaison with fire overhead on all matters pertaining to inmates - food, bedding areas, etc.
- The officer-in-charge will remain with the crew while on the fireline. Any fire suppression related problems such as pumps, tools, drinking water and fire equipment, etc., are to be taken care of by the Fire Overhead.
- Inmates should not be used in a "Squad Boss" type position, or given supervision over fellow inmates.
- Inmate crews should be provided a separate sleeping area where they can be away from other crews.
- Provide separate sleep areas for male and female, adult and juvenile crews.
- Interspersing inmate crews with civilian crews on the fireline is generally permitted (but not encouraged) provided the crew supervisor is aware of the situation at all times.
- Intermingling of inmates at the incident base with civilians should only occur at meal times.
- Inmates will be confined to the incident base or camp while off-shift.
- Inmates shall not be allowed to handle explosives and/or detonating devices.
- Civilians and inmates shall have separate schedules for bathing.

Production Tables

Sustained Line Production Rates of 20-Person Crews for Construction, Burnout, and Holding in Chains/Hour

Fire Behavior Fuel Model	Specific Conditions	Crew Type	
		Type I	Type II
1 Short Grass	Grass Tundra	30 9	18 5
2 Open Timber/ Grass Understory	All	24	16
3 Tall Grass	All	5	3
4 Chaparral	Chaparral High Pocosin	5 4	3 2
5 Brush	All	6	4
6 Dormant Brush/ Hardwood Slash	Black Spruce Others	7 6	5 4
7 Southern Rough	All	4	2
8 Closed Timber Litter	Conifers	7 40	5 24
9 Hardwood Litter	Conifers Hardwoods	28 40	16 24
10 Timber (Litter & Understory)	All	6	4
11 Logging Slash, Light	All	15	9
12 Logging, Slash, Medium	All	7	4
13 Logging Slash, Heavy	All	5	3

NOTE: Allowances have been made in production rates for rest periods and cumulative fatigue.

Line Production Rates for Initial Action by Hand Crews in Chains per Person per Hour

NOTE: These rates are to be used for estimating initial action productivity only. Do not use these rates to estimate sustained line construction, burnout, and holding productivity. Initial action consists of scratch line counstruction and hotspotting.

Fire Behavior Fuel Model	Specific Conditions	Construction Rate in Chains per Person per Hour
1 Short Grass	Grass Tundra	4.0 1.0
2 Open Timber/ Grass Understory	All	3.0
3 Tall Grass	All	0.7
4 Chaparral	Chaparral High Pocosin	0.4 0.7
5 Brush	All	0.7
6 Dormant Brush/ Hardwood Slash	Black Spruce Others	0.7 1.0
7 Southern Rough	All	0.7
8 Closed Timber Litter	Conifers Hardwoods	2.0 10.0
9 Hardwood Litter	Conifers Hardwoods	2.0 8.0
10 Timber (Litter & Understory)	All	1.0
11 Logging Slash, Light	All	1.0
12 Logging Slash, Medium	All	1.0
13 Logging Slash, Heavy	All	0.4

Line Production Rates for Initial Action by Engine Crews in Chains per Crew per Hour

NOTE: These rates are to be used for estimating initial action productivity only. Do not use these rates to estimate sustained line construction, burnout, and holding productivity. Initial action may consist of scratch line construction and hotspotting.

Fire Behavior Fuel Model	Specific Conditions	Chains per Crew Hour Number of Persons in Crew				
		1	**2**	**3**	**4**	**5+**
1 Short Grass	Grass Tundra	6 2	12 8	24 15	35 24	40 30
2 Open Timber/ Grass Understory	All	3	7	15	21	25
3 Tall Grass	All	2	5	10	14	16
4 Chaparrel	Chaparrel High Pocosin	2 2	3 4	8 10	15 15	20 18
5 Brush (2 ft)	All	3	6	12	16	20
6 Dormant Brush/ Hardwood Slash	Black Spruce Others	3 3	6 6	10 12	16 16	20 20
7 Southern Rough	All	2	5	12	16	20
8 Closed Timber Litter	Conifers Hardwoods	3 10	8 30	15 40	20 50	24 60
9 Hardwood Litter	Conifers Hardwoods	3 8	7 25	12 40	18 50	22 60
10 Timber (Litter & Understory)	All	3	8	12	16	20
11 Logging Slash, Light	All	3	8	12	16	20
12 Logging Slash, Medium	All	3	5	10	16	20
13 Logging Slash, Heavy	All	2	4	8	15	20

Fireline Explosives Production Comparisons

Note: This is based upon Washington State Department of Natural Resources experience.

Production Rate Comparison Between a Seven (7) Person Fireline Explosives Crew and a 20 Person Hand Crew Over a Ten (10) Hour Shift

	Constructed Fireline in Chains	
Fuel Type	**Explosives Crew**	**Hand Crew**
Grass	360	360
Second Growth Conifers	240	180
Light Slash	210	90
Heavy Slash	120	45

Dozer Fireline Construction Rates (single pass) in Chains Per Hour

Note: Prediction rates are not precise, but vary with conditions. The higher rate can be used for newer dozers (1975 and later), dozers in excellent operating condition, most qualified operators, temperatures below 90 degrees, moist soil, few or no rocks, no lost time, indirect fireline, average fire behavior, daylight operations, and less resistive vegetative types within each fire behavior model.

Fire Behavior Fuel Model	Up or Down Slope	Slope Class 1 0-25%	2 26-40%	3 41-55%	4 56-74%
Type III Dozer	Up	55-90	30-55	8-30	0-8
1, 2	Down	90-110	90-110	20-90	0-20
3, 5, 8	Up	45-70	25-45	2-25	0-2
	Down	70-80	65-80	0-65	0
4.00	Up	20-35	10-20	0-10	0
	Down	35-40	25-40	0-25	0
6, 7, 9	Up	35-55	15-35	0-15	0
	Down	55-60	40-60	0-40	0
11, 12	Up	15-25	7-15	0-7	0
	Down	25-30	10-30	0-10	0
10, 13	Up	8-15	3-8	0-3	0
	Down	10-15	5-10	0-5	0
Type II Dozer	Up	85-125	60-85	30-60	0-30
1, 2	Down	125-145	130-145	75-130	0-75
3, 5, 8	Up	70-105	45-70	15-45	0-15
	Down	105-120	105-120	55-105	0-55
4.00	Up	35-60	20-35	2-20	0-2
	Down	60-75	65-76	20-65	0-20
6, 7, 9	Up	50-85	30-50	7-30	0-7
	Down	85-100	85-100	40-85	0-40
11, 12	Up	25-40	15-25	1-15	0-1
	Down	40-55	45-55	0-45	0
10, 13	Up	10-20	7-10	0-7	0
	Down	20-25	20-25	0-20	0

Fire Behavior Fuel Model	Up or Down Slope	Slope Class			
		1 0-25%	2 26-40%	3 41-55%	4 56-74%
Type I Dozer 1, 2	Up Down	100-140 140-155	70-100 140-155	35-70 85-140	0-35 0-85
3, 5, 8	Up Down	75-110 110-130	50-75 110-130	20-50 55-110	0-20 0-55
4.00	Up Down	45-70 70-80	30-45 75-85	8-30 25-75	0-8 0-25
6, 7, 9	Up Down	65-95 95-110	40-65 90-110	15-40 50-90	0-15 0-50
11, 12	Up Down	35-55 55-65	20-35 55-65	3-20 6-55	0-3 0-6
10, 13	Up Down	20-35 35-40	9-20 30-40	0-9 0-30	0 0

Tractor-Plow Fireline Production Rates in Chains Per Hour (drag or mounted plow, appropriate blade, level to rolling terrain)

Fire Behavior Fuel Model	Tractor Plow Type					
	1	2	3	4	5	6
	(165 HP) D-7, JD-850 TD-20 & Larger	(140 HP) D-6, JD-750, TD-15, Case 1450	(120 HP) D5H, D4H, TD-12, Case 1150	(90HP) D-4, JD-650, TD-9, D5C	(70-80 HP) JD-450, D4C, TD-8	(42-60 HP) JD350, D3, JD-400, TD-7
1	240	240	240	200	180	80
2	180	180	180	140	120	80
3	180	180	180	120	100	70
4	80	80	60	40	20	0
5	160	160	160	100	80	40
6	120	120	100	60	40	20
7	160	160	160	120	100	60
8	180	180	180	120	100	70
9	180	180	180	120	100	70
10	100	100	80	50	40	20
	Mountainous Terrain, 60% or less slope, front and rear mounted plow, downhill plowing					
8	--	--	--	50	40	20
9	--	--	--	50	40	20
	Mountainous terrain, 60% or less slope, using ripper attachment, up/down slope fireline construction					
1, 2, 3	20/30	10/30	0/30	--	--	--
4, 6, 12, 13	10/20	5/10	0/5	--	--	--
5, 7, 8-10, 11	12/25	8/15	0/10	--	--	--

*Minimum standards for personnel with dozers may differ depending on fuel type, terrain, and resource configuration. Dozer strike teams may use team leader in place of additional personnel per dozer. Fuel requiring burnout and terrain that requires scouting demands two personnel per dozer.

Resource Typing

Hand Crews

Components	Minimum Standards for Type	
	1	2
Production Factor	1.0	0.8
Dispatch to Arrival Time	12 hours	No minimum time
Fully Mobilized	Required	Not required
Inter-crew Communications	Yes	Desirable
Permanent Supervision	Yes	Desirable
Experience	80% one season	N/A
Training: (classroom - not physical)	80 hours annually	National standards
Full Time Organized Crew	Yes	No standards
Physical Requirement	45 or higher	45 or higher
Crew Size	18-20	18-20
Maximum Crew Weight	5100 pounds	5100 pounds

Note: 1. Crews moved on an inter-regional basis will meet NWCG standards for personal protective clothing.
2. Crew productivity factors are an arbitrary figure arrived at from the 1979 Fire Lab Study data as a base.

Engines

	Minimum Standards for Type						
Components	1	2	3	4	5	6	7
Pump Capacity (GPM)	1000	500	120	70	50	50	20
Tank Capacity (Gallons)	400	400	500	750	500	200	125
Hose, 2 l/2" (feet)	1200	1000	--	--	--	--	--
Hose, 1 ½" (feet)	400	500	1000	300	300	300	200
Hose, 1" (feet)	200	300	800	300	300	300	200
Ladder (feet)	20	20	--	--	--	--	--
Heavy Stream (GPM)	500	--	--	--	--	--	--
Personnel (minimum number)	4	3	3	3	3	2	2

Note: 1. An "X" after the type number denotes all-wheel drive.
2. Foam or water expansion units must be ordered as such.

Other Resources

Resource	Components	Minimum Standards for Type			
		1	2	3	4
Water Tender	Pump, GPM Tank, Gallons	300 5000	200 2500	200 1000	-- 1000
Helicopters	Seats, including pilot (minimum)	16	10	5	3
	Card Weight Capacity (lbs)	5000	2500	1200	600
	Tank, gallons of Retardant (min)	700	300	100	75
	Examples:	Bell 214	Bell 204, 205, 212	Bell 206	Bell 47
Air Tankers	Minimum Capacity (gallons)	3000	1800	600	100
	Examples:	C-130 P-3 DC-7	DC-4 SP2H P2V	S-2	Thrush
Helitanker	- Fixed Tank - Air Tanker Board Certified - 1,100 Min. Gal. Capacity				

CLEAR TEXT GUIDE

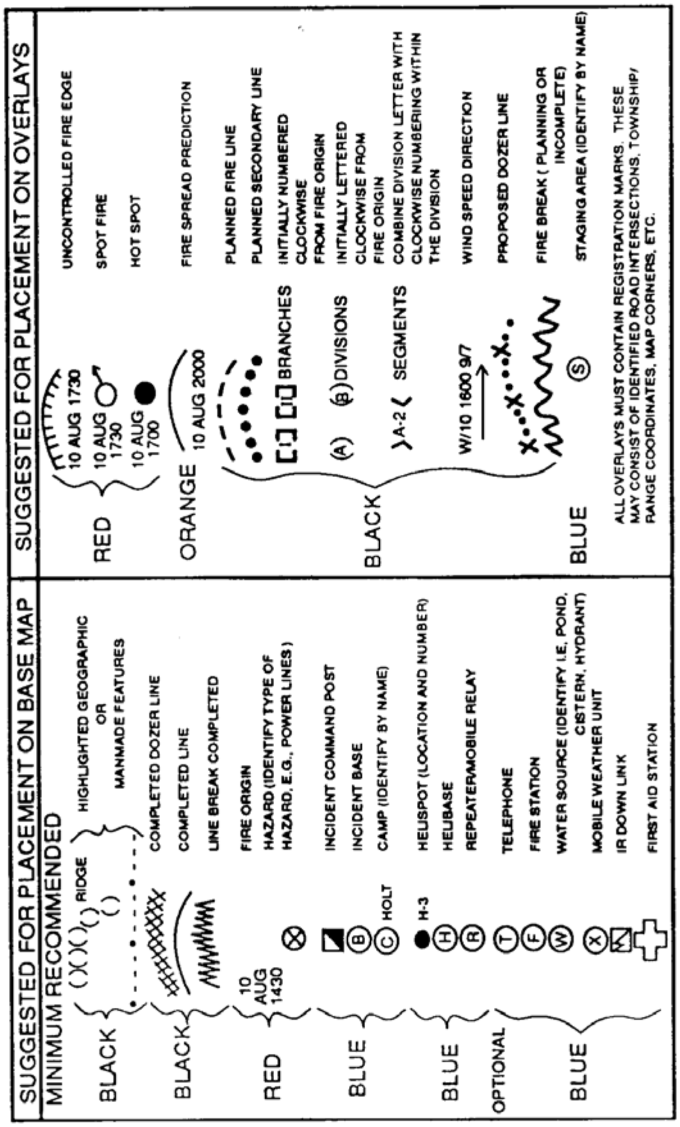
WORDS AND PHRASES	*APPLICATION - EXAMPLES*
STANDARD REPLIES:	
Affirmative	Yes
Can Handle	Used with the amount of equipment needed to handle the incident. Example: "Waverly 3 can handle with units now at the scene."
Copy, Copies	Used to acknowledge message received. Example: "Engine 3 copies."
Disregard	Self-explanatory
Proceed	Indicates another unit may transmit. Example: "Go ahead Essex 50."
How do you copy?	Request for report on transmission quality.
Loud and Clear	Self-explanatory
Negative	No
Repeat	Self-explanatory
Standby	Self-explanatory
Unreadable	Signal received is not clear.
STATUS REPORTING:	
At scene	Used when units arrive at the scene of an incident.
Available (location)	Ready to respond to calls. Location is optional.
Available at residence	Used to indicate personnel are available and on-call at home.
Available at scene	No longer needed at scene and are available to respond to other calls.
En route (location)	Used to designate a non-emergency destination. Enroute is not substitute for responding.
In-quarters (location)	Used to indicate that a resource is at station. Example: "Engine 7 in quarters, Charlottesville."
In-service	Unit is operating, but not in response to a dispatch.
Off duty (location)	Used to sign off when going off duty and are unavailable for calls.
Out-of-Contact (location)	Indicates unit is still on duty, but out of radio contact at the location specified.
Out-of-Service (location is optional)	Indicates unit is not available due to mechanical problems.
Respond, responding	Used in dispatch - proceed to or proceeding to an incident. EX: "Salem 4, responding to......." or "Salem 4, respond to........"

Return to, returning to	Used to direct units that are available to a station or other location.
INFORMATIONAL:	
Burning Operation (specify if illegal)	Indicates a legal fire unless specified otherwise.
Call __________by phone.	Self-explanatory
Contact________ message.	Relay message to person named.
Emergency Traffic	Used to gain control of the radio frequency to report an emergency in progress or a new incident. Used by base.
False Alarm	Self-explanatory
Fire	Fire emergency requiring a response. Specify structure, field, forest, etc.
Fire Under Control	Self-explanatory
Is ________ available for a phone call?	Self-explanatory
Let me talk to____________.	Self-explanatory
No smoke or fire	Response to Report of Conditions, if appropriate.
Report on Conditions	Specify location if needed. EX: "Wise 3 to Lee 2, Report on conditions, Jonesville Fire."
Resume normal traffic	Self-explanatory. Used by base.
Signing on, signing off	Self-explanatory. Used by base.
Smoke	Suspected or uncomfirmed fire.
Weather	Specify report or forecast.
What is your location?	Self explanatory

International Phonetic Alphabet

A - Alpha	J - Julliett (Jooleeyet)	S - Sierra
B - Bravo	K - Kilo (Keelo)	T - Tango
C - Charlie	L - Lima	U - Uniform
D - Delta	M - Mike	V - Victor
E - Echo	N - November	W - Whiskey
F - Foxtrot	O - Oscar	X - X-ray
G - Golf	P - Papa	Y - Yankee
H - Hotel	Q - Quebec	Z - Zulu
I - India	R - Romeo	

ICS Map Display Symbols



Conversion Factors for Map Scale

Representative Fraction	Inches/Mile	Inches/Chain	Feet/Inch
1:253,440	1/4	0.00312	21,120
1:126,720	l/2	0.00625	10,560
1: 63,680	1	0.0125	5,280
1: 31,680	2	0.025	2,640
1: 24,000	2 ⅝ or 2.64	0.0328	2,000
1: 21,120	3	0.375	1,760
1: 15,840	4	0.05	1,320
1: 7,920	8	0.10	660

Calculating the Area and Circumference of a Circle

- Circle, Area $= 3.1416 \times \frac{\text{diameter squared}}{4}$

  or

  $= 3.1416 \times$ radius squared

- Circle, Circumference $= 3.1416 \times$ diameter

Acreage Determination Factors

Perimeter Chart

	Perimeter in Chains				Perimeter in Chains		
Acres	Minimum	Usual	Maximum	Acres	Minimum	Usual	Maximum
1	11	17	22	700	300	450	600
2	16	24	32	800	320	475	625
3	19	29	39	900	340	500	675
4	22	34	45	1,000	350	525	700
5	25	38	50	1,200	400	600	775
7	30	45	59	1,400	425	625	850
10	36	53	71	1,600	450	675	900
15	45	65	85	1,800	475	725	950
20	50	75	100	2,000	500	750	1,000
25	55	85	110	2,400	550	825	1,100
30	60	90	125	2,800	600	875	1,175
40	70	105	140	3,200	625	950	1,275
50	80	120	160	3,600	675	1,000	1,350
75	100	150	190	4,000	700	1,075	1,425
100	110	170	220	5,000	800	1,200	1,600
150	140	200	280	6,000	850	1,300	1,700
200	160	240	320	7,000	950	1,400	1,900
300	200	300	400	8,000	1,000	1,500	2,000
400	225	350	450	9,000	1,050	1,600	2,100
500	250	375	500	10,000	1,100	1,700	2,250
600	275	425	550	12,000	1,250	2,000	2,500

INSTRUCTIONS FOR THE USE OF THIS TABLE

1. Use this table as a guide to estimate areas and perimeters. Remember that results are approximate values only and have been rounded off.

2. Fires that are roughly circular in shape will have perimeters that approach Minimum values.

3. Fires that are very long and narrow or with many fingers will have perimeters that approach or possibly exceed Maximum values.

4. Values in the Usual column will represent fires that are oval or wedge shaped.

Acreage Chart: Area in Acres

Perimeter in Chains	1	2	3	4	5	6
1	.01	.01	.01	.01	.01	.01
2	.03	.02	.02	.02	.01	.01
3	.06	.05	.04	.04	.03	.02
4	.11	.10	.08	.06	.05	.03
5	.17	.15	.12	.10	.07	.05
6	.25	.22	.18	.14	.11	.07
7	.34	.29	.24	.20	.15	.10
8	.45	.38	.32	.26	.19	.13
9	.57	.49	.40	.32	.24	.16
10	.7	.6	.5	.4	.3	.2
12	1.0	.8	.7	.6	.4	.3
14	1.4	1.2	1.0	.8	.6	.4
16	1.8	1.5	1.3	1.0	.8	.5
18	2.3	1.9	1.6	1.3	1.0	.6
20	2.8	2.4	2.0	1.6	1.2	.8
22	3.4	2.9	2.4	1.9	1.4	1.0
24	4.0	3.5	2.9	2.3	1.7	1.2
26	4.7	4.1	3.4	2.7	2.0	1.3
28	5.5	4.7	3.9	3.1	2.3	1.6
30	6.3	5.4	4.5	3.6	2.7	1.8
32	7.2	6.1	5.1	4.1	3.1	2.1
34	8.1	6.9	5.8	4.6	3.5	2.3
36	9.1	7.8	6.5	5.2	3.9	2.6
38	10.1	8.7	7.2	5.8	4.3	2.9
40	11.2	9.6	8.0	6.4	4.8	3.2
42	12	11	9	7	5	3.5
44	14	12	10	8	6	4
46	15	13	11	8.5	6	4
48	16	14	11.5	9	7	4.5
50	17	15	12	10	7	5
60	25	21	18	14	11	7
70	34	30	25	20	15	10
80	45	38	32	26	19	13
90	57	49	40	32	24	26
100	70	60	50	40	30	20

This table is to help you estimate the area of a fire. To use it, pace the distance around the fire in chains (1 chain = 66 feet) and determine the general shape of the fire. Select the column (1-6) which best fits the fire's shape and read the acreage for the paced perimeter shown in the left column.

Acreage Chart (con't)

Explanation of columns representing shapes of fires

1. Fire is in the general shape of a circle.
2. Fire is in the shape of either a square or a rectangle which is not more than twice as long as it is wide with a moderately irregular perimeter.
3. Fire is in the shape of a rectangle about three times longer than it is wide. The column also gives the area of a triangle with a moderately irregular perimeter.
4. Fire in the shape of a rectangle about four times longer than it is wide and having a fairly irregular perimeter.
5. Fire which is long and narrow with an irregular perimeter.
6. Fire with two or three long fingers or a very irregular perimeter.

Conversion Factors

Linear Measure

Chain	=	66 feet
	=	100 links
	=	20.1168 meters
Foot	=	12 inches
	=	0.3048 meters
Inch	=	2.54 centimeters
Kilometer	=	0.62317 statute miles
	=	1,093.6 yards
	=	3,280.8 feet
Link	=	0.66 feet
	=	7.92 inches
	=	0.2012 meters
Meter	=	3.2808 feet
	=	39.37 inches
Mile, statute	=	5,280 feet
	=	1,760 yards
	=	80 chains
	=	1.60934 kilometers
	=	0.8684 nautical miles
Mile, nautical	=	6,080 feet
	=	2,026.7 yards
	=	92.12 chains
	=	1.8532 kilometers
	=	1.1515 statute miles
Yard	=	3 feet
	=	36 inches
	=	0.9144 meters

Conversion Factors (cont.)

Square (Area) Measure		
Acre	=	43,560 square feet
	=	4,840 square yards
	=	10 square chains
	=	208.7 x 208.7 feet
	=	0.405 hectares
Hectare	=	1000 square meters
	=	2,471 acres
	=	328.1 x 328.1 feet
Square foot	=	144 square inches
Square mile	=	640 acres
Township	=	36 square miles
	=	6 x 6 miles
Square Yard	=	9 square feet
	=	1296 square inches
Cubic (Volume) Measure		
Cubic foot	=	7.4805 U.S. gallons
	=	6.2360 Imperial gallons
	=	1728 cubic inches
	=	28.316 liters
Cubic yard	=	27 cubic feet
	=	200.3 U.S. gallons
	=	11 Imperial gallons
	=	764.53 liters

Conversion Factors (cont.)

Liquid Measure		
Cup	=	8 ounces
Gallon, Imperial	=	10 pounds
	=	1.2009 U.S. gallons
	=	0.160546 cubic feet
	=	4.8036 quarts
	=	4.5459 liters
Gallon, U. S.	=	8.33717 pounds
	=	0.83267 Imperial gallons
	=	0.133680 cubic feet
	=	4 quarts
	=	128 ounces
	=	3.7853 liters
Liter	=	0.264179 U.S. gallons
	=	0.21998 Imperial gallons
	=	1.0567 quarts
	=	33.8144 ounces
Pint	=	2 cups
	=	16 ounces
	=	0.47315 liters
Quart	=	2 pints
	=	32 ounces
	=	0.9463 liters

Incident Command System Forms

Forms which are routinely used in the incident Command System are listed below. Those marked with an (*) are commonly used in written Incident Action Plans.

ICS Form Number	Form Title
201	Incident Briefing
202 (*)	Incident Objectives
203 (*)	Organizational Assignment List
204 (*)	Division Assignment List
205 (*)	Incident Radio Communications Plan
206 (*)	Medical Plan
207	Organizational Chart
209	Incident Status Summary
210	Status Change Card
211	Check-in List
212	Vehicle Demob Inspection
213	General Message Form
214	Unit Log
215	Operational Planning Worksheet
216	Radio Requirements Worksheet
217	Radio Frequency Assignment
218	Support Vehicle Inventory
219	Resource Status Card
220 (*)	Air Operations Summary Worksheet
221	Demobilization Checkout
224	Crew Performance Rating
225	Incident Personnel Rating

Resource Status Card (Colors and Uses)

Card Color	Kind of Resource	Form Number
Gray	Headers	219-1
Green	Hand Crews	219-2
Rose	Engines	219-3
Blue	Helicopters	219-4
White	Personnel	219-5
Orange	Aircraft, Fixed Wing	219-6
Yellow	Dozers, Tractor-Plows	219-7
Tan	Misc. Equipment and Task Forces	219-8

INDEX

WATCHOUT SITUATIONS

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior.
5. Uninformed on strategy, tactics and hazards.
6. Instructions and assignments not clear.
7. No communication link with crew members/supervisor.
8. Constructing fireline without safe anchor point.
9. Building fireline downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and the fire.
12. Cannot see main fire, not in contact with anyone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather is getting hotter and drier.
15. Wind increases and/or changes direction.
16. Getting frequent spot fires across line.
17. Terrain and fuels make escape to safety zones difficult.
18. Taking a nap near the fireline.

APPENDIX B

ICS FORMS 201 to 215

DOCUMENTATION

The purpose of this appendix is to familiarize students with certain ICS forms that may be used during major and target hazard incidents. We will use a major nursing home incident as the basis for the forms to show how these forms may be used at a target-hazard occupancy.

Scenario:

The Kent Retirement home, located at 8th and Z Streets in Central City, is contained in a two-story building measuring 120' by 150'. The building is of noncombustible construction. It is built on a concrete slab with masonry walls. The floor assembly is concrete on steel bar-joist with metal decking. The roof assembly is prestressed concrete beams with a built-up roof covering of tar and stone.

There are 23 rooms and a lobby area on the first floor and 27 rooms on the second floor. The structure is 90 percent occupied, having a total of 90 patients and a staff of 12 at any given time.

The fire is occurring on Wednesday, 0930 hours, weather: 75°F, winds 5 mph from the west.

The fire occurs in a storage room in a first-floor patient room and spreads to the corridor. It is presumed that the two patients in the involved room have perished. The fire is now involving the storage room and the patient room on the first floor. Heavy smoke has filled the first-floor common areas and the HVAC system has spread smoke to the second floor.

The following strategies have been identified by the Deputy Chief who arrived on the second alarm.

1. Rescue and evacuation.
2. Confinement and extinguishment.
3. Ventilation.
4. Full medical branch operation--multiple casualty incident.

The following resources have been dispatched to the incident:

1st alarm:	E1, E2, E3, L1, M1, PM6, BC1, R1
2nd alarm:	E4, E5, E6, L2, M2, EMC, BC2, DC1
3rd alarm:	E7, E8, E9, L3, Tr.BC, Ad.BC, FPBC
4th alarm:	E10, E11, L4

Division 1 consists of the following units: E1, E2, E3, L1, E7, E2 officer is Div. 2.

Division 2 consists of the following units: E4, E5, E6, L2, E4 officer is Div. 2.

Evacuation Branch consists of the following units: R1, E8, E9, E10, L3, L4, Rescue 1 officer is Evacuation Branch Director.

EMS Branch consists of the following units: PM6, PM7, M1, M2, M3, M4, M5, EMS Chief is Branch Director.

Fire Staging--7th and Z Streets.

EMS Staging--7th and AA Streets.

Fire attack is underway and nearly completed in the rooms on the first floor. Evacuation of the first floor is 80 percent completed. Evacuation of the second floor is 20 percent completed. Horizontal ventilation of the first floor is completed. Horizontal ventilation of the second floor is 50 percent completed. Patients are being transported to hospitals.

Forms Description

ICS 201 page 1	Sketch of operation, resource locations, and assignments. Shows graphically where resources are working.
ICS 201 page 2	Summary of Current Actions, describing present actions.
ICS 201 page 3	Current ICS organization for handling resources. This is the basic ICS organization for the incident.
ICS 201 page 4	Summary of resources requested/arrived/assigned. This is the resource tracking document for the incident.
ICS 202	Incident Action Plan developed by Planning Section Chief. The IAP for the incident.
ICS 203	Organization Assignment List by Resource Unit Leader. A clear depiction of the assignments in the ICS organization.
ICS 204	Assignment List (1 example) by Resource Unit Leader. Assignments to Evacuation Division 1 and assignment.
ICS 205	Incident Radio Communication Plan--N/A this incident.
ICS 206	Medical Plan by EMS Branch Director. Medical Plan for the incident by the EMS Branch Director.

ICS 207	Incident Organization Chart by Resource Unit Leader. Full incident organization chart.
ICS 209	Incident Status Summary by Planning Section Chief. A summary of information, including resources for the incident.
ICS 210	Status Change Card--N/A this incident.
ICS 211	Check-in List--Resource Unit Leader. Unit check-in list for the incident.
ICS 213	General Message--N/A this incident.
ICS 214	Unit Log by Unit Leader--Division 1 as an example. Log of actions directed and taken for the incident.
ICS 215	Operational Planning Worksheet--N/A this incident.
ICS 216	Radio Requirements Worksheet--N/A this incident.
ICS 217	Radio Frequency Assignment Worksheet--N/A this incident.
ICS 218	Support Vehicle Inventory--N/A this incident.
ICS 219	Resource Status Cards (T-cards)--N/A this incident.
ICS 221	Demobilization Checkout--N/A this incident.

INCIDENT DEBRIEFING	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
	Kent	10-10-95	1315

Division 1	Evacuation Branch	Division 2
E1	R1	E4
E2	E8	E5
E3	E9	E6
L1	E10	L2
E7	R2	
	L3	
	L4	
First Floor		Second Floor

Fire staging--7th and Z Streets

EMS staging--7th and AA Streets

EMS Branch
EMS Captain

M1	PM6
M2	PM7
M3	
M4	
M5	

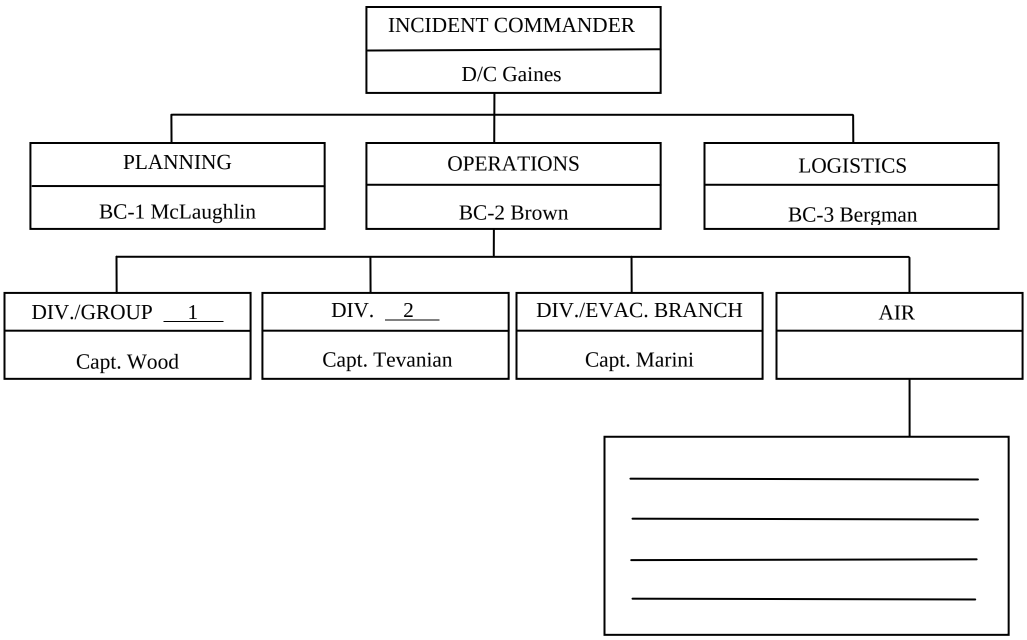
ICS 201 (12/93) NFES 1325	PAGE 1	5. PREPARED BY (NAME AND POSITION)
		Capt. Jim Davis

6. SUMMARY OF CURRENT ACTIONS

Fire attack is progressing, nearly complete; evacuation of first floor 80 percent done, Evacuation of second floor is 20 percent done. Ventilation--horizontal first floor done, second floor 50 percent done. Patients being transported to hospitals.

ICS 201 (12/93) **NFES 1325**	PAGE 2	

7. CURRENT ORGANIZATION



ICS 201 (12/93) **NFES 1325**	PAGE 3	

8. RESOURCES SUMMARY				
RESOURCES ORDERED	**RESOURCES IDENTIFICATION**	**ETA**	**ON SCENE √**	**LOCATION/ASSIGNMENT**
E1	Engine		√	DIV 1
E2	Engine		√	DIV 1
E3	Engine		√	DIV 1
L1	Truck		√	DIV 1
BC1	Battalion Chief		√	Plans
E4	Engine		√	DIV 2
E5	Engine		√	DIV 2
E6	Engine		√	DIV 2
L2	Truck		√	DIV 2
BC2	Battalion Chief		√	Operations
E7	Engine		√	DIV 1
E8	Engine		√	Evac. Branch
E9	Engine		√	Evac. Branch
L3	Truck		√	Evac. Branch
Ad.BC3	Battalion Chief		√	Logistics
DC-1	Deputy Chief		√	IC
M-1	BLS Units		√	EMS Captain
M-2	BLS Units		√	EMS Captain
M-3	BLS Units		√	EMS Captain
EMS Captain	BLS Units		√	EMS Captain
ICS 201 (12/93) NFES 1325	PAGE 4			

8. RESOURCES SUMMARY				
RESOURCES ORDERED	**RESOURCES IDENTIFICATION**	**ETA**	**ON SCENE √**	**LOCATION/ASSIGNMENT**
M-4	BLS Unit		√	EMS Branch
M-5	BLS Unit		√	EMS Branch
PM-6	Paramedic		√	EMS Branch
PM-7	Paramedic		√	EMS Branch
E10	Engine		√	Evac. Branch
E11	Engine	10 min.		
L4	Truck		√	Evac. Branch
Tr.BC	Battalion Chief		√	Safety Officer
R1	Rescue		√	Evac. Branch
FP.BC	Battalion Chief		√	Information Officer
ICS 201 (12/93) NFES 1325	PAGE 4			

Instructions for Completing the Incident Briefing (ICS Form 201)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
1.	Incident Name	Print the name assigned to the incident.
2.	Date Prepared	Enter date prepared (month, day, year).
3.	Time Prepared	Enter time prepared (24-hour clock).
4.	Map Sketch	Show perimeter and control lines, resources assignments, incident facilities, and other special information on a sketch map or attached to the topographic or orthophoto map.
5.	Resources Summary	Enter the following information about the resources allocated to the incident. Enter the number and type of resource ordered.
	Resources Ordered	Enter the number and type of resource ordered.
	Resource Identification	Enter the agency three-letter designator, S/T, Kind/ Type and resource designator.
	ETA/On Scene	Enter the estimated arrival time and place the arrival time or a checkmark in the "on scene" column upon arrival.
	Location/ Assignment	Enter the assigned location of the resource and/or the actual assignment.
6.	Current Organization	Enter on the organization chart the names of the individuals assigned to each position. Modify the chart as necessary.
7.	Summary of Current Actions	Enter the strategy and tactics used on the incident and note any specific problem areas.
8.	Prepared By	Enter the name and position of the person completing the form.
*Note		Additional pages may be added to ICS Form 201 if needed.

INCIDENT ACTION PLAN AND INCIDENT OBJECTIVES FORM (ICS 202)

Purpose. An Incident Action Plan documents the actions developed by the Incident Commander and Command and General Staffs during the Planning Meeting. When all attachments are included, the plan specifies control objectives, tactics to meet the objectives, resources, organization, communications plan, medical plan, and other appropriate information for use in tactical operations.

INCIDENT ACTION PLAN

1. Incident Objectives (ICS Form 202)
2. Organization Assignment List (ICS Form 203)
3. Incident Map (top section or sketch)
4. Assignment List (ICS Form 204)
5. Radio Communications Plan (ICS Form 205)
6. Traffic Plan (internal and external to the incident)
7. Medical Plan (ICS Form 206)

Preparation. An Incident Action Plan is completed following each formal planning meeting conducted by the Incident Commander and the Command and General Staff. The plan must be approved by the Incident Commander prior to distribution.

Distribution. Sufficient copies of the Incident Action Plan will be reproduced and given to all supervisory personnel at the Section, Branch, Division/Group, and Unit leader levels.

The Incident Objectives Form (ICS Form 202) is the first page of an Incident Action Plan. The Incident Objectives Form describes the basic incident strategy, control objectives, and provides weather information and safety considerations for use during the next operational period.

INCIDENT OBJECTIVES	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
	Kent	10-10-95	1330

4. OPERATIONAL PERIOD (DATE/TIME)

10-10-95 1330-1430

5. GENERAL CONTROL OBJECTIVES FOR THE INCIDENT (INCLUDE ALTERNATIVES)

Control fire on first floor
Stop extension to second floor
Ventilate building (PPV, if possible)
Rescue trapped occupants
Evacuate entire building
Move patients to hospitals

6. WEATHER FORECAST FOR OPERATIONAL PERIOD

75°F, sunny, humidity 40%

7. GENERAL SAFETY MESSAGE

Watch personnel for overextension during rescue

8. ATTACHMENTS (√ IF ATTACHED)

☐ ORGANIZATION LIST (ICS 203)	☐ MEDICAL PLAN (ICS 206)	☐
☐ ASSIGNMENT LIST (ICS 204)	☐ INCIDENT MAP	☐
☐ COMMUNICATIONS PLAN (ICS 205)	☐ TRAFFIC PLAN	☐

202 ICS 3-80	9. PREPARED BY (PLANNING SECTION CHIEF)	10. APPROVED BY (INCIDENT COMMANDER)
	B/C McLaughlin	B.W. Phelps

Instructions for Completing the Incident Objectives (ICS Form 202)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
		Note: ICS Form 202, Incident Objectives, serves only as a cover sheet and is not considered complete until attachments are included.
1.	Incident Name	Print the name assigned to the incident.
2.	Date Prepared	Enter date prepared (month, day, year).
3.	Time Prepared	Enter time prepared (24-hour clock).
4.	Operational Period	Enter the time interval for which the form applies. Record the start time and end time and include date(s).
5.	General Control Objectives (include alternatives)	Enter short, clear, and concise statements of the objectives for managing the incident, including alternatives. The control objectives usually apply for the duration of the incident.
6.	Weather Forecast for Operational Period	Enter weather prediction information for the specified operational period.
7.	General/Safety Message	Enter information such as known safety hazards and specific precautions to be observed during this operational period. If available, a safety message should be referenced and attached.
8.	Attachments	The form is ready for distribution when appropriate attachments are completed and attached to the form.
9.	Prepared By	Enter the name and position of the person completing the form (usually the Planning Section Chief).
10.	Approved By	Enter the name and position of the person approving the form (usually the Incident Commander).

ORGANIZATION ASSIGNMENT LIST (ICS FORM 203)

Purpose. The Organization Assignment List provides ICS personnel with information on the units that are currently activated and the names of personnel staffing each position/unit. It is used to complete the Incident Organization Chart (ICS Form 207) which is posted on the Incident Command Post display.

Preparation. The list is prepared and maintained by the Resources Unit under the direction of the Planning Section Chief.

Distribution. The Organization Assignment List is duplicated and attached to the Incident Objectives form and given to all recipients of the Incident Action Plan.

ORGANIZATION ASSIGNMENT LIST	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
	Kent	10-10-95	1340

4. OPERATIONAL PERIOD (DATE/TIME): 10-10-95 1330-1430

POSITION	NAME
5. INCIDENT COMMANDER AND STAFF	
INCIDENT COMMANDER	B/C Gaines
DEPUTY	
SAFETY OFFICER	Capt. Close
INFORMATION OFFICER	Lt. Davis
LIAISON OFFICER	Lt. Wivell

6. AGENCY REPRESENTATIVES

AGENCY	NAME
Coroner	Dr. Meta

7. PLANNING SECTION

CHIEF	B/C McLaughlin
DEPUTY	
RESOURCES UNIT	FF Burkell
SITUATION UNIT	
DOCUMENTATION UNIT	FF Clark
DEMOBILIZATION UNIT	
TECHNICAL SPECIALISTS	

8. LOGISTICS SECTION

CHIEF	B/C Bergman
DEPUTY	
a. SUPPORT BRANCH	
DIRECTOR	
SUPPLY UNIT	
FACILITIES UNIT	
GROUND SUPPORT UNIT	
b. SERVICE BRANCH	
DIRECTOR	
COMMUNICATIONS UNIT	
MEDICAL UNIT	
FOOD UNIT	

9. OPERATIONS SECTION

CHIEF		Brown
DEPUTY		
a. BRANCH I - DIVISION/GROUPS/EVACUATION		
BRANCH DIRECTOR		Capt. Marini
DEPUTY		
EVAC/DIVISION	1	Capt. Williams
EVAC/DIVISION	2	Capt. Ryan
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
b. DIVISION/GROUPS		
DIVISION	1	Capt. Wood
DIVISION	2	Capt. Tevanian
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
c. BRANCH IIIÛDIVISIONS/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
d. AIR OPERATIONS BRANCH		
AIR OPERATIONS BR. DIR.		
AIR ATTACK SUPERVISOR		
AIR SUPPORT SUPERVISOR		
HELICOPTER COORDINATOR		
AIR TANKER COORDINATOR		

10. FINANCE SECTION

CHIEF	
DEPUTY	
TIME UNIT	
PROCUREMENT UNIT	
COMPENSATION/CLAIMS UNIT	
COST UNIT	

203 **ICS** 1/82	PREPARED BY (RESOURCES UNIT)
	FF Burkell

Instructions for Completing the Organization Assignment List (ICS Form 203)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
		An Organization Assignment List may be completed any time the number of personnel assigned to the incident increases or decreases or a change in assignment occurs.
1.	Incident Name	Print the name assigned to the incident.
2.	Date Prepared	Enter date prepared (month, day, year).
3.	Time Prepared	Enter time prepared (24-hour clock).
	Operational Period	Enter the time interval for which the assignment list applies. Record the start time and end time and include date(s).
4. thru 8.		Enter the names of personnel staffing each of the listed positions. Use at least first initial and last name. For Units indicate Unit Leader and for Divisions/Groups indicate Division/Group Supervisor. Use an additional page if more than three branches are activated.
9.	Prepared By	Enter the name of the Resources Unit member preparing the form. Attach form to the Incident Objectives.

ASSIGNMENT LIST (ICS FORM 204)

Purpose. The Assignment List(s) is used to inform Operations Section personnel of incident assignments. Once the assignments are agreed to by the Incident Commander and General Staff, the assignment information is given to the appropriate Units and Divisions via the Communications Center.

Preparation. The Assignment List normally is prepared by the Resources Unit using guidance by the Incident Objectives (ICS Form 202), Operational Planning Worksheet (ICS Form 215), and Operations Section Chief. The Assignment List must be approved by the Planning Section Chief. When approved, it is attached to the Incident Objectives as part of the Incident Action Plan.

Distribution. The Assignment List is duplicated and attached to the Incident Objectives and given to all recipients of the Incident Action Plan. In some cases, assignments may be communicated via radio.

1. BRANCH	2. DIVISION/GROUP	ASSIGNMENT LIST
EVACUATION	EVAC DIV 1	

3. INCIDENT NAME	4. OPERATIONAL PERIOD
KENT	DATE 10/10/95 TIME 1330-1430

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF	Brown	DIVISION/GROUP SUPERVISOR	Williams
BRANCH DIRECTOR	Marini	AIR TACTICAL GROUP SUPERVISOR	

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF TP/TIME	PICK-UP PT/TIME
R1	Lt. Gray	4			
E8	Lt. Long	4			
E9	Lt. Baker	4			
E10	Lt. Dawn	4			

7. CONTROL OPERATIONS

Evacuate entire first floor. Move patients to medical branch.

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATIONS SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CHAN.
COMMAND	LOCAL				SUPPORT	LOCAL			
	REPEAT					REPEAT			
DIV/GROUP TACTICAL					GROUND-TO-AIR				

PREPARED BY (RESOURCES UNIT)	APPROVED BY (PLANNING SECTION CHIEF)	DATE	TIME
FF Burkell	B/C McLaughlin	10/10/95	1320

Instructions for Completing the Assignment List (ICS Form 204)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
		A separate sheet is used for each Division or Group. The identification letter of the Division is entered in the form title. Also enter the number (Roman numeral) assigned to the Branch.
1.	Incident Name	Print the name assigned to the incident.
2.	Date Prepared	Enter date prepared (month, day, year).
3.	Time Prepared	Enter time prepared (24-hour clock).
4.	Operational Period	Enter the time interval for which the form applies. Record the start time and end time and include date(s).
5.	Operations Personnel	Enter the name of the Operations Chief, applicable Branch Director, and Division Supervisor.
6.	Resources Assigned Strike Team/Task Force/Resource Designator	List resource designators, leader name, and total number of personnel for strike teams, task forces, or single resources assigned.
7.	Control Operations	Provide a statement of the tactical objectives to be achieved within the operational period. Include any special instructions for individual resources.
8.	Special Instructions	Enter statement calling attention to any safety problems or specific precautions to be exercised or other important information.
9.	Division Communication Summary	The Communications Unit provides this information on the form for Command, Division, Tactical, Support, and Ground-to-Air frequencies.
10.	Prepared By	Enter the name of the Resources Unit member preparing the form.
11.	Approved By	Enter the name of the person approving the form (usually the Planning Section Chief).

INCIDENT RADIO COMMUNICATIONS PLAN (ICS FORM 205)

Purpose. The Incident Radio Communication Plan provides in one location information on all radio frequency assignments for each operational period. The plan is a summary of information obtained from the Radio Requirement Worksheet (ICS Form 216) and the Radio Frequency Assignment Worksheet (ICS Form 217). Information from the Radio Communications Plan on frequency assignments normally is placed on the appropriate Assignment List (ICS Form 204).

Preparation. The Incident Radio Communication Plan is prepared by the Communications Unit Leader and given to the Planning Section Chief. Detailed instructions on preparing this form may be found in ICS 223-5, Communications Unit Position Manual.

Distribution. The Incident Radio Communication Plan is duplicated and given to all recipients of the Incident Objectives form, including the Incident Communications Center. Information from the plan is placed on Assignment Lists.

INCIDENT RADIO COMMUNICATIONS PLAN

1. INCIDENT NAME

2. DATE/TIME PREPARED

3. OPERATIONAL PERIOD DATE/TIME

4. BASIC RADIO CHANNEL UTILIZATION

SYSTEM/CACHE	CHANNEL	FUNCTION	FREQUENCY	ASSIGNMENT	REMARKS

205 ICS 9-86

5. PREPARED BY (COMMUNICATIONS UNIT)

Instructions for Completing the Incident Radio Communications Plan (ICS Form 205)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
1.	Incident Name	Print the name assigned to the incident.
2.	Date/Time Prepared	Enter date (month, day, year) and time prepared (24-hour clock).
3.	Operational Period Date/Time	Enter the date and time interval for which the Radio Communications Plan applies. Record the start time and end time and include date(s).
4.	Basic Radio Channel Utilization System/Cache	Enter the radio cache system(s) assigned and used on the incident (e.g., Boise Cache, FIREMARS, Region 5 Emergency Cache, etc.).
	Channel Number	Enter the radio channel numbers assigned.
	Function	Enter the function each channel number is assigned (i.e., command, support, division tactical, and ground-to-air).
	Frequency	Enter the radio frequency tone number assigned to each specified function (e.g., 153.400).
	Assignment	Enter the ICS organization assigned to each of the designated frequencies (e.g., Branch I, Division A).
	Remarks	This section should include narrative information regarding special situations.
5.	Prepared By	Enter the name of the Communications Unit Leader preparing the form.

MEDICAL PLAN (ICS FORM 206)

Purpose. The Medical Plan provides information on incident medical aid stations, transportation services, hospitals, and medical emergency procedures.

Preparation. The Medical Plan is prepared by the Medical Unit Leader and reviewed by the Safety Officer.

Distribution. The Medical Plan may be an attachment to the Incident Objectives, or information from the plan pertaining to incident medical aid stations and medical emergency procedures may be taken from the plan and placed on Assignment Lists.

MEDICAL PLAN	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED	4. OPERATIONAL PERIOD
	Kent	10-10-95	1320	1330-1340

5. INCIDENT MEDICAL AID STATIONS

MEDICAL AID STATIONS	LOCATION	PARAMEDICS	
		YES	NO
7th and AA Streets	7th and AA Streets	√	

6. TRANSPORTATION

A. AMBULANCE SERVICES

NAME	ADDRESS	PHONE	PARAMEDICS	
			YES	NO
Departmental			√	

B. INCIDENT AMBULANCES

NAME	LOCATION	PARAMEDICS	
		YES	NO

7. HOSPITALS

NAME	ADDRESS	TRAVEL TIME		PHONE	HELIPAD		BURN CENTER	
		AIR	GRND		YES	NO	YES	NO
Levine	MM and 17th Streets		10			√		√
Faith	S and 14th Streets	10	25		√		√	
Central City	31st and D Streets	10	15		√			√

8. MEDICAL EMERGENCY PROCEDURES

Track all patients.

206 ICS 8-78	9. PREPARED BY (MEDICAL UNIT LEADER)	10. REVIEWED BY (SAFETY OFFICER)
	Capt. Anderson	B/C Close

Instructions for Completing the Medical Plan (ICS Form 206)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
1.	Incident Name	Print the name assigned to the incident.
2.	Date Prepared	Enter date prepared (month, day, year).
3.	Time Prepared	Enter time prepared (24-hour clock).
4.	Operational Period Date/Time	Record the date and time of the operational period for which this plan is in effect.
5.	Incident Medical Aid Stations	Enter name and location of incident medical aid stations (e.g., Cajon Staging Area, Cajon Campground) and indicate with a √ if paramedics are located at the site.
6.	Transportation	
	A. Ambulance Services	List name and address of ambulance services (e.g., Shaeffer, 4358 Brown Parkway, Corona). Provide phone number and indicate if ambulance company has paramedics.
	B. Incident Ambulances	Name of organization providing ambulances and the incident location. Also indicate if paramedics are aboard.
7.	Hospitals	List hospitals which could serve this incident. Incident name, address, the travel time by air and ground from the incident to the hospital, phone number, and indicate with a √ if the hospital is a burn center and has a helipad.
8.	Medical Emergency Procedures	Note any special emergency instructions for use by incident personnel.
9.	Prepared By	Enter the name of the Medical Unit Leader preparing the form.
10.	Reviewed By	Obtain the name of the Safety Officer who must review the plan.

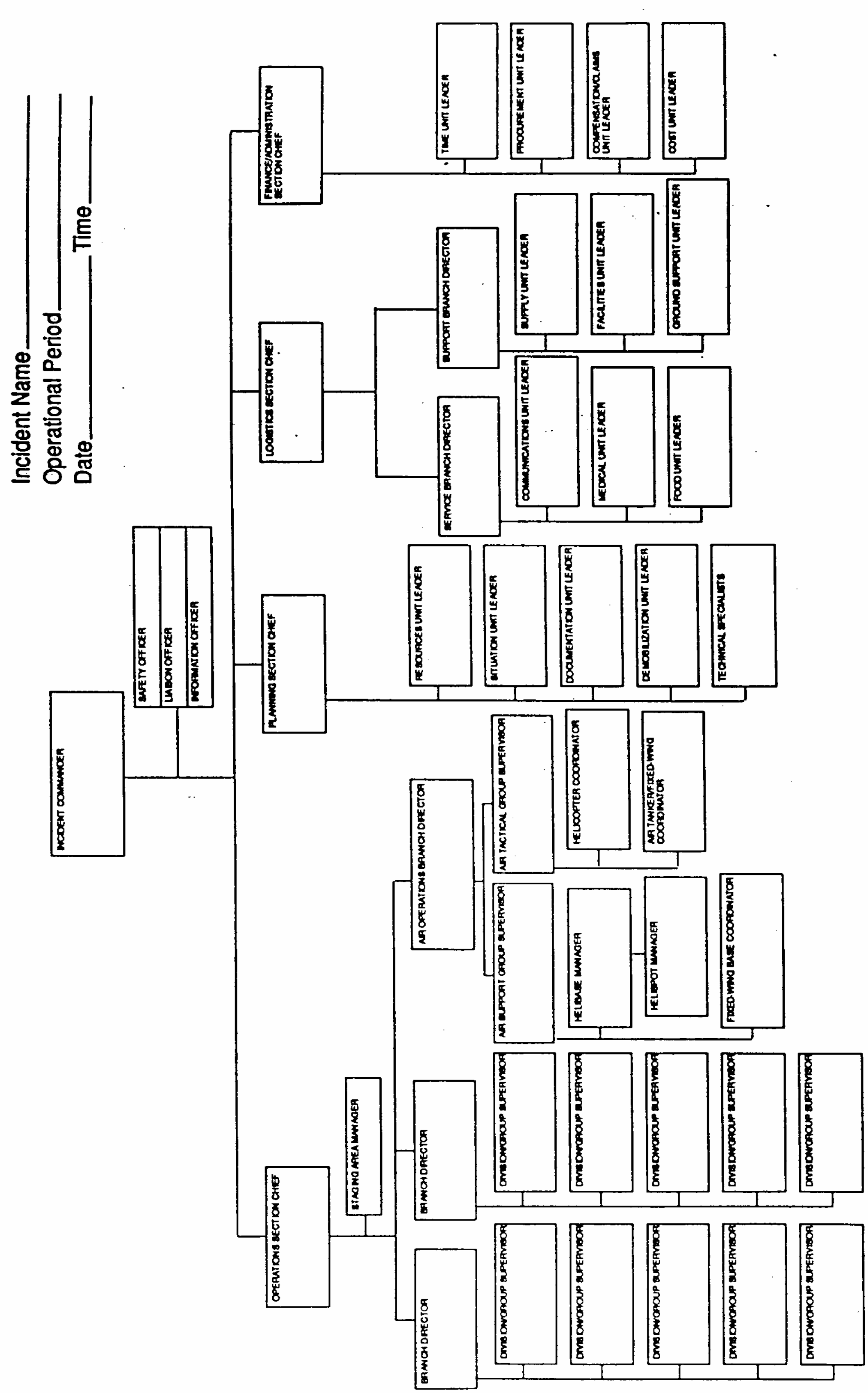
INCIDENT ORGANIZATION CHART (ICS FORM 207)

Purpose. The Incident Organization Chart is used to indicate what ICS organizational elements are currently activated and the names of personnel staffing each element. The attached chart is an example of the kind of Organizational Chart used in the ICS. Personnel responsible for managing organizational positions would be listed in each box as appropriate.

Preparation. The organization chart is prepared by the Resources Unit and posted along with other displays at the Incident Command Post. A chart is completed for each operational period and updated when organizational changes occur.

Distribution. When completed, the chart is posted on the display board located at the Incident Command Post.

Wall Size Chart. The ICS Form 207 WS is a large chart that is used primarily to post on the Command Post display board for better visibility.


Incident Name
Operational Period
Date
Time
INCIDENT COMMANDER
SAFETY OFFICER
LIAISON OFFICER
INFORMATION OFFICER
OPERATIONS SECTION CHIEF
PLANNING SECTION CHIEF
LOGISTICS SECTION CHIEF
FINANCE/ADMINISTRATION SECTION CHIEF
STAGING AREA MANAGER
BRANCH DIRECTOR
BRANCH DIRECTOR
AIR OPERATIONS BRANCH DIRECTOR
DIVISION/GROUP SUPERVISOR
AIR SUPPORT GROUP SUPERVISOR
HELIBASE MANAGER
HELISPOT MANAGER
FIXED-WING BASE COORDINATOR
AIR TACTICAL GROUP SUPERVISOR
HELICOPTER COORDINATOR
AIR TANKER/FIXED-WING COORDINATOR
RESOURCES UNIT LEADER
SITUATION UNIT LEADER
DOCUMENTATION UNIT LEADER
DEMOBILIZATION UNIT LEADER
TECHNICAL SPECIALISTS
SERVICE BRANCH DIRECTOR
COMMUNICATIONS UNIT LEADER
MEDICAL UNIT LEADER
FOOD UNIT LEADER
SUPPORT BRANCH DIRECTOR
SUPPLY UNIT LEADER
FACILITIES UNIT LEADER
GROUND SUPPORT UNIT LEADER
TIME UNIT LEADER
PROCUREMENT UNIT LEADER
COMPENSATION/CLAIMS UNIT LEADER
COST UNIT LEADER

INCIDENT STATUS SUMMARY (ICS FORM 209)

Purpose. The Incident Status Summary serves the following purposes:

1. It is used by Situation Unit personnel for posting information on Incident Command Post displays.

2. When duplicated and provided to Command Staff members, it provides them with basic information for use in planning for the next operational period.

3. It provides basic information to the Information Officer for preparation of media releases.

4. It provides incident information to agency dispatch and off-incident coordination centers.

Preparation. The Incident Status Summary is prepared by the Situation Unit. Resource information should be obtained from the Resources Unit. It is scheduled for presentation to the Planning Section Chief and other General Staff members prior to each Planning Meeting and may be required at more frequent intervals by the Incident Commander or Planning Section Chief.

Distribution. When completed, the form is duplicated and copies are distributed to the Incident Commander and staff, and all Section Chiefs, Planning Section Unit Leaders, and Agency Dispatch Centers. It is also posted on the display board located at the Incident Command Post.

Completion of the Incident Status Summary will be as specified by agency or municipality. Report by telephone, teletype, computer, or facsimile to the local agency or municipality headquarters by 2100 daily on incidents as required by agency or municipality (reports are normally required on life-threatening situations, real property threatened or destroyed, high resource damage potential, and complex incidents that could have political ramifications). Normally wildland agencies require a report on all Class D (100 acres plus) and larger incidents (unless primarily grass type in which case report Class E, 300 acres or larger). The first summary will cover the period from the start of the incident to 2100 the first day of the incident, if at least four hours have elapsed; thereafter the summary will cover the 24-hour period ending at 1900 (this reporting time will enable compilation of reporting data and submission of report to local agency or municipality headquarters by 2100) daily until incident is under control. Wildland fire agencies will send the summary to the National Interagency Fire Center by 2400 Mountain Time.

INCIDENT STATUS SUMMARY
(*See reverse for general instructions*.)

1. Date	Time	2.	3. Incident Name	4. Incident Number
10/10/95	1320	INITIAL ☐ UPDATE ☒ FINAL ☐	Kent (12)	0012687 (8)

5. Incident Commander	6. Jurisdictions	7. County	8. Type Incident	9. Location	10. Started
Gaines (12)	(5)	AA (14)	Structure Fire (20)	8th and Z Sts. (64)	Date 10/10/95 Time 1230 (6/4)

11. Cause	12. Area Involved	13. % Contained	14. Expected Containment	15. Ext. Control	16. Declared Controlled
Unknown (28)	1 Floor (28)	70% (4)	Date 10/10/95 Time 1400 (6/4)	Date Time (6/4)	Date Time (6/4)

17. Current Threat	18. Current Problems
Patients (66)	Removing patients (64)

19. Est. Loss	20. Est. Savings	21. Injuries	Deaths	22. Line Built	23. Line to Build
$20,000 (12)	$1 million (12)	30 (4)	2 (4)	(6)	(6)

24. Current Weather	25. Predicted Weather	26. Costs to Date	27. Est. Total Cost
WS 5 Temp 70 WD NW RH 40 (14)	WS 5 Temp 70 WD NW RH 40 (14)	(12)	(12)

28. AGENCIES

29. RESOURCES (4)

KIND OF RESOURCE	FD SR	FD ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	TOTALS
ENGINES	11																						
DOZERS																							
CREWS																							
HELICOPTERS																							
AIR TANKERS																							
LADDER COS	4																						
RESCUE	11																						
WATER TENDERS																							
OTHER (MED UNITS)	7																						
OVERHEAD PERSONNEL																							
TOTAL PERSONNEL																							

30. Cooperating Agencies

Coroner's office, hospitals, police

(52)

31. Remarks

(8 Lines/80)

32. Prepared By	33. Approved By	34. Sent To
McLaughlin (12)	McLaughlin (12)	IC Date 10/10/95 Time 1230 By MCM

9/86 ICS 209

GENERAL INSTRUCTIONS

Completion of the Incident Status Summary will be as specified by Agency or municipality. Report by telephone, teletype, computer, or facsimile to the local Agency or municipality headquarters by 2100 daily on incidents as required by Agency or municipality (reports are normally required on life-threatening situations, real property threatened or destroyed, high resource damage potential, and complex incidents that could have political ramifications). Normally wildland agencies require a report on all Class D (100 acres plus) and larger incidents (unless primarily grass type in which case report Class E, 300 acres or larger). The first summary will cover the period from the start of the incident to 2100 the first day of the incident, if at least four hours have elapsed; thereafter, the summary will cover the 24-hour period ending at 1900 (this reporting time will enable compilation of reporting data and submission of report to local Agency or municipality headquarters by 2100) daily until incident is under control. Wildland fire agencies will send the summary to the National Interagency Fire Center by 2400 Mountain Time.

1. Enter date and time report completed (mandatory).
2. Check appropriate space (mandatory-no computer entry).
3. Provide name given to incident by Incident Commander or Agency (mandatory).
4. Enter number assigned to incident by Agency (mandatory).
5. Enter first initial and last name of Incident Commander (optional).
6. Enter Agency or Municipality (mandatory).
7. Enter County where incident is occurring (optional).
8. Enter type incident, e.g., wildland fire (enter fuel type), structure fire, hazardous chemical spill, etc. (mandatory).
9. Enter legal description and general location. Use remarks for additional data if necessary (mandatory).
10. Enter date and Zulu time incident started (mandatory--maximum of 6 characters for date and 4 characters for time).
11. Enter specific cause or under investigation (mandatory).
12. Enter area involved, e.g., 50 acres, top 3 floors of building, etc. (mandatory).
13. Enter estimate of percent of containment (mandatory).
14. Enter estimate of date and time of total containment (mandatory).
15. Enter estimated date and time of control (mandatory).
16. Enter actual date and time fire was declared controlled (mandatory).
17. Report significant threat to structures, watershed, timber, wildlife habitat, or other valuable resources (mandatory).
18. Enter control problems, e.g., accessibility, fuels, rocky terrain, high winds, structures (mandatory).
19. Enter estimated dollar value of total damage to date. Include structures, watershed, timber, etc. Be specific in remarks (mandatory).
20. Enter estimate of values saved as result of all suppression efforts (optional).
21. Enter any serious injuries or deaths which have occurred since the last report. Be specific in remarks (mandatory).

22. Indicate the extent of line completed by chains or other units of measurement (optional).
23. Indicate line to be constructed by chains or other units of measurement (optional).
24. Indicate current weather conditions at the incident (mandatory).
25. Indicate predicted weather conditions for the next operational period (mandatory).
26. Provide total incident cost to date (optional).
27. Provide estimated total cost for entire incident (optional).
28. List agencies which have resources assigned to the incident (mandatory).
29. Enter resource information under appropriate Agency column by single resource or strike team (mandatory).
30. List by name those agencies which are providing support, e.g., Salvation Army, Red Cross, law enforcement, National Weather Service, etc. (mandatory).
31. The Remarks space can be used to (1) list additional resources not covered in Section 28/29; (2) provide more information on location; (3) enter additional information regarding threat control problems, anticipated release, or demobilization, etc. (mandatory).
32. This will normally be the Incident Situation Unit Leader (mandatory).
33. This will normally be the Incident Planning Section Chief (mandatory).
34. The ID of the Agency entering the report will be entered (optional--no computer entry).

For those areas using existing computer system refer to User's Manual.

Maximum number of characters allowed for each block are specified in parenthesis on front of form.

Instructions for Completing the Incident Status Summary (ICS Form 209)

ITEM NUMBER	INSTRUCTIONS
1.	Enter date and time report completed (mandatory).
2.	Check appropriate space (mandatory-no computer entry).
3.	Provide name given to incident by Incident Commander or Agency (mandatory).
4.	Enter number assigned to incident by Agency (mandatory).
5.	Enter first initial and last name of Incident Commander (optional).
6.	Enter Agency or Municipality (mandatory).
7.	Enter County where incident is occurring (optional).
8.	Enter type incident, e.g., wildland fire (enter fuel type), structure fire, hazardous chemical spill, etc. (mandatory).
9.	Enter legal description and general location. Use remarks for additional data if necessary (mandatory).
10.	Enter date and Zulu time incident started (mandatory--maximum of 6 characters for date and 4 characters for time).
11.	Enter specific cause or under investigation (mandatory).
12.	Enter area involved, e.g., 50 acres, top three floors of building, etc. (mandatory).
13.	Enter estimate of percent of containment (mandatory).
14.	Enter estimate of date and time of total containment (mandatory).
15.	Enter estimated date and time of control (mandatory).
16.	Enter actual date and time fire was declared controlled (mandatory).
17.	Report significant threat to structures, watershed, timber, wildlife habitat, or other valuable resources (mandatory).
18.	Enter control problems, e.g., accessibility, fuels, rocky terrain, high winds, structures (mandatory).
19.	Enter estimated dollar value of total damage to date. Include structures, watershed, timber, etc. Be specific in remarks (mandatory).
20.	Enter estimate of values saved as result of all suppression efforts (optional).

21.	Enter any serious injuries or deaths which have occurred since the last report. Be specific in remarks (mandatory).
22.	Indicate the extent of line completed by chains or other units of measurement (optional).
23.	Indicate line to be constructed by chains or other units of measurement (optional).
24.	Indicate current weather conditions at the incident (mandatory).
25.	Indicate predicted weather conditions for the next operational period (mandatory).
26.	Provide total incident cost to date (optional).
27.	Provide estimated total cost for entire incident (optional).
28.	List agencies which have resources assigned to the incident (mandatory).
29.	Enter resource information under appropriate Agency column by single resource or strike team (mandatory).
30.	List by name those agencies which are providing support, e.g., Salvation Army, Red Cross, law enforcement, National Weather Service, etc. (mandatory).
31.	The remarks space can be used to (1) list additional resources not covered in Section 28/29; (2) provide more information on location; (3) enter additional information regarding threat control problems, anticipated release, or demobilization, etc. (mandatory).
32.	This will normally be the Incident Situation Unit Leader (mandatory).
33.	This will normally be the Incident Planning Section Chief (mandatory).
34.	The ID of the Agency entering the report will be entered (optional-no computer entry).

STATUS CHANGE CARD (ICS FORM 210)

Purpose. The Status Change Card is used by the incident Communications Center Manager to record status change information received on resources assigned to the incident.

Preparation. The form is completed by radio/telephone operators who receive status change information from individual resources, Task Forces, Strike Teams, and Division/Group Supervisors. Status information could also be reported by Staging Area and Helibase Managers and fixed-wing facilities.

Distribution. The Status Change Card is a two-part form. The original copy is given to the Resources Unit, and the second (pink) copy is retained by the Communications Unit.

DESIGNATOR NAME/ID.NO.		
STATUS ☐ ASSIGNED ☐ AVAILABLE ☐ O/S REST ☐ O/S MECHANICAL ☐ O/S MANNING ETR (O/S=Out-of-Service)		
FROM	LOCATION	TO
	DIVISION/GROUP	
	STAGING AREA	
	BASE/ICP	
	CAMP	
	EN ROUTE	ETA
	HOME AGENCY	
MESSAGE		
TIME	RESOURCES PROCESS •	
ICS FORM 210 6/83	STATUS CHANGE CARD	
*U.S. GOVERNMENT PRINTING OFFICE: 1986-695-272		

Instructions for Completing the Status Change Card (ICS Form 210)

ITEM TITLE	INSTRUCTIONS
Designator Name/ID No.	Enter the appropriate designator for the kind of resource. The resource type codes are in ICS 020-1, Resource Listings.
Status	Determine the current status of the resource. If out-of-service status is checked, enter the time when the resource will return to service (ETR).
From/Location/To	Place a checkmark in the FROM column indicating the current location of the resource (where it came from). Also place a check in the TO column indicating the assigned location of the resource. When more than one Division, Staging Area, or Camp is used, identify the specific location (e.g., Division A, Redfern Staging Area, Camp Hood).
Message	Enter any special information provided by the resource or dispatch center such as individual designators of strike teams and task forces.
Time	Enter the time of the status change (24-hour clock).
Resources Process	This box is checked by Resources Unit personnel after the Unit has transferred the information to a Resource Status Card (ICS Form 219).

CHECK-IN LIST (ICS FORM 211)

Purpose. Personnel and equipment arriving at the incident can check in at various incident locations. Check-in consists of reporting specific information which is recorded on the Check-In List. The Check-in List serves several purposes:

1. Used for recording arrival times at the incident of all overhead personnel and equipment.

2. Used for recording the initial location of personnel and equipment and thus a subsequent assignment can be made.

3. Used to support demobilization by recording the home base, method of travel, etc., on all check-ins.

Preparation. The Check-in List is initiated at a number of incident locations, including

1. Staging areas, base camps, helibases, and ICP. Managers at these locations record the information and give it to the Resources Unit as soon as possible.

2. Incident Communications Center Manager located in the Communications Center records the information and also gives it to the Resources Unit as soon as possible.

3. Check-in at the ICP will be done by a recorder at the Resources Unit.

Distribution. Check-in Lists, which are completed by personnel at the various check-in locations, are provided to both the Resources Unit and the Finance Section. The Resources Unit maintains a master list of all equipment and personnel that have reported to the incident.

CHECK-IN LIST

1. INCIDENT NAME: KENT

2. CHECK-IN LOCATION: ☐ BASE ☐ CAMP ____ ☒ STAGING AREA ☐ ICP RESOURCES ☐ HELIBASE

3. DATE/TIME: 10/10/95 1330

CHECK-IN INFORMATION

4. LIST PERSONNEL (OVERHEAD) BY AGENCY & NAME OR LIST EQUIPMENT BY THE FOLLOWING FORMAT:

AGENCY	SINGLE T/F S/T	KIND	TYPE	I.D. NO./NAME	5. ORDER/ REQUEST NUMBER	6. DATE/TIME CHECK-IN	7. LEADER'S NAME	8. TOTAL NO. PERSONNEL	9. MANIFEST YES	NO	10. CREW WEIGHT OR INDIVIDUAL'S WEIGHT	11. HOME BASE	12. DEPARTURE POINT	13. METHOD OF TRAVEL	14. INCIDENT ASSIGNMENT	15. OTHER QUALIFICATION	16. SENT TO RESOURCES TIME/INT.
F	S	E		E4		1240	Rober	4		X					D2		
F	S	E		E5		1240	Dudo	4		X					D2		
F	S	E		E6		1241	Over	4		X					D2		
F	S	T		L2		1241	Louis	4		X					D2		
F	S	E		E7		1250	Green	4		X					D1		
F	S	E		E8		1251	Blue	4		X					EVAC		
F	S	E		E9		1250	Gray	4		X					EVAC		
F	S	E		E10		1251	Hazel	4		X					EVAC		
F	S	T		L3		1252	Ruby	4		X					EVAC		
F	S	T		L4		1253	Azure	4		X					EVAC		
F	S	E		E11		1325	George	4		X							

17. Page ___ of ________

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18. PREPARED BY (NAME AND POSITION) USE BACK FOR REMARKS OR COMMENTS

Instructions for Completing the Incident Radio Communications Plan (ICS Form 211)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
		Incident Dispatchers, upon receipt of a check-in message by radio, record the information on the Check-in List (ICS Form 211) and then give the information to the Resources Unit.
		Resources Unit Recorders, upon receipt of information on an in-person check-in, record the information directly onto the Check-in List form.
1.	Incident Name	Print the name assigned to the incident.
2.	Check-in Location	Place a checkmark in the appropriate box indicating where the resource or person checked in at the incident.
3.	Date/Time Prepared	Enter date (month, day, year) and time prepared (24-hour clock).
4.	List Personnel (Overhead) by Agency and Name	Use this section to list agency three-letter designator and individual names for all overhead (supervisory) personnel. When listing equipment, use three-letter designator, indicate if resource is a single resource, task force or strike team; enter kind of resource (letter for single resources, Number 1-3 for Strike Team); enter type of resource (1-4), and designated identification number.
5.	Order/Request Number	Order number will be assigned by Agency dispatching the resources or personnel to the incident.
6.	Date/Time Check-In	Self-explanatory.
7.	Leader's Name	Self-explanatory.
8.	Total Number Personnel	Enter total number of personnel in strike teams, task forces, or manning single resources. Include leaders.
9.	Manifest	Indicate if a manifest was prepared.
10.	Crew Weight or Individual's Weight	Self-explanatory.
11.	Home Base	Location at which the resource/individual is normally assigned. (May not be departure location.)
12.	Departure Point	Location from which resource/individual departed for this incident.

13.	Method of Travel	Means of travel to incident (bus, truck, engine, personal vehicle, etc.).
14.	Incident Assignment	Assignment at time of dispatch.
15.	Other Qualifications	List any other ICS position the individual has been trained to fill.
16.	Sent to	Enter initials and time that the information pertaining to that entry was sent to the Resources Unit.
17.	Page	Indicate page number and number of pages being used for Check-In at this location.
18.	Prepared by	Enter name of Check-In Recorder.

GENERAL MESSAGE (ICS FORM 213)

The General Message form in use within the ICS is a three-part form.

Purpose. The General Message form is used by:

1. Incident dispatchers to record incoming messages which cannot be orally transmitted to the intended recipients.

2. Command Post and other incident personnel to transmit messages to the Incident Communications Center for transmission via radio or telephone to the addressee.

3. Incident personnel to send any message or notification to incident personnel which requires hard-copy delivery.

Initiation of Form. The General Message form may be initiated by incident dispatchers for any other personnel on an incident.

Distribution. Upon completion, the General Message may be:

1. Hand carried to the addressee.

2. Hand carried to the incident Communications Center for transmission.

*U.S. GPO: 1009-783-875

GENERAL MESSAGE

TO:	POSITION
FROM	POSITION

SUBJECT	DATE	

MESSAGE:

DATE	TIME	SIGNATURE/POSITION

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PERSON RECEIVING GENERAL MESSAGE KEEP THIS COPY

SENDER REMOVE THIS COPY FOR YOUR FILES

Instructions for Completing the General Message (ICS Form 213)

ITEM TITLE	INSTRUCTIONS
To	Indicate Unit/Person the General Message is intended for. Be specific.
Office	Indicate the location where the Unit/Person is located, e.g., Ground Support Unit Leader, Simpson Camp, Communications, etc.
From	Indicate appropriate designation and location of sender.
Subject	Fill in if applicable.
Date	List the date and time.
Message	Briefly complete. Think through your message before writing it down. Try to be as concise as possible.
Reply	This section is intended to be used by the Unit/Person who receives the message to reply to your message.
Date	Record the date and time of reply.
Signature	Record the signature and title of person replying.
White Copy/Pink Copy	Both copies are sent by person who initiates the message.
Yellow Copy	Retained by the person who initiates the message.
Pink Copy	May be returned to the person who initiates the message.

UNIT LOG (ICS FORM 214)

Purpose. The Unit Log is used to record details of unit activity including strike team activity. The file of these logs provides a basic reference from which to extract information for inclusion in any after-action report.

Initiation of Log. A Unit Log is initiated and maintained by Command Staff members, Division/Group Supervisors, Air Operations Groups, Strike Team/Task Force Leaders, and Unit Leaders. Completed logs are forwarded to supervisors who provide copies to the Documentation Unit.

Distribution. The Documentation Unit maintains a file of all Unit Logs. It is necessary that one copy of each log be submitted to the Documentation Unit.

UNIT LOG	1. INCIDENT NAME KENT	2. DATE PREPARED 10-10-95	3. TIME PREPARED 1430

4. UNIT NAME/DESIGNATORS DIVISION 1	5. UNIT LEADER (NAME AND POSITION) CAPT. WOOD	6. OPERATIONAL PERIOD 1330-1430

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
CAPT. HUGH WOOD	DIVISION 1	

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
1330	Continued to extinguish and overhaul fire.
1350	Found one victim.
1355	Found second victim.
1355	Requested coroner to location.

Instructions for Completing the Unit Log (ICS Form 214)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
1.	Incident Name	Print the name assigned to the incident.
2.	Date Prepared	Enter date prepared (month, day, year).
3.	Time Prepared	Enter time prepared (24-hour clock).
4.	Unit Name	Enter the title of the organizational unit or resource designator (e.g., Facilities Unit, Safety Officer, Strike Team).
5.	Unit Leader	Enter the name of the individual in charge of the Unit.
6.	Operational Period	Enter the time span covered by the log (e.g., 1800 Oct. 12 to 0600 Oct. 13).
7.	Personnel Roster	List the name, position, and home base of each member assigned to the unit during the operational period.
8.	Activity Log	Enter the time and briefly describe each significant occurrence or event (e.g., task assignments, task completions, injuries, difficulties encountered, etc.).
9.	Prepared By	Enter the name and title of the person approving the log. Provide log to immediate supervisor at the end of each operational period.

OPERATIONAL PLANNING WORKSHEET (ICS FORM 215)

Purpose. The Operational Planning Worksheet is to communicate the decisions made during the Planning Meeting concerning resource assignments to the Resources Unit. The Worksheet is used by the Resources Unit to complete Assignment Lists and by the Logistics Section Chief for ordering resources for the incident.

Initiation of Form. The Operational Planning Worksheet is initiated by the Incident Commander and General Staff at each Planning Meeting. It is recommended that the format be drawn on the chalkboard, and when decisions are reached, the information is recorded on the Operational Planning Worksheet.

Distribution. When the division work assignments and accompanying resource allocations are agreed to, the form is distributed to the Resources Unit to assist in the preparation of the Assignment Lists. The Planning Section will use a copy of this worksheet for preparing requests for resources required for the next operational period.

OPERATIONAL PLANNING WORKSHEET	1. INCIDENT NAME	2. DATE PREPARED TIME PREPARED	3. OPERATIONAL PERIOD (DATE/TIME)

4. DIVISION OR OTHER LOCATION	5. WORK ASSIGNMENTS	6. RESOURCES BY TYPE (SHOW STRIKE TEAM AS ST)							7. REPORTING LOCATION	8. REQUESTED ARRIVAL TIME
		RESOURCE								
		TYPE								
		REQ								
		HAVE								
		NEED								
		REQ								
		HAVE								
		NEED								
		REQ								
		HAVE								
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		NEED								
		REQ								
		HAVE								
		NEED								
		REQ								
		HAVE								
		NEED								
215 ICS 9-66	9. TOTAL RESOURCES REQUIRED	SINGLE RESOURCES / STRIKE TEAMS							10. PREPARED BY (NAME AND POSITION)	
	TOTAL RESOURCES ON HAND									
	TOTAL RESOURCES NEEDED									

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Instructions for Completing the Operational Planning Worksheet (ICS Form 215)

ITEM NUMBER	ITEM TITLE	INSTRUCTIONS
1.	Incident Name	Print the name assigned to the incident.
2.	Date/Time Prepared	Enter date (month, day, year) and time prepared (24-hour clock).
3.	Operational Period	Enter the time interval for which the information applies. Record the start time and end time and date(s).
4.	Division or Other Location	Enter the Division letter or location of the work assignment for the resources.
5.	Work Assignments	Enter the specific work assignments given to each of the Divisions.
6.	Resource	Complete resource headings, both for kind and type appropriate for the incident. Enter, for the appropriate resources, the number of resources by type (engines, crew, etc.) required "REQ," and the number of resources available "HAVE" to perform the work assignment. Then record the number of resources needed "NEED" by subtracting the number in the "HAVE" row from the number in the "REQ" row.
7.	Reporting Location	Enter the specific location the "needed" resources are to report for the work assignment (staging area, location on the fire line, etc.).
8.	Requested Arrival Time	Enter time resources are requested to arrive at the reporting location.
9.	Total Resources Required, On Hand, Ordered	Enter the total number of resources by type (engines, crews, dozers, etc.) required, on hand, and ordered.
10.	Prepared By	Record the name and position of the person completing the form.

RADIO REQUIREMENTS WORKSHEET (ICS FORM 216)

Purpose. The Radio Requirements Worksheet is used to develop the total number of personal portable radios required for each Division/Group and Branch. It provides a listing of all units assigned to each Division, and thus depicts the total incident radio needs.

Initiation of Form. The worksheet is prepared by the Communications Unit for each operational period and can only be completed after specific resource assignments are made and designated on Assignment Lists. This worksheet need not be used if the Communications Unit Leader can easily obtain the information directly from Assignment Lists.

Distribution. The worksheet is for internal use by the Communications Unit and therefore there is no distribution of the form.

APPENDIX C

EXAMPLE INCIDENT ACTION PLAN

Incident Action Plan

Date / Time Prepared: *7/3/98 11:23:05 PM*

Operational Period (Date / Time): Day Operations 0700 - 1900 hrs. 7/4/98

Incident Name: **Bunnell Complex St.Johns/Flagler**

Incident Number: FL-FLS-80616

Approved by Incident Commander: TOM HUTCHISON

Contents:

ICS-202 Incident Objectives:	Yes	**Safety Plan:**	Yes
ICS-203 Organization Assignment List	Yes	**Weather Forcast:**	Yes
ICS-204 Division Assignment:	Yes	**Incident Map:**	Yes
ICS-205 Radio Communications Plan:	No	**Incident Base Map:**	Yes
ICS-206 Medical Plan:	Yes	**Transportation Plan / Map:**	No
ICS-220 Air Operations Plan:	Yes	**Other:**	

ICS-202 Incident Objectives

Incident Name	Incident Number	Date / Time Prepared:
Bunnell Complex St.Johns/Flagler	FL-FLS-80616	7/3/98 5:54:16 PM

Operational Period

Day Operations 0700 - 1900 hrs. 7/4/98

General Incident Objectives

1. THROUGH EFFECTIVE USE OF THE FIRE ORDERS, WATCHOUT SITUATIONS, EVACUATION AND GOOD COMMUNICATIONS, PROVIDE FOR PUBLIC AND FIRE FIGHTER SAFETY.
2. USING DIRECT AND INDIRECT FIRE CONTROL METHODS:
   - PROVIDE FOR STRUCTURE AND IMPROVEMENT PROTECTION.
   - KEEP FIRES;
     - NORTH OF HWY 40
     - WEST OF HWY 9 S
     - SOUTH OF HWY 207
     - EAST OF PUTMAN COUNTY LINE AND STATE ROAD 305 / 17

3. WITH PERSONAL CONTACTS AND PHONE CALLS, KEEP FLAGLER COUNTY AND ST. JOHN'S OFFICIALS UP TO DATE WITH THE INCIDENT STATUS.

Weather Forecast for Operational Period

SEE ATTACHED WEATHER FORCAST

General / Safety Message

DRINK THAT WATER AND PACE YOUR WORK! MAKE SURE YOU HAVE COMMUNICATIONS AND ALL OF YOU PERSONAL PROTECTION EQUIPMENT PRIOR TO BEGINNING YOU SHIFT. HAVE A SAFE DAY!

ICS-202 Incident Objectives:	☑	Safety Plan:	☑
ICS-203 Organization Assignment List	☑	Weather Forecast:	☑
ICS-204 Division Assignment:	☑	Incident Map:	☑
ICS-205 Radio Communications Plan:	☐	Incident Base Map:	☑
ICS-206 Medical Plan:	☑	Transportation Plan / Map:	☐
ICS-220 Air Operations Plan:	☑	Other	☐

Prepared by Plans Section Chief:	Approved by Incident Commander:
TONY SARZOTTI	TOM HUTCHISON

ICS-203 Organization Assignment List

1. Incident Name	Bunnell Complex St.Johns/Flagler
4. Ops. Period	Day Operations 0700 - 1900 hrs. 7/4/98
2. Date/Time Prepared:	7/4/98 7:09:30 PM

5. Incident Command and Staff

Incident Commander	TOM HUTCHISON
I.C. / Deputy	STEVE GAGE
I.C. / Deputy	
Safety Officer	RALPH TAYLOR (DEP.)MORRELAND GUETH
Information Officer	JACK HORNER
Liaison Officer	

Agency:	Rep Name:
DOF	A.C. MILLENDER

7. Planning Section

Planning Sect. Chief	TONY SARZOTTI
Deputy PS	DAN GOSNELL
Resource Unit	STEVE BEAR
Situation Unit	MIKE FERDIG
Documentation Unit	STEVE MOORE
Demobilization Unit	BECKY METCALF/DALE PUTMAN

Technical Specialist:

FBAN - LINDA ADAMS / CARL JOHNSON / DICK RATH

IMET - TERRY MARSHA / MIKE HUSTON

8. Logististic Section

Logistic Section Chief	A. KELLOGG
Deputy LSC	D. REYNOLDS
Support Branch Director	
Supply Unit	LEDA HUNTER
Facilities Unit	WALLY GROGAN
Ground Support Unit	DAN BROWN
Service Branch Director	
Communications Unit	BILL IFORD
Medical Unit	MIKE MANLOVE
Food Unit	DAVE HUBERT
Prepared by Res. Unit	STEVE BEAR

Operations Section

Ops Sect. Chief	GEORGE CORLEY / TERRY MOLZAH
Ops Chief / Deputy	
Branch / Director	I - DANA D'ANDREA
Division / Group	"A" GREG CHANDLER
Division / Group	"B" LARRY GLODOSKI
Branch / Director	I I - MIKE LaNIER
Division / Group	"C" ROBERT McCLLEM
Division / Group	"D" MIKE DUNN
Division / Group	"E" FRANK BRUNO
Division / Group	BR I I STRUCTURE GROUP
Branch / Director	I I I - JOE MOLHOEK
Division / Group	"F" RICHARD SORENSEN
Division / Group	"G" TIM BUTTON
Division / Group	"H" DAVE BLACK
Division / Group	BR I I I STRUCTURE GROUP
Branch / Director	I V - LARRY DARLING
Division / Group	"I" DENNIS SMITH
Division / Group	"J" TBA
Division / Group	"K" GRANT BEEBE
Division / Group	BR I V STRUCTURE GROUP
Division / Group	"L" PEARSON FIRE TBA
Division / Group	BUNNELL STAGING
Division / Group	

Air Operations Branch

Air Ops Branch Dir	BRUCE WICKS / DICK STILIHA
Air Attack Grp Supv	JACK BRINKERHOFF
Air Support Grp Supv	
Helicopter Coord.	
Air Tanker Coord.	

Finance Section

Finance Sect. Chief	KATHY REMLEY
Deputy FSC	
Time Unit	DIANE LACEY
Procurement Unit:	
Comp / Claim Unit	MARIE GLETNE
Cost Unit	LONNIE DUNNGIAN

FIRE WEATHER FORECAST

FORECAST NO. 09

NAME OF FIRE: Flagler/St Johns Incidnt PREDICTION FOR: Day SHIFT

UNIT: ______ SHIFT DATE: Saturday 07/04/98

TIME AND DATE FORECAST ISSUED: 2200 07/03/98 SIGNED: ______ Fire Weather Meteorologist

WEATHER DISCUSSION: A high pressure ridge remains centered over the Mississippi river valley while a weak upper level disturbance edges south toward northern Florida. High pressure at the surface building into the Gulf will help to weaken the lower level flow and promote seabreeze development. Look for scattered afternoon thunderstorms to develop along the seabreeze front as the weak upper disturbance shifts into the region.

WEATHER FORECAST

WEATHER: Haze and smoke during the morning. Becoming mostly cloudy in the afternoon with scattered thundershowers developing along the seabreeze front.

TEMPERATURES: Afternoon High 92-97 inland locations...88-93 coastal locations by 1400 EDT. Heat Index inland locations of 105 which is on the lower end of the Very Hot adjective rating scale. Sunstroke, heat cramps or heat exhaustion are likely with prolonged exposure and/or physical activity.

HUMIDITY: Early morning humidity near 85-95. Humidity falling to less than 60% inland locations by 1100 EDT...after 1200 EDT most coastal locations. Minimum RH of 38-43% inland locations by 1400 EDT...46-51% most coastal locations.

20 FT WINDS: Light west to northwest winds 3-8 mph in the morning. Seabreeze developing and moving inland 10-20 miles toward the ST John's river area between noon and 1400 EDT. East to northeast seabreeze 6-12 mph developing most coastal areas by 1200-1300 EDT. Seabreeze working inland past Hwy 1 by 1300-1400 EDT.

MIXING HEIGHT/TRANSPORT WINDS: Mixing height around 500' in the morning rising to 3000' MSL coastal regions and 20000 feet inland regions by afternoon. Transport winds north to 12 mph.

OUTLOOK FOR SUNDAY: A broad ridge of high pressure continues across the region with a surface high extending across southern Florida into the Gulf. This pattern will continue to promote seabreze development during the afternoon. A chance of afternoon thundershowers will continue along the seabreeze front. Little change in High temperatures with mid 90s coastal locations and mid to upper 90s inland locations. Min RH will see little change.

EXTENDED FORECAST: Little change expected as the upper level high continues to build across the southern states and remains the dominant weather feature. A chance of afternoon thunderstorms each afternoon as the seabreeze shifts inland. Continued hot and mostly dry through early next week.

FIRE WEATHER AND FIRE BEHAVIOR FORECAST

Name of Incident: Bunnell Complex
Prediction for Day shift: July 4, 1998
Time and date issued: 1800 July 3, 1998

Weather Summary:A high pressure ridge continues to build across the southern states while a weak upper level disturbance edges south along the east Florida coast. High pressure at the surface building across southern Southern Florida into the Gulf will help to enhance the local seabreeze.

Today's weather: Smokey during the morning. Partly cloudy in the afternoon with a slight chance of a thundershower developing along the seabreeze front.

Temperatures:Highs 93-98 by 1400-1500EDT

Relative Humidity: Early-80-85% Mid-morning-60% Lowest 38-42% by 1400.

20 ft Winds:Light west to northwest winds 3-8 mph in the morning. Seabreeze developing and moving inland 10-20 miles toward the St. John's river area between noon and 1400. East to northeast seabreeze 6-12 mph developing most coastal areas by 1200-1300. Seabreeze working inland past Hwy 1 by 1300-1400.

Outlook for Sunday: Smoke and Haze in the morning... becoming partly cloudy with widely scattered thunderstorms possible along the seabreeze front during the afternoon.

Mixing height/Transport winds: Approx. 500-1000 feet in am, rising to 5000-6000+ during the afternoon. Transport winds west to 12mph in the morning then east to 10mph in the afternoon.

Fire Behavior - General: All rainfall has now disappeared and Keetch-Byrum Index above 700. Backing and flanking fire moves at 75 - 200 feet per hour depending on winds. Head fire will generally move at 1000 - 3000 feet per hour in 3-5 mph winds and up to 4 miles per hour with 20 mph winds!!

Plantations: Plantations between 4' and 20' have the potential for crowning and spotting due to entire fuel bed being available. Plantations above 20' may occasionally torch but should not support crown fire.
Pocosin: 4-8 foot flame lengths on flanks. 15-25 with head runs, making head attack unwise.
Specific:If possible, "herd" fires into bays or drainages where headfires will die down.

Reburn Potential: In addition to the potential of initial fires, the reburn potential grows every day. Remaining hot spots will be "spoon fed" fuel from falling leaves and needles. This provides a path across control lines as well as providing enough fuel for hot surface fire.

BASIC ATTACK PRINCIPLES:During peak burning period (1300-1800), direct attack on head will not be possible. Flanks can quickly turn to heads with shifting winds. Stay alert and always assume a 180 degree shift in direction.

Dick Rath/Carl Johnson - Fire Behavior Analyst
Mike Huston- Fire Weather Meteorologist

1. BRANCH I	2. DIVISION/GROUP A	DIVISION ASSIGNMENT LIST ICS 204

3. INCIDENT NAME BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT	4. OPERATIONAL PERIOD DATE 07-04-98 TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF - **GEORGE CORLEY**
BRANCH DIRECTOR - **DANA D'ANDREA**
DIV/GROUP SUPERVISOR **GREG CHANDLER**
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
SIERRA # 13, 52, 32			3 TP III ENG
NEVADA #1 ST	T. DEFALCO		5 TP IV ENG
NC FOREST SERVICE #1 ST	F.HARRIS/R.TRIPP		2 TP II T/P
TOTAL			

7. CONTROL OPERATIONS

- **CONSTRUCT AND IMPROVE PLOWLINES. MOP-UP ALONG HWY 206.**

8. SPECIAL OPERATIONS

- **REPORTING POINT - DUPONT CENTER BY 0800**

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY (RESOURCE UNIT LEADER)	APPROVED BY (PLANNING SECTION CHIEF)	DATE 7/3/98	TIME

1. BRANCH I	2. DIVISION/GROUP B	DIVISION ASSIGNMENT LIST ICS 204

3. INCIDENT NAME BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT	4. OPERATIONAL PERIOD DATE 07-04-98 TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -GEORGE CORLEY
BRANCH DIRECTOR -DANA D'ANDREA

DIV/GROUP SUPERVISOR - LARRY GLODOWSKI
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
SOUTH CAROLINA #1 ST	B. SHARPE	16	5 TP IV BP
NC FD #1 TF	SCOTT LOOPER	17	6 TP VI BP 1W/T
GARNER 6/7 ST	CHARLES TUSS	5	2 TP II T/P
TOTAL		38	

7. CONTROL OPERATIONS

- CONSTRUCT AND IMPROVE PLOW LINES

8. SPECIAL OPERATIONS

- REPORTING LOCATION DUPONT CENTER BY 0800.

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: BASE CHANNEL 8
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/5/98	

1. BRANCH II	2. DIVISION/GROUP C	DIVISION ASSIGNMENT LIST ICS 204

3. INCIDENT NAME BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT	4. OPERATIONAL PERIOD DATE 07-04-98 TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -GEORGE CORLEY
BRANCH DIRECTOR -MIKE LANIER

DIV/GROUP SUPERVISOR ROBERT MCCELLUM
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
SEQUIOA 61, 31, 21, 44, 53	AVELALLEMANT	27	5 TP IV ENG
NC FOREST SERVICE #2 ST	T. HARISS	6	2 TP I1 T/P
NC FOREST SERVICE #3 ST	L. LAWRENCE	6	4 TP I1 T/P
TOTAL		39	

7. CONTROL OPERATIONS

- CONSTRUCT AND IMPROVE DOZER PLOW LINES WHERE NEEDED. MOP-UP 25'IN.

8. SPECIAL OPERATIONS

- REPORTING LOCATION HWY 204 AND OLD BRICK RD. BY 0800

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: BASE CHANNEL 8
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/3/98	

1. BRANCH **II**	2. DIVISION/GROUP **D**	**DIVISION ASSIGNMENT LIST ICS 204**

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**

4. OPERATIONAL PERIOD
DATE **07-04-98**
TIME **0700-1900**

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -**GEORGE CORLEY**
BRANCH DIRECTOR -**MIKE LANIER**
DIV/GROUP SUPERVISOR -
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
FT. STEWART ST	**STEVE RAKICH, STL**	**8**	**3 TP II T/P**
MARK TWAIN (NEEDS TRANSPORT)	"	**2**	**1 TP II T/P**
TOTAL			

7. CONTROL OPERATIONS

- **PROVIDE INITIAL ATTACK ON NEW FIRES. ST. JOHNS/FLAGLER INCIDENT WILL SUPPORT INITIAL ATTACK OPERATIONS WITH ADDITIONAL RESOURCES IF REQUESTED AND AVAILABLE.**

8. SPECIAL OPERATIONS

BUNNELL 46 OUT OF SERVICE --1600-6/23/98 - MAJOR REPAIR

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(signature) (RESOURCE UNIT LEADER)	(signature) (PLANNING SECTION CHIEF)	7/3/98	

1. BRANCH II	2. DIVISION/GROUP E	DIVISION ASSIGNMENT LIST ICS 204

3. INCIDENT NAME BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT

4. OPERATIONAL PERIOD
DATE 07-04-98
TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -GEORGE CORLEY
BRANCH DIRECTOR -MIKE LANIER

DIV/GROUP SUPERVISOR -FRANK BRUNO
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
CA ENG #1 ST	K. OPLIGER	27	5 TP IV ENG
TENN #112 & 113 ST	G. GRAHAM	4	2 TP II T/P
MISSISSIPPI #1	RICKEY HARWELL	12	6 TP III T/P
TOTAL		43	

7. CONTROL OPERATIONS

- CONSTRUCT AND IMPROVE DOZER/PLOWLINES

8. SPECIAL OPERATIONS

- REPORTING LOCATION AT OLD BRICK RD. ST DIVISION BREAK BY 0800.

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: BASE CHANNEL 8
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/4/98	

1. BRANCH **II**	2. DIVISION/GROUP **STRUCTURE GROUP**	**DIVISION ASSIGNMENT LIST ICS 204**

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**	4. OPERATIONAL PERIOD DATE **07-04-98** TIME **0700-1900**

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF **-GEORGE CORLEY**
BRANCH DIRECTOR **-MIKE LANIER**
DIV/GROUP SUPERVISOR **-GARY HART**
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
LAKELAND ST	**JASON WOODS**	5	**3 TP II BP**
TOTAL			

7. CONTROL OPERATIONS

- **PALM COAST PKWY AND HWY 1**

8. SPECIAL OPERATIONS

- **REPORTING LOCATION AT SCHOOL BY 0800.**

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/3/98	

1. BRANCH **III** | 2. DIVISION/GROUP **F** | **DIVISION ASSIGNMENT LIST ICS 204**

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**

4. OPERATIONAL PERIOD
DATE 07-04-98
TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -**GEORGE CORLEY**
BRANCH DIRECTOR -**JOE MOLHOEK**
DIV/GROUP SUPERVISOR -**R. SORENSON**
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
TALLAHASSE #1 ST	**WOODY POWEL**	5	**4 TP II T/P**
TOTAL		5	

7. CONTROL OPERATIONS

- **CONSTRUCT AND BURN OUT LINE BEHIND STRUCTURES.**

8. SPECIAL OPERATIONS

REPORTING LOCATION AT HIGHWAY 2 AND FIRE EDGE BY 0800.

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL** 8
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/5/98	

1. BRANCH III	2. DIVISION/GROUP G	DIVISION ASSIGNMENT LIST ICS 204

3. INCIDENT NAME BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT	4. OPERATIONAL PERIOD DATE 07-04-98 TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -GEORGE CORLEY
BRANCH DIRECTOR -JOE MOLHOEK
DIV/GROUP SUPERVISOR -TIM BUTTON
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
GARNER #9		2	1 TP II DOZERS
WISCONSIN	T. DORSHORST	2	1 TP 2 T/P
GARNER #5	JACK CHRISTIAN	1	1 DOZER TP 3
TOTAL			

7. CONTROL OPERATIONS

- LOCATE AND CONSTRUCT LINE

8. SPECIAL OPERATIONS

- REPORTING LOCATION AT HWY 11 AND FIRE EDGE BY 0800.

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: BASE CHANNEL 8
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/3/98	

1. BRANCH **III**	2. DIVISION/GROUP **STRUCTURE GROUP**	**DIVISION ASSIGNMENT LIST ICS 204**

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**	4. OPERATIONAL PERIOD DATE **07-04-98** TIME **0700-1900**

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -**GEORGE CORLEY**
BRANCH DIRECTOR -**JOEL MOLHOEK**

DIV/GROUP SUPERVISOR -TBA
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
TALLAHASSEE E825 &E880		3	**3 TP V BP**
TOTAL			

7. CONTROL OPERATIONS

- **PROTECT STRUCTURES**

8. SPECIAL OPERATIONS

- **REPORTING LOCATION AT BELLE TERRE AND HWY 100 BY 0800.**

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY	**APPROVED BY**	**DATE**	**TIME**
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/3/98	

1. BRANCH **IV**	2. DIVISION/GROUP **H**	**DIVISION ASSIGNMENT LIST ICS 204**

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**	4. OPERATIONAL PERIOD DATE 07-04-98 TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -**GEORGE CORLEY**
BRANCH DIRECTOR -**LARRY DARLING**

DIV/GROUP SUPERVISOR -**DAVE BLACK**
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
GARNER #8	**PAUL BRNA**	3	**1 TP II DOZER**
GARNER #10		2	**1 TP II DOZER**
GARNER #12		2	**1 TP II DOZER**
GARNER #14		2	**1 TP II DOZER**
TOTAL		9	

7. CONTROL OPERATIONS

- **CONSTRUCT AND BURN OUT LINE BEHIND STRUCTURES.**

8. SPECIAL OPERATIONS

- **REPORTING LOCATION AT HIGHWAY 17 AND FIRE EDGE RIDGE BY 0800.**

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY (RESOURCE UNIT LEADER)	APPROVED BY (PLANNING SECTION CHIEF)	DATE 7/3/98	TIME

1. BRANCH IV	2. DIVISION/GROUP I	DIVISION ASSIGNMENT LIST ICS 204

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**

4. OPERATIONAL PERIOD
DATE **07-04-98**
TIME **0700-1900**

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -**GEORGE CORLEY**
BRANCH DIRECTOR -**LARRY DARLING**

DIV/GROUP SUPERVISOR -**DENNIS SMITH**
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
GARNER #3 & #4	**JIM VALENTINE**	3	**2 TP II T/P**
GARNER #1 & #2	**JACK SPENSER**	3	**2 TP II T/P**
BUNNELL 173 & (850/D6)	**MCLOUD**	2	**2 TP 1 DOZER**
IDAHO #2 & #3	**LUCAS SANTIO**	10	**2 TP III ENG**
NC ENG #162	"	3	**1 TP III ENG**
NC ENG #56	"	3	**1 TP III ENG**
SAVANNAH RIVER #1	"	3	**1 TP III ENG**
WYOMING #3	"	3	**1 TP III ENG**
TOTAL		**30**	

7. CONTROL OPERATIONS

- **CONSTRUCT AND IMPROVE LINES 2-3 BLADE WIDTH OR 2 PLOW LINES WIDTH.**

8. SPECIAL OPERATIONS

- **REPORTING LOCATION AT HIGHWAY 40 AND HUNTERS RIDGE BY 0800.**

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
(RESOURCE UNIT LEADER)	(PLANNING SECTION CHIEF)	7/3/98	

1. BRANCH **IV**	2. DIVISION/GROUP **J**	**DIVISION ASSIGNMENT LIST ICS 204**

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**	4. OPERATIONAL PERIOD DATE **07-04-98** TIME **0700-1900**

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF **-GEORGE CORLEY**
BRANCH DIRECTOR **-LARRY DARLING**
DIV/GROUP SUPERVISOR **-GRANT BEEBEE**
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
NAT'L GUARD ST	**M. PHILLMAN**	7	**2 TP I DOZERS**
TOTAL		7	

7. CONTROL OPERATIONS

- **MOP-UP 25 FEET. SECURE AMD MOP UP ALL SPOTS 100%.**

8. SPECIAL OPERATIONS

- **REPORTING LOCATION AT HWY 11 AND SKINNER NURSERY BY 0800.**

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY (RESOURCE UNIT LEADER)	APPROVED BY (PLANNING SECTION CHIEF)	DATE 7/3/98	TIME

1. BRANCH **IV**	2. DIVISION/GROUP **K**	**DIVISION ASSIGNMENT LIST ICS 204**

3. INCIDENT NAME **BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT**	4. OPERATIONAL PERIOD DATE **07-04-98** TIME **0700-1900**

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF **-GEORGE CORLEY**
BRANCH DIRECTOR **-LARRY DARLING**

DIV/GROUP SUPERVISOR **-TBA**
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
VIRGINIA TF	**LARRY COCHER**	16	**4 TP II T/P, 2 TP VI BP**
GARNER #6 AND #11	**BILL SELBY**	3	**1 TP I DOZER, 1 TP II DOZER**
WYOMING #1 AND #2		6	**2 TP IV ENG**
MINN. BRUSH HOGS #1 & #2		4	**2 TP VII ENG**
TOTAL		29	

7. CONTROL OPERATIONS

- **MOP-UP 25 FEET. SECURE AMD MOP UP ALL SPOTS 100%.**

8. SPECIAL OPERATIONS

- **REPORTING LOCATION AT HWY 11 AND HWY 11 INTERSECTION BY 0800.**

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: **BASE CHANNEL 8**
TACTICAL CHANNEL 1

PREPARED BY	APPROVED BY	DATE	TIME
[signature] (RESOURCE UNIT LEADER)	[signature] (PLANNING SECTION CHIEF)	7/3/98	

1. BRANCH IV	2. DIVISION/GROUP L PIERSON FIRE	DIVISION ASSIGNMENT LIST ICS 204

3. INCIDENT NAME BUNNELL COMPLEX ST. JOHNS/FLAGLER INCIDENT	4. OPERATIONAL PERIOD DATE 07-04-98 TIME 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF -GEORGE CORLEY
BRANCH DIRECTOR -LARRY DARLING
DIV/GROUP SUPERVISOR -TBA
AIR ATTACK SUPERVISOR NO.

6. RESOURCES ASSIGNED THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	DESCRIPTION
IDAHO #1 ST	STEVE LOUCKS	27	5 TP IV ENG
GAARNER #15 AND #16	M. STEVENSON	5	2 TP III DOZER
GARNER #13	DALE SCHREMPP	2	1 TP I DOZER
KISATCHIE #1	"	2	1 TP I DOZER
TOTAL		29	

7. CONTROL OPERATIONS

- LINE AND SECURE 100% 2-3 BLADES WIDE 2 PLOW WIDTHS. MOP UP 50' IN.

8. SPECIAL OPERATIONS

- REPORTING LOCATION AT HWY 17 @ FIRE EGDE BY 0800.

9. DIVISION/GROUP COMMUNICATION SUMMARY

RADIO CHANNEL: BASE CHANNEL 8
TACTICAL CHANNEL 1

PREPARED BY (RESOURCE UNIT LEADER)	APPROVED BY (PLANNING SECTION CHIEF)	DATE	TIME
[signature]	[signature]	7/3/98	

1. INCIDENT NAME	2. OPERATIONAL PERIOD		3. DISTRIBUTION
St. Johns/Flagler	DATE 7/4/98	TIME 0600	DELAND FAX # — COPIES HELIBASE 12, TIME 0600; COPIES FIXED WING BASE 1, TIME 0600

4. PERSONNEL / COMMUNICATIONS	NAME	AIR / AIR FREQUENCY	AIR GROUND / COMMAND FREQUENCY	5. FIXED WING NO.	5. FIXED WING TYPE	6. ROTOR WING NO.	6. ROTOR WING TYPE	7. AVAILABLE / COMMENCE TIME	8. OPERATING BASE
AIR OPERATIONS DIRECTOR	Bruce Wicks		TBA						Flagler
AIR ATTACK SUPERVISOR	Jack Brinkerhoff	To be assigned	TBA	*		1	I	0900 / 0930	11
AIR ATTACK SUPERVISOR 58D	Ken McLaughlin	" " "	TBA			3*	II	0900 / 0930	11
AIR TANKER COORDINATOR			TBA	1.		3	III	0900 / 0930	11
AIR TANKER COORDINATOR									
HELICOPTER COORDINATOR									
AIR SUPPORT SUPERVISOR	Dick Stilha								
HELIBASE MANAGER	Kirby Cook								

9. LOCATION FUNCTION	10. PRIORITY BY ASSIGNMENTS
All [illegible]	Type I's & II's to [illegible] suppression & mop up efforts as requested by Ops or [illegible]
Fire Area	95W, & CE available [illegible] Operations use 1st recon only if Ops has the need. 79R Recons as needed, or bucket work in support of suppression effort.

11. REMARKS (SAFETY NOTES, HAZARDS, PRIORITIES)

* ALL Fixed wing request to go through DeLand Dispatch

1. A.I.D. machine w/Operator available upon request thru DeLand Dispatch. This [illegible] should be [illegible] of need.

2. With poor visibility be on look out for wires and towers [illegible] to Hazard map. If you find one we missed get it on the map

3. If you do not have contact with ground, Do not drop!

4. Use 103.00 on departure & [illegible] from Flagler Field.

12. AIR OPERATIONS SPECIAL EQUIPMENT	13. PREPARED BY	14. DATE	15. TIME
Crash Rescue Engine - Jacksonville F.D.	[illegible signature]	7/3/98	2130

ICS-206 Medical Plan

1. Incident Name	2. Date / Time Prepared:	3. Operational Period
Bunnell Complex St.Johns/Flagler	7/3/98 8:02:05 PM	Day Operations 0700 - 1900 hrs. 7/4/98

5. Incident Medical Aid Stations

Medical Aid Station	Station Location	Paramedics
ICP STAGING	BUNNELL FAIR GROUNDS	Paramedics: ☐
	CELL PHONE # 904-703-6342	Paramedics: ☐
	MEDICAL UNIT # 904-437-8263	Paramedics: ☐
		Paramedics: ☐
		Paramedics: ☐
		Paramedics: ☐
		Paramedics: ☐
		Paramedics:: ☐

6. Transportation

A. Ambulance Service

Ambulance Name	Ambulance Location	Ambulance Phone	Paramedics
ST. JOHNS CO. DEPT	ST. AUGUSTINE	CALL 911	Paramedics: ☑
	COUNTY DISPATCH	(904) 829-2226	Paramedics: ☐
FLAGLER COUNTY	BUNNELL	CALL 911	Paramedics: ☑
		(904) 437-7381	Paramedics: ☐
AIRPORT STAGING	BUNNELL AIRPORT	CALL 911	Paramedics: ☑
	(24 HRS)	(904)437-7462	Paramedics: ☐

B. Incident Ambulances

Incident Ambulance	Incident Ambulance Location	Paramedics
FLORIDA DISASTER MEDICAL ASST TEAM #	BUNNELL AIRPORT	Paramedics: ☑
		Paramedics: ☐
		Paramedics: ☐
		Paramedics: ☐
		Paramedics: ☐
		Paramedics: ☐

7. Hospitals

Hospital	Hospital Address	Travel Times: Air	Travel Times: Ground	Hospital Phone	Helipad	Burn Cntr
FLAGLER MEMORIAL HOSPITAL	RT.BOX2 BUNNELL			(904) 437-2211	Helipad ☑	Burn Cntr ☐
FLAGLER HOSPITAL	ST. AUGUSTINE			(904) 829-5155	Helipad ☑	Burn Cntr ☐
UNIVERSITY	JACKSONVILLE			(800) 223-4878	Helipad ☑	Burn Cntr ☐
SHANDS	GAINESVILLE			(800) 342-5365	Helipad ☑	Burn Cntr ☑
					Helipad ☐	Burn Cntr ☐
					Helipad ☐	Burn Cntr ☐

8. Medical Emergency Procedures

- **Report all imjuries to Safety Officer / Medical Unit. Get seriously injured people immediate medical care, others bring into ICP staging fairgrounds.**
- **Know who your line EMTs are. - Air Attack helicopter rescue TELL #800IDS**
- **Medical supplies can be received in morning. If we do not have it we will try to get it.**
- **Know location when calling 911. Then find out where pat. is being transported & pass it on.**
- **University Hospital Tram 1 Life-Flight Dispatch #1(800) 223-4878 LAT 29, 51.70 LONG: 81,15.**
- **Shands Burn Center Freq. 123.02 DISPATCH #1(800) 342-5365 LAT: 29,38.07 LONG: 82, 38.**

Prepared by Medical Unit Leader MIKE MANLOVE	Reviewed by SOFR RALPH TAYLOR

*LCES ANALYSIS OF TACTICAL APPLICATIONS / OTHER RISK ANALYSIS

Branch	Division/Group	HIGHWAY SMOKE	Underslung Fireline	Indirect Fireline	Mid-slope Fireline	Frontal Assault	Anchor Points	Extreme Conditions Spotting, wind driven	Unburned Area	Snags	HEAT STRESS	LCES Mitigations	Hazardous Materials	Transportation	Communications	Structure Protection	Multi-Aircraft	PPE	THUNDERSTORMS	Other Risk Mitigations
I	A	✓		✓		✓	✓	✓	✓	✓	✓	lights on			✓	✓	✓	✓	✓	NO COMMUNICATIONS = NO WORK
	B	✓		✓		✓	✓	✓	✓	✓	✓	Drive slow BURN OUT UNBURNED FUEL			✓	✓	✓	✓	✓	NO PPE = NO WORK IF THUNDERSTORMS MOVE TROOPS
	STR GRP											ADJACENT TO LINE. AVOID FRONTAL ATTACKS Know your Fire weather Forecasts. Burn out unburned								INTO VEHICLES UNTIL OVER.
II	C	✓		✓		✓	✓	✓	✓	✓	✓	Areas. Be aware of snags +falling green trees. Drink	✓		✓	✓	✓	✓	✓	
	D	✓		✓		✓	✓	✓	✓	✓	✓	lots of water, pace yourself,	✓		✓	✓	✓	✓	✓	
	E	✓		✓		✓	✓	✓	✓	✓	✓	take frequent breaks. Start work from strong anchor			✓	✓	✓	✓	✓	
	STR GRP											points. Be aware of critters.								
III	F	✓		✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	
	G	✓		✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	
	H STR GRP	✓		✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	
IV	I	✓		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	
	J	✓		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	
	K	✓		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	
	M	✓		✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	
	STR GRP																			

ICS 215A (11/93) NFES 2221

INCIDENT SAFETY ANALYSIS (*LCES)

*Lookouts, Communications, Escape routes, Safety zones (LCES)

1. Incident Name	2. Date Prepared	3. Operational Period (Date/Time)
Flagler/Bunnell Complex	7-3-98 Time Prepared 2000	7-4-98 0700 – 1900

R. TAYLOR 7/3/98

Bunnell Complex St.Johns/Flagler ICP