Fireline Handbook

March, 2004

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STANDARD FIREFIGHTING ORDERS

1. Keep informed on fire weather conditions and forecasts.
2. Know what your fire is doing at all times.
3. Base all actions on current and expected behavior of the fire.
4. Identify escape routes and safety zones, and make them known.
5. Post lookouts when there is possible danger.
6. Be alert. Keep calm. Think clearly. Act decisively.
7. Maintain prompt communications with your forces, your supervisor and adjoining forces.
8. Give clear instructions and insure they are understood.
9. Maintain control of your forces at all times.
10. Fight fire aggressively, having provided for safety first.

COMMON DENOMINATORS OF
FIRE BEHAVIOR ON TRAGEDY FIRES

There are four major common denominators of fire behavior on fatal and near-fatal fires. Such fires often occur:

1. On relatively small fires or deceptively quiet areas of large fires.
2. In relatively light fuels, such as grass, herbs, and light brush.
3. When there is an unexpected shift in wind direction or in wind speed.
4. When fire responds to topographic conditions and runs uphill.

NWCG
Fireline
Handbook

**A Publication of the
National Wildfire Coordinating Group**

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Prepared by
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CONTENTS

APPENDIX B: ORDER NFES #2165

FIRELINE HANDBOOK

**CHAPTER 1—
FIREFIGHTING SAFETY**

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

RISK MANAGEMENT

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

Remember To:

- Follow the Standard Firefighting Orders (inside front cover).

- Recognize the Watch Out Situations (inside back cover).

- Recognize the Common Denominators of Fire Behavior on Tragedy Fires (inside front cover).

- Follow the Risk Management Process.

The Risk Management Process

Step 1 - Situation Awareness

- Gather Information

    - ✓ Objective(s)
    - ✓ Previous Fire Behavior
    - ✓ Communication
    - ✓ Weather Forecast
    - ✓ Who's in Charge
    - ✓ Local Factors

- Scout the Fire

Step 2 - Hazard Assessment

- Eliminate Potential Fire Behavior Hazards.

  - ✓ Look Up, Down and Around Indicators (see page 7)

- Identify Tactical Hazards.

  - ✓ Watch-Outs (see page 8)

- What other safety hazards exist?

- Consider severity vs. probability.

Step 3 - Hazard Control

- Firefighting Orders → LCES Checklist – MANDATORY

  - ✓ Anchor Point

  - ✓ Downhill Checklist (if applicable; see page 17)

- What other controls are necessary?

Step 4 - Decision Point

- Are controls in place for identified hazards?

    NO – Reassess situation
    YES – Next question

- Are selected tactics based on expected fire behavior?

    NO – Reassess situation
    YES – Next question

- Have instructions been given and understood?

    NO – Reassess situation
    YES – Initiate action

Step 5 - Evaluate

- Self: Low experience level with local factors?
    - Distracted from primary tasks?
    - Fatigue or stress reaction?
    - Hazardous attitude?

- The Situation: What is changing?
    - Are strategy and tactics working?

Look Up, Down and Around Indicators

Fire Environment Factors	Indicators

Fuel Characteristics
Assess
	Continuous fine fuels
	Heavy loading of dead and down
	Ladder fuels
	Tight crown spacing (<20 ft.)
	Special Conditions:
	      Firebrand sources
	      Numerous snags
	      Preheated canopy
	      Frost and bug kill
	      Unusual fine fuels
	      High dead to live ratio

Fuel Moisture Feel and Measure	**Low RH (<25%)** Low 10 hr FMC (<6%) Drought conditions Seasonal drying
Fuel Temperature Feel and Measure	**High temps (>85F)** High % of fuels w/direct sun Aspect fuel temp. increasing
Terrain Scout	**Steep slopes (>50%)** **Chutes – Chimneys** Box canyons Saddles Narrow canyons
Wind Observe	**Surface winds above 10 mph** Lenticular clouds High, fast-moving clouds Approaching cold fronts Cumulonimbus development Sudden calm Battling or shifting winds
Stability Observe	Good visibility Gusty winds and dust devils Cumulus clouds Castellatus clouds in the a.m. Smoke rises straight up Inversion beginning to lift Thermal belt
Fire Behavior Watch	Leaning column Sheared column **Well-developed column** **Changing Column** Trees **torching** Smoldering fires picking up Small firewhirls beginning Frequent spot fires

Tactical Watch-Outs

Position

- Building fireline downhill.

- Building underslung or mid-slope fireline.

- Building indirect fireline or unburned fuel remains between you and the fire.

- Attempting frontal assault on the fire, or you are delivered by air to the top of the fire.

- Terrain and/or fuels make escape to safety zones difficult.

Situation

- Small fire transitioning to a larger fire or an isolated area of a large fire.

- Suppression resources are fatigued or inadequate.

- Assignment depends on aircraft support.

- Nighttime operations.

- Wildland-Urban interface operations.

EACH OF THESE WATCH-OUTS REQUIRES THAT YOU IMPLEMENT APPROPRIATE HAZARD CONTROL(S).

The safety hazards that exist in a typical protection of structures from wildland fire assignments are significant. In addition to applying **THE STANDARD FIREFIGHTING ORDERS** and avoiding **THE WATCH OUT 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.

Wildland-Urban Watch-Outs

- Poor access and narrow one-way roads

- Bridge load limits

- Wooden construction and wood shake roofs

- Power lines, propane tanks, and HazMat threats

- Inadequate water supply

- Natural fuels 30 feet or closer to structures

- Structures in chimneys, box canyons, narrow canyons, or on steep slopes (30% or greater)

- Extreme fire behavior

- Strong winds

- Evacuation of public (panic)

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.

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 AND WORK AS A TEAM WITH OTHERS**. 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 of 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, and

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 location

- 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

- Avoid uphill escape routes

- Scouted: Loose soils/rocks/vegetation

- Timed: Slowest person/fatigue and temperature factors

- Marked: Flagged for day or night (NFES 0566)

- Evaluate: Escape time vs. rate of spread

- Vehicles parked for escape

Safety Zones

- Survivable without a fire shelter

- Back into clean burn

- Natural Features: Rock areas/water/meadows

- Constructed Sites: Clearcuts/roads/helispots

- Scouted for size and hazards

- Upslope? = more heat impact = larger safety zone

- Downwind? = more heat impact = larger safety zone

- Heavy fuels? = more heat impact = larger safety zone

Escape time and safety zone size requirements will change as fire behavior changes.

Escape Routes and Safety Zones

An **Escape Route** is "a preplanned and understood route firefighters take to move to a Safety Zone or other low-risk area."

A **Safety Zone** is "a preplanned area of sufficient size and suitable location that is expected to protect fire personnel from known hazards without using fire shelters."

Identification of Escape Routes and Safety Zones is one of the primary responsibilities of any wildland firefighter working on or near the fireline. The following guidelines can be used when selecting Safety Zones:

- Calculations indicate that for most fires, Safety Zones must be wider than 164 feet to ensure firefighter survival.

- The calculation to determine Safety Zone radius is four times the maximum flame height plus 50 square feet per firefighter, or an additional four feet of radius per firefighter. This calculation provides the radius of the Safety Zone, meaning the Safety Zone diameter should be twice the value of the above formula.

- If potential for the fire to burn completely around the Safety Zone exists, the diameter should be twice the values indicated above.

- Factors that will reduce Safety Zone size include reduction in flame height by thinning or burnout operations, shielding the Safety Zone from direct exposure to the flame by locating it on the lee side of ridges or other geographic structures, or reducing flame temperatures by applying fire retardant to the area around the Safety Zone.

- All firefighter PPE must be worn.

- Keep in mind that these guidelines do not address convective energy.

Safety Zone Guidelines

- Avoid locations that are downwind from the fire.

- Avoid locations that are in chimneys, saddles, or narrow canyons.

- Avoid locations that require a steep uphill escape route.

- Take advantage of heat barriers such as lee side of ridges, large rocks, or solid structures.

- Burn out safety zones prior to flame front approach.

- For radiant heat only, the distance separation between the firefighter and the flames must be at least 4 times the maximum flame height. This distance must be maintained on all sides, if the fire has ability to burn completely around the safety zone. **Convective heat from wind and/or terrain influences will increase this distance requirement. The calculations in the following table assume no slope and no wind.**

Flame Height	Distance Separation (firefighters to flame)	Area in Acres
10 ft.	40 ft.	1/10 acre
20 ft.	80 ft.	1/2 acre
50 ft.	200 ft.	3 acres
75 ft.	300 ft.	7 acres
100 ft	400 ft.	12 acres
200 ft.	800 ft.	50 acres

Distance Separation is the radius from the center of the safety zone to the nearest fuels. When fuels are present that will allow the fire to burn on all sides of the safety zone this distance must be doubled in order to maintain effective separation in front, to the sides, and behind the firefighters.

Area in Acres is calculated to allow for distance separation on all sides for a three person engine crew. One acre is approximately the size of a football field or exactly 208 feet x 208 feet.

Last Resort Survival

Look at your options and immediately act on the best one!

Utilize all Personal Protective Equipment!

Protect your airway!

Escape if you can:
- Drop any gear not needed for fire shelter deployment (keep your fire shelter, hand tool, quart of water, and radio).

- You may be able to use the fire shelter for a heat shield as you move.

- In LIGHT FUELS, you may be able to move back through the flames into the black.

- If you are on the flank of the fire, try to get below the fire.

- Consider vehicles or helicopters for escape.

Find a survivable area:
- Stay out of hazardous terrain features.

- Use bodies of water that are more than 2 feet deep.

- In LIGHT FUELS, you may be able to light an escape fire.

- In other fuels, you may be able to light a backfire.

- Call for helicopter or retardant drops.

- Cut and scatter fuels if there is time.

- Use any available heat barriers (structure, large rocks, dozer berms).

- Consider vehicle traffic hazards on roads.

Pick a fire shelter deployment site:
- Find the lowest point available.

- Maximize distance from nearest aerial fuels or heavy fuels.

- Pick a surface that allows the fire shelter to seal and remove ground fuels.

- Get into the fire shelter before the flame front hits.

- Position your feet toward the fire and hold down the fire shelter.

- Keep your face pressed to the ground.

- Deploy next to each other and keep talking.

Expect:
- Extremely heavy ember showers.

- Superheated air blast to hit before the flame front hits.

- Noise and turbulent powerful winds hitting the fire shelter.

- Pin holes in the fire shelter that allow fire glow inside.

- Heat inside the shelter = Extreme heat outside.

- Deployments have lasted up to 90 minutes.

- When in doubt wait it out.

Downhill Checklist

Downhill fireline construction is hazardous in steep terrain, fast-burning fuels, or rapidly changing weather. Downhill fireline construction should not be attempted unless there is no tactical alternative. When building downhill fireline, the following is required:

- Crew supervisor(s) and fireline overhead will discuss assignments prior to committing crew(s). Responsible overhead individual will stay with job until completed (TFLD or ICT4 qualified or higher).

- Decision will be made after proposed fireline has been scouted by supervisor(s) of involved crew(s).

- LCES will be coordinated for all personnel involved.

    - ✓ Crew supervisor(s) is in direct contact with lookout that can see the fire.

    - ✓ Communication is established between all crews.

    - ✓ Rapid access to safety zone(s) in case fire crosses below crew(s).

- Direct attack will be used whenever possible; if not possible, the fireline should be completed between anchor points before being fired out.

- Fireline will not lie in or adjacent to a chute or chimney.

- Starting point will be anchored for crew(s) building fireline down from the top.

- Bottom of the fire will be monitored; if the potential exists for the fire to spread, action will be taken to secure the fire edge.

Common Denominators of Fire Behavior on Tragedy Fires

- Incidents happen on smaller fires or on isolated portions of larger fires.

- Fires look innocent before "flare-ups" or "blow-ups." In some cases, tragedies may occur in the mop-up stage.

- Flare-ups generally occur in deceptively light fuels.

- Fires run uphill surprisingly fast in chimneys, gullies, and on steep slopes.

- Wind direction or wind speed unexpectedly shifts.

Thunderstorm Safety

Approaching thunderstorms may be noted by a sudden reverse in wind direction, a noticeable rise in wind speed, and a sharp drop in temperature. Rain, hail, and lightning occur only in the mature stage of a thunderstorm.

Observe the 30/30 rule: a) If you see lightning and hear thunderclaps within 30 seconds take storm counter-measures identified below. b) Do not resume work in exposed areas until 30 minutes after storm activity has passed.

- Take shelter in a vehicle or building if possible.

- If outdoors, find a low spot away from tall trees, wire fences, utility lines, and other elevated conductive objects. Make sure the place you pick is not subject to flooding.

- If in the woods, move to an area with shorter trees.

- If only isolated trees are nearby, keep your distance twice the tree height.

- If in open country, crouch low minimizing contact with the ground. You can use a pack to sit on, but never lay on the ground.

- If you feel your skin tingle or your hair stand on end, immediately crouch low to the ground. Make yourself the smallest possible target and minimize your contact with the ground.

- Don't group together.

- Don't stay on ridgetops, in wide open areas, near ledges or rock outcroppings.

- Don't operate land line telephones, machinery, or electric motors.

- Don't handle flammable materials in open containers or metal hand tools.

- Handheld radios and cellular telephones can be used.

Clothing and Personal Protective Equipment (PPE)

- All PPE must meet or exceed NFPA 1977 Standard on Protective Clothing and Equipment for Firefighters (current edition).

- Wear hard hat while on the fireline.

- Wear 8-inch laced all-leather boots with slip- and melt-resistant soles and heels.

- 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 and face protection whenever there is a danger from material being thrown back in your face.

- Determine and comply with host agency requirements regarding fire shelters on fireline suppression assignments or follow your own agency's requirements if they are more restrictive. The fire shelter is a tool of last resort, not to be used tactically.

- Use hearing protection when working with high noise-level firefighting equipment, such as helicopters, air tankers, chain saws, pumps, etc.

- When operating chain saws, sawyers and swampers will wear additional safety equipment including approved chaps, gloves, hard hat, eye and ear protection.

- Recommend use of an approved dust/smoke mask when in heavy smoke and dusty environments. Use of a dust/smoke mask is not a PPE requirement for all agencies at this time.

- Face and neck protection (Nomex shrouds) are not required PPE. If used, they must meet NFPA 1977. If issued, shrouds should be deployed only in impending flash fuel or high radiant heat situations and not routinely worn throughout the operational period, due to an unacceptable increase in physiological heat stress.

- PPE clothing will be cleaned or replaced whenever soiled, particularly with oils. PPE will be replaced when the fabric is so worn as to reduce fire resistance capability of the garment.

How to Properly Refuse Risk

Every individual has the right and obligation to report safety problems and contribute ideas regarding their safety. Supervisors are expected to give these concerns and ideas serious consideration. When an individual feels an assignment is unsafe they also have the obligation to identify, to the degree possible, safe alternatives for completing that assignment. Turning down an assignment is one possible outcome of managing risk.

A "turn down" is a situation where an individual has determined they cannot undertake an assignment as given **and** they are unable to negotiate an alternative solution. The turn down of an assignment must be based on an assessment of risks and the ability of the individual or organization to control those risks.

- Individuals may turn down an assignment as unsafe when:

  - ✓ There is a violation of safe work practices.

  - ✓ Environmental conditions make the work unsafe.

  - ✓ They lack the necessary qualifications or experience.

  - ✓ Defective equipment is being used.

- Individual will directly inform their supervisor that they are turning down the assignment as given. The most appropriate means to document the turn down is using the criteria (Standard Firefighting Orders, 18 Watch Out Situations, etc.), outlined in the Risk Management Process.

- Supervisor will notify the Safety Officer **IMMEDIATELY** upon being informed of the turn down. If there is no Safety Officer, notification shall go to the appropriate Section Chief or to the Incident Commander. This provides accountability for decisions and initiates communication of safety concerns within the incident organization.

- ✓ If the supervisor asks another resource to perform the assignment, they are responsible to inform the new resource that the assignment has been turned down and the reasons that it was turned down.

- ✓ If an unresolved safety hazard exists or an unsafe act was committed, the individual should also document the turn down by submitting a SAFENET (ground hazard) or SAFECOM (aviation hazard) form in a timely manner.

These actions do not stop an operation from being carried out. This protocol is integral to the effective management of risk, as it provides timely identification of hazards to the chain of command, raises risk awareness for both leaders and subordinates, and promotes accountability.

After Action Review

What was planned?

- Review the primary objectives and expected action plan.

What actually happened?

- Review the day's actions:

  - ✓ Identify and discuss effective and non-effective performance.

  - ✓ Identify barriers that were encountered and how they were handled.

- ✓ Discuss all actions that were not standard operating procedure, or those that presented safety problems.

Why did it happen?

- Discuss the reasons for ineffective or unsafe performance. Concentrate on **WHAT**, not **WHO**, is right.

What can we do next time?

- Determine lessons learned and how to apply them in the future.

FIREFIGHTER HEALTH

Fatigue – Work and Rest

- Establish record-keeping systems that track crew work time.

- Plan and strive to provide one hour of sleep or rest for every two hours worked.

- When deviating from work/rest guidelines, the agency administrator or incident commander (IC) must approve in writing.

- Start each operational period with rested crews.

- Provide an adequate sleep environment.

- Monitor individuals for sleep deprivation.

The pulse is a good way to gauge fatigue. The pulse should recover in one minute or less to 110 beats per minute, or, if not, a longer break is needed. A firefighter's wake-up pulse can signal potential problems. If it is 10% or more above normal, it can mean fatigue, dehydration, or even a pending illness.

Food and Nutrition

Nutritious food can be a morale booster, but more importantly, it fuels muscles for hard work and internal organs for health and fitness. A firefighter may burn 5,000 to 6,000 calories a day. These calories must be replaced to avoid cramping, fatigue, and impaired judgment. Government-provided food must be low in fats and high in complex carbohydrates.

Drinks provided must replace essential fluids lost from the body during exercise. On a normal fireline assignment, firefighters may replace 12 or more quarts of fluids a day. In some cases, firefighters may need to replace one to two quarts of fluids per hour. Water is an excellent way to replenish fluid loss. Natural juices and sport drinks contain energy-restoring glucose. Avoid caffeinated, carbonated, and "diet" drinks.

Firefighter Rehabilitation

Areas designed for resting, eating, 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.

Driving Limitations

Drivers operating vehicles that require a Commercial Drivers License (CDL) are regulated by the Federal Motor Carriers Safety Regulations Part 393.3 and any applicable State Laws.

All governmental fire agencies are exempted from several requirements of CDL regulation under Department of Transportation 49 CFR but are subject to the NWCG National Incident Operations Driving Standards.

These standards address driving by personnel actively engaged in wildland fire or all risk response activities, including driving while assigned to a specific incident or during initial attack fire response (includes time required to control the fire and travel to a rest location). In the absence of more restrictive agency policy, these guidelines will be followed during mobilization and demobilization as well. Individual agency driving policies shall be consulted for all other non-incident driving.

1. Agency resources assigned to an incident or engaged in initial attack fire response will adhere to the current agency work/rest policy for determining length of duty day.

2. No driver will drive more than 10 hours (behind the wheel) within any duty day.

3. Multiple drivers in a single vehicle may drive up to the duty-day limitation provided no driver exceeds the individual driving (behind the wheel) time limitation of 10 hours.

4. Drivers shall drive only if they have had at least 8 hours off duty before beginning a shift.

   Exception to the minimum off-duty hour requirement is allowed when essential to:

   a. Accomplish immediate and critical suppression objectives, or

   b. Address immediate and critical firefighter or public safety issues.

5. Documentation of mitigation measures used to reduce fatigue is required for drivers who exceed 16-hour work shifts. This is required regardless of whether the driver was still compliant with the 10-hour individual (behind the wheel) driving limitations.

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.

First Aid Guidelines

Legality:

- Do only what you know how to do and keep records of actions.

Bloodborne Pathogens:

- Personal protective equipment (pocket mask, latex gloves and goggles) should be worn if contact with body fluids is possible.

Treatment Principles:

- Think: prevent further injury; remove from danger. No liquids for the unconscious.

- Fast Exam: airway, breathing and circulation.

- Thorough Exam: head to toe and side to side (symmetry).

- Keep readable records and send a copy with the patient when transporting or evacuating.

Specific Treatments:

- Bleeding: Direct pressure, elevate, and pressure point.

- Shock: Lay patient down, elevate feet, keep warm and replace fluids if conscious.

- Fractures: Splint joints above and below injury and monitor pulse beyond the injury away from the trunk of the body.

- Bee Sting (anaphylaxis): Life-threatening; see if the patient has a sting kit and transport immediately.

- Burns: Remove heat source, cool with water, dry wrap, and replace fluids.

- Diarrhea: Drink fluids in large quantities.

- Eye Injuries: Wash out foreign material, don't open swollen eyes, leave impaled objects, and pad and bandage both eyes.

- Heat Exhaustion: Skin is gray, cool, and clammy. Rest in cool place and replace electrolytes.

- Heat Stroke: Skin is dry, red, and temperature hot. Cool and transport immediately.

CPR

Determine responsiveness – Gently shake shoulder and shout: "Are you OK?" If no response, call EMS. If alone, call EMS before starting **ABCs**.

Airway: Roll victim on back as a unit supporting head and neck. Open airway by head-tilt/chin-lift maneuver. Look, listen, and feel for breathing for 3 to 5 seconds. If no response, go to **B.**

Breathing: Pinch victim's nose shut. Put mouth over victim's making a tight seal. Give 2 slow breaths. If chest does not rise, reposition and try again. If breaths still do not go through, use abdominal thrusts to clear airway. If chest does rise, go to **C**.

Circulation: Check carotid pulse for 5 to 10 seconds. If there is a pulse but no breathing, give 1 breath every 5 seconds until victim is breathing or help arrives. If no pulse, begin chest compressions.

One/Two Rescuer CPR – Perform 15 external chest compressions at the rate of 80 to 100 times per minutes to a 1.5 to 2″ depth. Reopen airway and give 2 full breaths. After 4 cycles of 15:2 (about 1 minute), check pulse. If no pulse, continue 15:2 cycle beginning with chest compression until advanced life support is available. If two rescuers are available, use 5:1 compressions to breaths ratio. Use a 5:1 ration for children and infants with compressions at a rate of 100 times per minutes. Use a 1 to 1.5″ depth for children and a .5″ to 1″ depth for infants.

Carbon Monoxide Poisoning

Carbon monoxide (CO) is an odorless, tasteless, invisible gas by-product emitted from combustion of forest and range fuels, internal combustion engines, and a variety of other sources. In a wildfire, heavy concentrations of CO can co-exist with smoke. The body at a rapid rate absorbs CO 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 chain saw 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, cardiorespiratory 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 that minimize worker exposure to smoke concentrations (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 that concentrate smoke (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 next work assignment.

Hypothermia

Hypothermia can be life threatening! Signals include lower than normal body temperature, shivering, slurred speech, apathy, disorientation, drowsiness, and unconsciousness.

- Move victim into warm or sheltered area immediately.

- Check pulse and breathing.

- Get victim out of wet clothes and replace with dry clothes, sleeping bag, or blankets.

- Have victim drink a warm, nonalcoholic beverage if conscious.

Heat Stress

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**.

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 surviving a serious burn.

- Remove person from heat source, extinguish with water.

- Provide basic first aid:

  - ✓ Maintain airway, breathing, and circulation (ABCs).

  - ✓ Treat for shock by keeping person warm and feet elevated.

  - ✓ Provide oxygen, if available and trained.

- Assess degree of burn and area affected:

  - ✓ 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.

- Treatment of burn:

  ✓ Cut away only burned clothing. **DO NOT** remove clothing stuck to burned skin.

  ✓ Apply cool clean water over burned area to stop the burning process. **DO NOT** soak person or use cold water and ice packs as this will encourage hypothermia to set in. (See page 33 for hypothermia.)

Burn Notification Procedures

- Notify your immediate supervisor, providing the following information:

  ✓ Number of injured. **DO NOT** give out names over radio.

  ✓ Degree and severity of burn injury (2nd and 3rd degree over 30% of upper body).

  ✓ Location of injured.

- Cover burned area with sterile dressing, moisten with normal saline solution and apply another dry dressing on top.

- If person is burned severely or over a large area:

  ✓ 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).

Rule of Nine

"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%
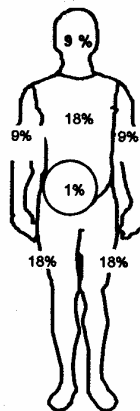
Injury/Fatality Procedures

Serious Injury

- Give first aid - call for medical aid and transportation if needed.

- Do not release victim's name except to authorities.

- **NEVER BROADCAST VICTIM'S NAME ON THE RADIO**.

- Do not allow unauthorized picture taking or release of pictures.

- Notify Incident Commander, who will:

    ✓ 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.

    ✓ 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.

    ✓ Notify the Agency Administrator.

Fatality

- Do not move the body unless it is in a location where it could be burned or otherwise destroyed. Secure accident scene.

- Do not release victim's name except to authorities.

- **NEVER BROADCAST VICTIM'S NAME ON AIR.**

- Do not allow unauthorized picture taking or release of pictures.

- Notify Incident Commander, who will:

    ✓ Assign person to start investigation until relieved by appointed investigating team.

     ✓ Notify Agency Administrator and report essential facts. The Agency Administrator will notify proper authorities and next of kin as prescribed by agency regulations.

     ✓ If requested, assist authorities in transporting remains. Mark location of body on ground. Note location of tools, equipment, or personal gear.

ENTRAPMENT

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. Entrapments also include situations involving engines, dozers, and tractor/plows. They include "near misses."

Fire Shelter Deployment

Following the Risk Management Process, the "Standard Firefighting Orders" and recognizing the "Watch Out Situations" should prevent you from getting into a situation that requires a shelter deployment. When threatened by an unexpected change in fire behavior, follow proven escape procedures first before considering a fire shelter deployment.

Drop your pack as soon as you realize your escape may be compromised. Take water and your fire shelter. Take your hand tool if you think you will need to clear a deployment site. You can run 15-30% faster without the weight of your pack.

When on the fireline, **YOU MUST CARRY YOUR SHELTER WITH YOU AT ALL TIMES**. It should not be stored in the main body of your pack. It should be in a location for quick access.

If you are a crewmember, your supervisor will decide when and where to deploy your shelter. Supervisors should pre-identify escape routes and safety zones-the best areas for deploying a fire shelter. When deciding to deploy, supervisors must identify a safe area and provide adequate time for deployment to occur. If you are not with a crew, you must rely on your own judgment where to deploy.

Choosing Deployment Area

- Direct flame contact is the biggest threat to your shelter. Deploy where flame contact is minimized.

- Look for natural firebreak, wide dozer line, low spots, wide streambed, lee side of ridge top, uphill side of road, burned over area, and rockslides. Low spots will have less heat and smoke exposure.

- Avoid areas with heavy brush, trees with low hanging branches, logs, snags, and flammable materials.

- Keep away from narrow draws, chutes, and chimneys as they tend to funnel smoke, flame, and hot gas.

Shelter Deployment

- Crew must stay together and maintain communication with each other and follow chain of command.

- 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.

- Get on the ground before the flame front arrives.

- 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.

- Position shelter so hold-down straps are beneath you when you lie prone. Push sides of shelter away from body to provide air gap. Hold shelter down with feet, legs, elbows, and hands.

- Items to wear and take into the fire shelter:

  Gloves   Without gloves, it will be very difficult to hold on to the shelter while inside.

  Hard hat   Provides head protection.

Radio   Supervisors must maintain
         communications with those
         outside the area of shelter
         deployment.

Water   Drink water so you continue to
         sweat, which aids body cooling.
         NEVER wet clothing, as wet
         clothes will rapidly conduct heat.

- Leave hand tools outside shelter. Toss any
  hazardous items like gasoline and fusees well
  away from the 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 gases. Keep your nose pressed to
  the ground as much as possible. Use a dry
  bandanna to protect your airway. **NEVER USE
  A WET BANDANNA! (Discuss with your
  agency using a dust/smoke mask.)**

- During high winds that should be expected as
  the flame front approaches and passes through,
  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 is to your shelter, you are still better off
  inside the shelter.

- Talk to each other. Remember: the noise can be deafening as the fire passes through, and you may not be able to hear anyone.

- Do not move unless it's absolutely necessary. If you must move, crawl on your belly, keeping the shelter edges close to the ground.

How Long To Stay Inside Your 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. **DO NOT LEAVE YOUR SHELTER UNTIL INSTRUCTED TO DO SO BY YOUR SUPERVISOR.**

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. Agency guidelines **MUST** be considered when deciding to use a building or structure as crew protection.

- Advise immediate supervisor (Strike Team Leader, Division/Group, 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 and secure exterior doors.

- Bring into structure fire extinguishers and back pumps, charged hose line 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. Agency guidelines **MUST** be considered when deciding to seek refuge in a vehicle.

- 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 that provides the area occupied by crew with maximum protection from approaching flame front.

- Set parking brake, leave motor running at high RPM, and 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 material 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. Cover up with turnouts and use SCBA's if available.

- 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 fire 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 crewmember covers themselves with a fire shelter.

- ✓ Exit the vehicle from the side away from 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 injuries and treat. Inspect vehicle for fire, extinguish if possible.

ORGANIZATIONAL

Observe the following basic safety principles on all fires, regardless of size or staffing except where provided otherwise through local cooperative agreements.

General Responsibilities

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.

Qualifications

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

Training

- Inform firefighters about hazards and safe working practices before starting work.

Supervisors have responsibility to issue clear instructions and ensure 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.

Supervision of Other Firefighters

Supervision of other firefighters' work includes:

- Setting a personal example of safe behavior and enforcing 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 shift or new work assignment.

- Becoming immediately involved whenever injury occurs, 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.

- Monitor and enforce work/rest guidelines.

- Providing leadership in applying corrective action aimed at eliminating causes of accidents and instilling a safe work attitude.

- Protecting employees from reprisal for reporting unsafe conditions.

Safety Officer (SOF1/2/3)

A Safety Officer, a member of the Command Staff, 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 sections of fireline that warrant special safety considerations.

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

Fire Behavior Analyst (FBAN)

Where extreme fire behavior potential exists, consider assigning a Fire Behavior Analyst to identify hazardous situations.

OPERATIONAL GUIDELINES

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.

- Apply the five-step Risk Management Process (see page 4).

  - ✓ Situation Awareness
  - ✓ Hazard Assessment
  - ✓ Hazard Control
  - ✓ Decision Point
  - ✓ Evaluate

- Address basic firefighter safety and health issues.

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. Disseminate to all fireline personnel.

NOAA Weather Radio forecasts should not be substituted for fire weather forecasts. NOAA Weather Radio may 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 warning has been issued.

Fire Danger Rating

Know and understand locally accepted Fire Danger Rating Indices and components. Find out what this season's trends are doing compared to the historic average and historic maximums.

Safety Precautions Under Extreme Fire Behavior

Be Alert to Indicators of Sudden Weather Changes

- Trees torching 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.

Be Aware of "Watch Out" Working Situations

- Building fireline down into where the fire is burning.

- Building fireline on hillside beneath fire.

- Building fireline through heavy cover at considerable distance from fire.

- Building fireline in country not seen in daytime.

Have Clear-Cut Plan of Action for Potential Extreme Fire Behavior Conditions

- Advise personnel of escape routes and make necessary provisions to ensure the route is clearly marked and accessible for foot or vehicle traffic.

- Give crew frequent rest periods, making sure adequate amounts of water are consumed.

- Ensure chain of command and firefighter accountability system are in place.

- Know location of rockslides, open hillsides, streams, etc.

- Post lookouts to alarm firefighters who are working where they cannot directly observe danger points (fire behavior, rolling material, etc.).

- Consider possibility of retreating into burn.

- When crossing fire edge into burn, have crew protect faces and hold breath, if possible.

- Do not travel in direction of fire spread unless certain a safe spot can be reached.

- Carry fusees to burn out "safety zones."

Night Operations

Every effort shall 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, particularly about line location and boundaries, terrain features, hazards, and control problem areas.

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/her seat until the vehicle is securely chocked. **NEVER** load or unload personnel from an **UNCHOCKED VEHICLE**.

- Driver shall conduct a 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.

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.

Line Scouting

- When scouting or working ahead of a crew in brushy terrain, carry a cutting tool and clear any vegetation that might hamper escape.

- A lookout should be posted to warn of danger when personnel are scouting in unburned areas of dense vegetation.

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 there is a danger of rolling rocks or 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 objects 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.

- In fast-burning fuels (grass, one-hour fuels, etc.), 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 an escape route and safety zone identified.

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

- **PANIC LEADS TO TROUBLE**. Keep a clear mind and act calmly.

Firefighters should never try to outrun the head of a fast moving fire. Try to get to a safety zone or into the burned area. If in danger of being overtaken by a fast moving fire, drop tools and move as rapidly as possible to a safety zone.

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."

  - ✓ Hot pink color marked ESCAPE ROUTE in black lettering denotes safety zones and escape routes.

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

Firing Equipment

- Only trained personnel should use firing equipment.

- 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 flamethrower 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.

Chain Saws

- Stop engine when carrying, making adjustments, repairing, or cleaning a chain saw.

- Use bar guards when carrying saw in rough country.

- Cool engine before refueling. Fill on bare ground and move at least ten feet from fueling area before starting.

- Use proper safety equipment such as chaps, gloves, hard hat, and eye and ear protection.

Hazard Trees

- Trees have been burning for an extended period.

- High-risk tree species (rotten and shallow root system).

- Numerous down trees.

- Dead or broken tips and limbs overhead.

- Accumulation of down limbs.

- Absence of needles, bark, or limbs.

- Leaning or hung-up trees.

- Presence of snags in the fire area.

Hazard Tree Safety

Environmental conditions that increase snag hazards:

- Strong winds

- Night operations

- Steep slopes

- Diseased or bug-kill areas

Felling

Felling of snags or large trees (over 20 inches DBH) shall be done by a qualified Class B or C faller. Personnel felling trees less than 20 inches DBH shall be supervised by certified personnel. Tree/snag falling shall meet specific agency faller qualification requirements.

Select a clear escape route(s) 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.
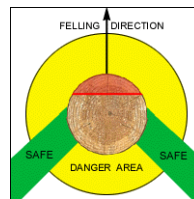
- If possible, stand behind another tree of sufficient size to provide protection.

- 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 crewmembers not on the felling team when tree felling will be occurring in their work area.

- Do not fell trees up hill (or upslope) of other crews.

- When felling trees, station a lookout to assist with cutting area control, and 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. **DO NOT BLOCK ROAD WITH YOUR ENGINE**.

- 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 with 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 firebreak 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.

Safety Guidelines

Equipment Placement

- Identify escape routes and safety zones and make them known to all crewmembers.

- Stay mobile; keep equipment running, emergency red lights on. Keep egress route clear; park extra equipment on street.

- Mark entrance to long driveways to show protection is in place (multiple ribbons at end of drive on street, ribbon/flagging across drive entrance, sign, or other predetermined signal).

- Back in equipment for quick escape.

- Park in a cleared area (watch for overhead hazards).

- Protect your equipment; park behind structure, placing structure between equipment and fire front.

- Watch for hazards (drop-offs, potholes, above-ground fuel storage, chemicals, septic tanks, etc.).

- Coil a short 1½ inch charged line with fog nozzle on your engine for safety and quick knock-down.

- Use short hose-lays. Keep hose off driveway.

- Know turnouts and bridge limits.

- Check roads before the fire hits.

- Try to keep sight contact with all crewmembers.

Water Use

- Maintain adequate water supply for engine protection.

- Top off tank at every opportunity; use garden hose.

- Draft from swimming pool, hot tub, pond, etc.

- **DO NOT** hook up to hydrant except to refill tank (hydrant may not always work if system is powered by electricity and power is lost in area).

- Conserve water, avoid wetting down an area. Apply water only if it controls fire spread or significantly reduces heating of structure being protected.

- Keep fire out of the heavier fuels.

- Extinguish fire at its lowest intensity, not when it is flaring up.

- Knock down fire in the lighter fuels.

- Have enough water to last duration of main heat wave and to protect crew.

Class A Foam Use

- Direct attacks—apply to base of flame.

- Indirect attacks—lie out wet line and burn out.

- Apply to structure (roof and siding) 10-15 minutes before fire arrives.

Safety Zone

- Follow the Standard Firefighting Orders.

- Always stay oriented to a safety zone (and alternate as needed).

- If you need to drive to the safety zone, ensure that:

  - ✓ Someone is watching the escape route.

  - ✓ You have a "trigger point" that will cause a retreat with adequate time for travel.

  - ✓ You have absolute communication ability with your lookout(s).

  - ✓ You have the ability to control civilian traffic that could obstruct your escape route.

Develop a Travel LCES

- To assignment and between assignments:

  - ✓ Predict fire spread.

  - ✓ Leader or lead engine scout route and potential safety zones.

  - ✓ Lookout to observe all blind areas.

  - ✓ Communication.

- At assignment:

  - ✓ Predict fire behavior.

  - ✓ Determine need for protective action.

  - ✓ Implement or coordinate with lead engine.

  - ✓ Decide on safety zone option.

- ✓ Identify any hazards.

- ✓ Brief crew on safety zone plan, tactical plan, escape plan (to safety zone and for refuge).

- ✓ Crew stays close to structure.

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 conduction.

- 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 air tanker or helicopter 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.

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, 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. Constantly watch for suspicious activities and people; report to supervisor.

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.

If safe, attempt to identify material, and pass information on.

Incident-Generated HAZMAT

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 and Ground Support Unit Leaders should be well 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 and 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 (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.

Unexploded Ordinance (UXO)

Millions of acres in the United States contain unexploded ordinance (UXO), most a result of weapons system testing and troop training activities conducted by the Department of Defense. This property includes active military, formerly used defense (FUD), and base realignment and closure (BRAC) sites. The risks posed by property containing UXO could be great depending on the types and amount of UXO present and how the property is or may be used.

UXO Safety and Reporting

UXO, whether present in an area by design or by accident, poses the risk of injury or death to anyone in the vicinity.

- "**IF YOU DIDN'T DROP IT, DON'T PICK IT UP!**"

- When you see UXO, stop. Do not move closer.

- Never transmit radio frequencies (including handie-talkies, citizens' band radios).

- Never attempt to remove anything near a UXO.

- Never attempt to touch, move, or disturb a UXO.

- Clearly mark the UXO area.

- Avoid any area where UXO is located.

- Keep a minimum of 500 feet away from any UXO that is on fire.

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/Helibucket Operations

Personnel can be injured by the impact of retardant/water 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 hand tool 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 or Class A foam should be done with caution due to slippery surfaces.

- Wash retardant or Class A foam 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.

Managing Vehicle Traffic Under Severe Smoke Conditions

Smoke has the potential to cause severe safety hazards to vehicle traffic in the vicinity of active fires, especially at night.

- When potential smoke-related problems are identified:

  - ✓ Advise the Agency Administrator that severe smoke conditions exist.

  - ✓ 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.

- ✓ 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 having 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.

Essential Incident Response Driving

"ARRIVE ALIVE!"

Always drive defensively

Reducing response vehicle speed can prevent rollovers

Red traffic signals and stop signs mean complete STOP

Insist that vehicle occupants use seat belts

Verify vehicle occupants are seated and belted

Evaluate road surface and weather conditions

Abide by federal and state motor vehicle laws

Lengthy response distances require frequent rest stops

Initiate standard vehicle backing operating procedures

Value occupant and public safety versus time and speed

Enter dangerous curves and intersections cautiously

CHAPTER 2—INITIAL ATTACK

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

DEFINITION OF INITIAL ATTACK

Initial attack is the action taken by resources that are first to arrive at an incident. All wildland fires that are controlled by suppression forces undergo initial attack. The kind and number of resources responding to initial attack varies depending upon fire danger, fuel type, values to be protected, and other factors. Generally, initial attack involves a small number of resources, and incident size is small. **REGARDLESS OF FIRE TYPE, LOCATION, OR PROPERTY/RESOURCE BEING THREATENED, FIREFIGHTER SAFETY WILL ALWAYS BE THE #1 PRIORITY.**

CHARACTERISTICS OF AN INITIAL ATTACK INCIDENT (TYPE 4 & 5 INCIDENTS)

Resources vary from a single resource (Type 5) to several single resources (Type 4), possibly a single strike team or task force.

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

Normally does not require a <u>written</u> incident action plan. May use the ICS Initial Briefing Form (ICS 201).

The initial attack incident commander (ICT4 and ICT5) may be a single resource boss/company officer and is responsible for performing all command and general staff functions.

EXAMPLE OF INITIAL ATTACK ORGANIZATION (Type 4 Incident)
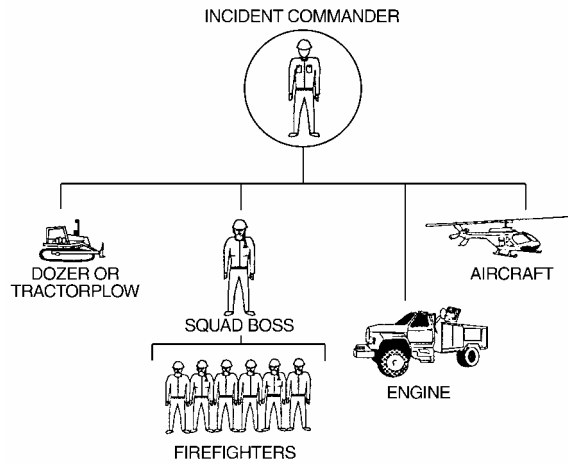
DUTIES OF INITIAL ATTACK INCIDENT COMMANDER

Upon Dispatch

Obtain the following incident information when dispatched to a wildland fire:

- Person reporting the fire –
  "Tim Murphy, 2121 Road St., 555-5555."

- Fire location – "north slope of Bald Mt, near lower campground."

- Best access – "Farm Road off main highway."

- Landowner, if available.

- Size – "less than 1 acre."

- Fuels involved (grass, brush, timber, etc.).

- Rate of spread (creeping, running, spotting, crowning).

- Hazards – "down powerlines, mining claims in area."

- Values threatened – "housing tract within ½ mile of fire."

- Other jurisdiction(s) involved (State, County, Local Fire Dept/Agency).

- Current fire weather information.

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

- Fire cause, if available.

- Appropriate fire management response as determined by agency (full or modified suppression, fire use).

WRITE DOWN DISPATCH INFORMATION – DON'T RELY ON YOUR MEMORY

If you did not receive all the needed information or you are not sure if you have correctly copied the information, have the dispatcher repeat it.

Use Maps to:

- Locate fire, identify access route(s), locate values threatened, and establish jurisdiction.

Fire Behavior:

- Pay particular attention to all fire behavior information, <u>especially</u> predicted fire weather.

En Route to Incident

TRAVEL SAFELY! DO NOT SPEED!

Consider what you know about the area:

- Type of fuel(s) and terrain.

- Access problem(s) - "Will there be people leaving the area?"

- Control points (natural and person-made).

- Ownership(s).

- Jurisdiction(s) - "May need to establish unified command."

- Local fire history.

- Resources en route - "What resources are other jurisdiction(s) sending?"

- Additional resource availability - "Will there be difficulty in getting additional resources (ground or air)?"

Fire behavior considerations:

- Combination of fuels, topography, and weather effecting rate of spread.

- How will this fire burn compared to others in similar areas?

- Is the fire danger increasing or decreasing?

Local weather indicators:

- Changes in wind speed and direction from initial reports.

- Presence of whirlwinds, dust devils as indicators of erratic winds.

- Changes in cloud cover and build-up.

- Unfavorable weather changes predicted.

- Diurnal winds effecting fire behavior.

- Observed weather conditions are much different from predicted conditions, especially wind speed and direction.

MAY WANT TO REQUEST A SPOT WEATHER FORECAST

Smoke column indicators:

- The smoke column can give you some idea what you will be confronting (refer to Appendix A, Page A-57 for Smoke Column Indicators).

Arriving On-Scene

When approaching the scene:

- Use caution when approaching scene. Observe fire scene for "Look Up, Look Down, Look Around" concerns.

- Watch for people leaving the area, take information (license numbers, vehicle and suspicious person descriptions) that may assist with a fire investigation.

- Identify best access routes into fire and escape routes; pass information on to incoming resources.

Once on-scene:

- Advise dispatch and on-scene resources that you are on-scene and assuming command.

- Name fire, size-up fire conditions and potential, passing information onto agency dispatch and on-scene resources.

- Initiate Risk Management Process. (Refer Chapter 1, Page 4 for Guidelines on Risk Management Process.)

DO NOT CROSS THE FIRE'S HEAD UNLESS IT CAN BE DONE SAFELY!

- Ensure that access into the fire scene is kept open and fire equipment is positioned to protect from fire damage and allow quick access out of the area.

- Attempt to locate fire origin and protect area (DO NOT remove any evidence unless necessary to prevent destruction).

- Account for all personnel and equipment that are already on-scene.

- Review Initial Attack Safety Checklist. (Refer to page 106.)

TAKING ON-SCENE ACTION

FIRES SHOULD BE FOUGHT AGGRESSIVELY, BUT SAFETY AND PROTECTION OF PERSONNEL AND EQUIPMENT MUST BE TOP PRIORITY.

<u>**REMEMBER**</u>**:**
- **STANDARD FIREFIGHTING ORDERS**
- **LCES**
- **WATCH OUT SITUATIONS**

Using the information from the fire size-up, develop incident objectives and fire suppression strategies, and ensure that assigned personnel know them.

Incident objectives to consider are as follows:

- FIREFIGHTER SAFETY

- Life hazard - "Protect residences leaving area."

- Property values - "Keep fire from reaching housing tract."

- Resource values - "Keep fire from reaching stand of timber."

- Keeping fire from spreading into heavier or more dangerous fuels.

- Keeping fire isolated on one side or in a single canyon or drainage.

- Keeping fire as small as possible within financial limits as determined by agency.

- Making sure that all assigned resources contribute to suppression efforts.

Fire Suppression Strategy(s) used to control a fire will depend on:

- Rate of spread

- Fire intensity (flame length)

- Spotting potential

- Values to be protected

- Kind and number of resources assigned

Present and predicted fire behavior and weather conditions will determine which strategy(s) and tactics you will use. It will be decided how close equipment and personnel work near or at the fire's edge by the flame length. (Refer to Appendix A, Page A-58 for Guidelines on Fire Suppression/ Flame Length Interpretation table.)

Suppression action(s), whether direct or indirect attack, need to start from an anchor point (road, creek, burned out area, etc.). Always be aware of hazards in the fire area (powerlines, snags, mines).

Initial briefing of resources at or arriving on-scene:

- Briefing should be face-to-face when possible.

- Briefing should include:

    - Incident objectives
    - On-scene conditions (weather, fire intensity, rate of spread, potential)
    - Division/Group assignment
    - Tactical and air-ground radio frequencies
    - Safety concerns

- Make sure personnel understand their assignment before going to work.

- Ensure that all responders are wearing the appropriate personal protective equipment (PPE).

ASSESSMENT OF INCIDENT PROGRESS

After resources have been deployed and suppression actions started, need to assess incident progress and make any changes to the incident action plan.

- View fire from a point where a complete picture of the fire can be obtained, use field observers as necessary.

- Is the incident action plan working? If not, make necessary changes.

- When making changes to the incident action plan, evaluate probability of success and consequence(s) of not changing plan.

MAKE SURE THAT ALL AFFECTED RESOURCES ARE ADVISED OF INCIDENT ACTION PLAN CHANGES

- Will changes in weather, fuel, or topography have enough of a fire behavior impact prior to control?

- Is rate of spread or fireline intensity increasing to a point where strategies may need to be changed?

- Are additional resources needed, including overhead (Div/Group Supervisors, etc.)? If so, place an order with dispatch.

- Can any resources be re-assigned or released?

- Has incident size and complexity reached a level where you are no longer qualified as an Incident Commander?

DO NOT HESITATE IN ASKING FOR HELP!

- Review the Initial Attack Safety Checklist as needed or when incident conditions change. (Refer to page 106.)

UPDATING INCIDENT STATUS

At the earliest opportunity, the following incident information should be forwarded to the agency dispatch (continue to keep dispatch updated of any significant changes and progress on the fire):

- Actual location

- Size of fire

- Rate of spread

- Fire potential (how large will/may fire get)

- Anticipated control problems

- Estimated control time

- Values threatened

- Fuel type

- Topography

- Weather conditions (especially if different from initial report)

- Resources on-scene

- Additional resource needs

- Resource releases

- Cause (if known) - **DO NOT PROVIDE THIS INFORMATION OVER RADIO IF POSSIBLE.**

FIRE SUPPRESSION 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. Suppression action(s) may include one or a combination of the following strategies:

Direct Attack

- Used when fire perimeter is burning at low intensity and fuels are light, allowing for safe operation at the fire's edge.

- Control efforts, including line construction, are done at the fire perimeter, which becomes the control line.

- Unless special situations dictate otherwise, line construction will start from an anchor point. KEEP ONE FOOT IN THE BLACK WHEN POSSIBLE.

Advantages of Direct Attack

- Safest place to work. Firefighters can usually escape into burn area.

- There is minimal area burned.

- No additional area is intentionally burned.

- Full advantage is taken of burn out areas.

- May reduce the possibility of the fire moving into the crowns of the trees or brush.

- Eliminates the uncertain elements of backfiring.

Disadvantages of Direct Attack

- Firefighters can be hampered by heat, smoke and flame.

- Control lines can be very long and irregular, because the line follows edge of fire.

- Firefighters may accidentally spread burning materials across line.

- Doesn't take advantage of natural or existing barriers.

- Usually more mop up and patrol.

Indirect Attack

- Used when a direct attack is not possible or practical.

- Fireline is located some distance from fire's edge.

- Terrain, fuels, fire behavior, and available resources will dictate fireline placement.

- Burning out of indirect line is handled as a second phase of line construction.

Advantages of Indirect Attack

- Can locate line along favorable topography.

- Take advantage of natural or existing barriers.

- Firefighters work out of smoke and heat.

- More time to construct line.

- Allows line to be constructed in lighter fuels.

- May be less danger of slopover.

Disadvantages of Indirect Attack

- More acres will be burned.

- May be dangerous to firefighters, because they are some distance from the fire and can't observe it.

- Fire may cross line before it is fired out.

- Burning out may leave unburned islands.

- Brings into play the dangers of back firing.

- Fails to take advantage of line that has already burned out.

FIRE SUPPRESSION TACTICS

Fireline Location Guidelines

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 Checklist. (Refer to Chapter 1, Page 17.)

Fireline Construction Guidelines

- 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.

- Below the fire on steep slope, construct trenched lines to catch rolling material.

- 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 fireline before burnout, if time permits.

- Build fireline as close to fire edges as conditions safely permit. Burn out fireline as control line proceeds.

- When building fireline uphill, burn out from the top down after line is tied in.

- Keep one foot in the black, where possible.

Water Use Guidelines

- 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 all personnel working with nozzle.

- Use foam or other water additives to increase effectiveness and save water.

Class-A 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 that 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:

  - ✓ Batch mixing directly into a water tank or water supply.

  - ✓ Through the discharge/intake side of the pump proportioning utilizing the Venturi Principle.

  - ✓ Positive pressurization that 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.

Dozer and Tractor Plow Guidelines

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

- Ensure 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 Retardant Application

- Determine tactics direct or indirect 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 the wind for best accuracy.

- Maintain honest evaluation and effective communication between the ground and air.

- Use direct attack only when ground support is available or extinguishment is feasible.

- Plan drops so they can be extended or intersected effectively.

- Monitor retardant effectiveness and adjust its use accordingly.

Directing Retardant and Bucket Drops

- <u>Give general location</u> on incident.

- <u>Finalize location</u> with:

  ✓ Clock direction - straight in front of the aircraft is 12 o'clock, out the right door is 3 o'clock, the tail is 6 o'clock, and the left door is 9 o'clock. When giving direction, remember that helicopters and air attack generally orbit in a right-hand pattern and air tankers in a left-hand pattern.

  ✓ Position on slope - lower third, upper third, mid slope, top of ridge, etc.

  ✓ Aspect - direction slope is facing.

  ✓ Describe prominent landmarks - Don't say, "I have a red hard hat. I'm wearing a yellow shirt. I'm waving. I'm by a big rock. I'm by the big tree." Visualize what the pilot sees from the air and describe the target.

  ✓ Use signal mirrors - use smoke or fusee, if a mirror is unavailable. Stand in drop location (when safe) for identification and move away before drop.

- <u>Describe target</u> from your location and explain mission. The pilot will decide drop technique and flight path.

- <u>Assure</u> pilot all personnel are safe and know aircraft intentions before the drop.

- <u>Give feedback</u> to pilot about drop accuracy. Be honest and constructive. Let the pilot know if drop is early, late, uphill, downhill, on target too high, or too low. Report low drops immediately.

Helicopter Use Guidelines

Helicopters may be the first unit to arrive at the fire. They are often used to drop water, foam, or fire retardant. 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 if certified to do so.

Burning Out Guidelines

- Always have an anchor point to support burning operations.

- Do not start burning out until a control line has been prepared and adequate firefighting forces are available to hold line.

- Fall snags and remove ladder fuels before burning out.

- When possible, fire from the top down in steep topography; fire into the wind; fire from the lee side or ridge top; fire from a wide canyon bottom; fire from roads or benches.

- You must manage the amount of heat generated; too much heat may cause fire to jump control lines; not enough heat will cause an unclean burn and require extensive mop-up.

- Burning operations must not adversely affect the actions of other firefighting forces.

- Keep those around you informed when burning out; firefighters not kept informed may see the burning operation and think it's a flare-up or slopover.

  MANY BURNING OPERATIONS HAVE BEEN STOPPED BY AN UNWELCOME RETARDANT DROP.

INCIDENT MOP-UP

Start mop-up as soon as line construction and burnout operations are completed. All material near the fireline needs to be extinguished to prevent a rekindle and possible escape. Mop-up can be done with water (wet mop-up) or without water (dry mop-up).

Rule of Mopping Up a Fire

Rule: Start work on each portion of line as soon as possible.

What? Start with the most dangerous line first. Work from the fireline toward the center of the fire. Small fires are totally extinguished. On larger fires, mop up a minimum of 100 feet, or to such a distance that nothing will blow, roll, or spot across the line.

Rule: Secure and extinguish burning materials.

What? Arrange burning fuels so they can't roll across the line. Spread smoldering fuels and apply water so they will cool. Scatter fuels away from the line.

Rule: Deal with special hazards INSIDE the line.

What? Fall snags; extinguish logs and stumps. If you can't fall the snag, clear around the base, so that burning materials will not fall into flammable fuels.

Rule: Deal with special hazards OUTSIDE the line.

What? Move slash back, away from the fireline. Fall snags and cover with dirt. If stumps are close to the line, cover them with dirt.

Rule: Reinforce the fireline.

What? Widen and clean the fireline. Reinforce any undercut line. Burn out or cold trail islands. Dig out roots that cross under the fireline. Feel for hot material along the fireline.

Rule: Check for spot fires.

What? CONSTANTLY check for spot fires, especially downwind from the fireline. CHECK heavier fuels (logs, snags, slash, etc.) for smoldering material.

Snag Removal

- Fall any snags that are both inside and outside the fireline, to a distance of 1½ times their height.

- Larger snags, or those with fire inside them, should be felled by an experienced faller.

- DO NOT attempt to fall a snag if you are not experienced.

Patrolling the Fire

- Begins right after fireline has been constructed.

- Intensity of patrol decreases as the danger of a rekindle decreases.

- Assigned specific sections of fireline for patrolling.

- Constantly move along fireline, watching for smoke both inside and outside the fireline, feeling for heat build up in fuels not completely burned up.

- Pay particular attention to areas where only water was used in suppression.

INITIAL ATTACK SAFETY CHECKLIST

Answer the following questions (repeat this
checklist whenever there is a change in conditions
on the fire or a predicted change in fire conditions).
If the answer is NO to any of the checklist
questions, you MUST take the appropriate
corrective action(s) IMMEDIATELY.

<u>Yes</u>   <u>No</u>

___   ___   Does everyone (dispatch and on-scene resources) know who the Incident Commander is?

___   ___   Have you sized up the fire and established Incident Objectives?

___   ___   Have you initiated the Risk Management Process?
(See page 4, Chapter 1)

___   ___   Do you have a current fire weather forecast for fire location?

___   ___   Is the observed fire weather consistent with the forecast?

___   ___   Have you developed a plan to attack the fire (direct or indirect, anchor points, priority areas)?
Have you communicated this plan to all personnel assigned to the fire, including new arrivals?

INITIAL ATTACK SAFETY CHECKLIST (continued)

<u>Yes</u>   <u>No</u>

___   ___   Can you control the fire with the resources available (on-scene and en route) under expected conditions?

___   ___   Do you have sufficient supervision on-scene?

___   ___   Do you have a complete list of resources on-scene and have been ordered for the fire?

___   ___   Are Situations and Standard Firefighting Orders being followed?

___   ___   *L*ookouts in place or you can see all of the fire area?

___   ___   Can you *C*ommunicate with everyone on the fire and with dispatch?

___   ___   *E*scape routes and *S*afety zones established? (If you are using the black, is it completely burned out and without a re-burn potential?)

___   ___   Will you control the fire before the next operational period?

___   ___   Have you reported the fire's status to dispatch?

INITIAL ATTACK SAFETY CHECKLIST (continued)

<u>Yes</u>   <u>No</u>

___   ___   If the fire will not be controlled before the next operational period, have you informed agency headquarters?

___   ___   Does the fire size or complexities remain within your capabilities and qualifications to manage the fire?

FIRELINE HANDBOOK

CHAPTER 3—EXTENDED ATTACK

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

DEFINITION OF EXTENDED ATTACK

An Extended Attack Incident is the phase of the incident when Initial Attack capabilities have been exceeded. This has a high potential for more serious accidents and injuries. All planned actions must consider firefighter and public safety as the number one priority.

When complexity levels exceed Initial Attack capabilities, the appropriate ICS positions should be added to the command staff, commensurate with the complexity of the incident. Complexity is usually Type 3, however, could be typed at any complexity level.

CHARACTERISTICS OF AN EXTENDED ATTACK INCIDENT

An Extended Attack Incident is normally characterized by:

- Usually less than 100 acres in size, however, size is only one determining factor.

- 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/Group Supervisor complexity.

- The incident is not expected to be contained/controlled in the first operational period.

- Generally, a written Incident Action Plan would not be needed or prepared.

- Some of the Command and General Staff functions such as Operations, Planning, Logistics, Safety, and Liaison may be staffed.

- 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.
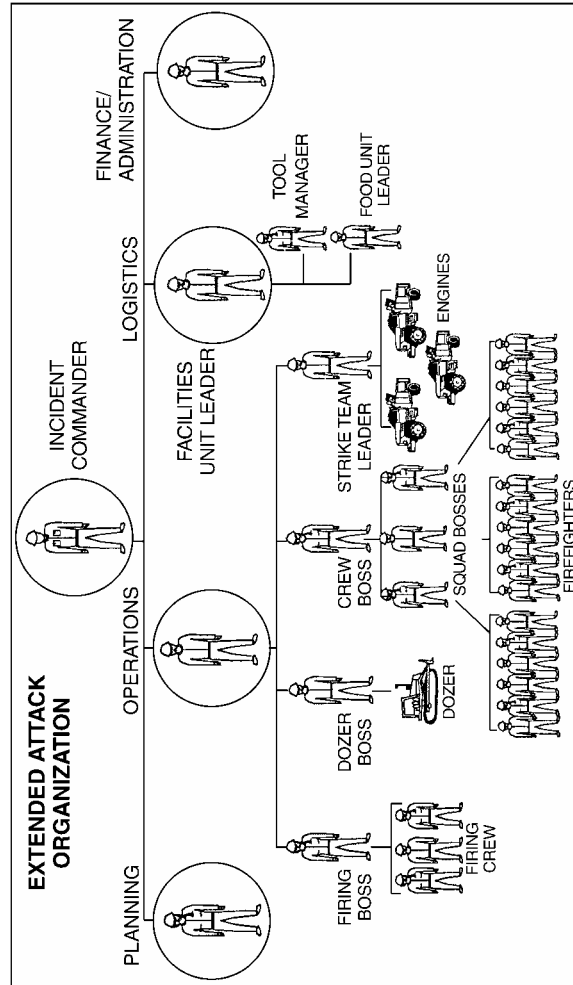
CHANGE FROM AN INITIAL ATTACK INCIDENT TO AN EXTENDED ATTACK INCIDENT

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

- Utilize complexity analysis to validate organizational needs (Appendix A).

- Follow the risk management process in Chapter 1. Review and update regularly during the incident.

- Employ strategy and tactics that will:

    ✓ Follow the Standard Firefighting Orders.

    ✓ Watch Out Situations are mitigated.

    ✓ Ensure work/rest requirements are met.

    ✓ Entrapment situations are avoided.

- Determine and document incident objectives. Included in the objectives will be triggers or decision points for disengagement.

- Complete and document incident complexity.

  - ✓ Type 3 or greater complexity incidents require an incident commander without collateral duties such as logistics, planning or duty officer.

- 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, en route, 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 to staff functional areas. These may be staffed by personnel at the unit leader level or by individuals that can complete the duties. Should the complexity require a fully qualified section chief, then the transition to a Type 2 Organization should begin.

- A person to directly supervise the suppression efforts.

- A person to begin assessing logistical needs such as feeding, fuel, sleeping arrangements, special equipment, etc.

- A person to address 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 OR TRANSFER TO 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:

- Incident objectives will not be met.

- 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, such as 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 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 provide for firefighter and public safety. Discharge of this objective applies the appropriate suppression response. This objective may require transfer of command. A measurable performance element with safety implications is the execution of this transfer of command. Adequate staffing, ordering of needed resources, good planning, good documentation and quality briefings are all important elements of transfer of command.

EXTENDED ATTACK SAFETY CHECKLIST

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

YES	NO	
		Do you have a current fire weather forecast for the fire location?
		Is the observed fire weather consistent with the forecast?
		Can you control the fire with the resources available (on the incident or soon to be on the incident) under expected conditions?
		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?
		Lookouts or you can see all of the fire area?
		Can you communicate with everyone on the fire and with dispatch?
		Escape routes are established. If you are using the black, is it completely burned and without a reburn potential?
		Safety and the Standard Firefighting Orders are being followed?
		Will you control the fire before the next operational period?
		Have you reported the status of the fire to dispatch?
		Do you have a complete list of what resources have been ordered for the fire?
		Cost-share issues present?
		Have all personnel on the fire been informed of the transition to an extended attack incident and any change of plans?
		Fire complexity has exceeded management capability of extended attack organization.
		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 4—LARGE FIRE MANAGEMENT TEAMS

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

LARGE FIRE MANAGEMENT TEAMS

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 and are 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.

Type 1 Organization

The primary difference between a Type 1 and 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 the characteristics of a Type 2 Organization plus:

- All Command and General Staff positions are filled with Type 1 qualified people.

- 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 exceed 1,000.

- 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.
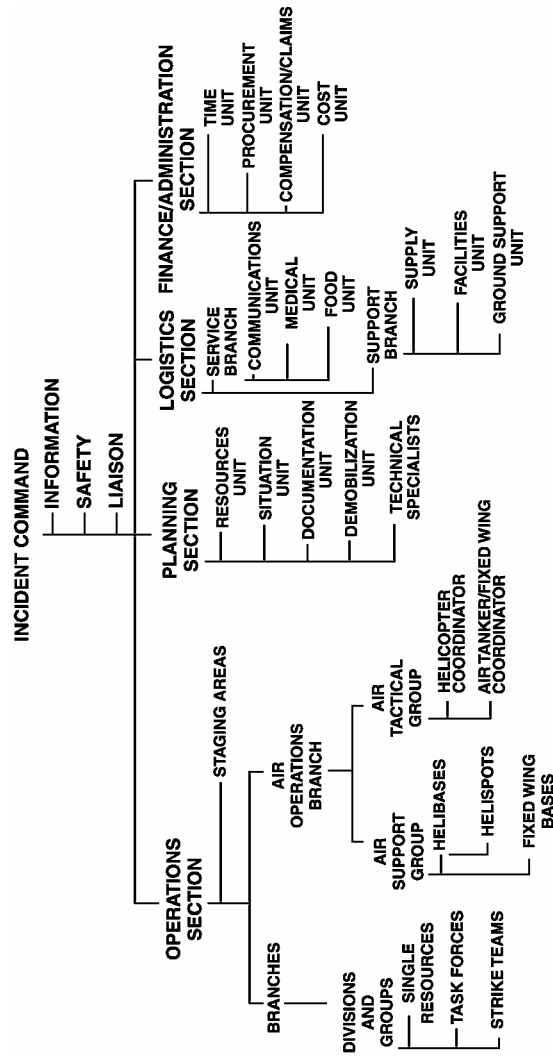
AREA COMMAND

Area of Command is an expansion of the incident command function. It is designed to manage a very large incident that has multiple incident management teams assigned. These teams may be established any time the incidents are close enough that oversight direction is required. This is to ensure that conflicts do not arise among the incident management teams.

The functions of Area Command are to coordinate:

1. Objectives that conflict between incidents.

2. Strategies that conflict between incidents.

3. Priorities for the use of critical resources allocated to the incident or incidents assigned to the Area Command.

The organization is normally small with personnel assigned to Command, Planning, Aviation, and Logistics.

UNIFIED COMMAND

A representative from each of the involved agencies with jurisdiction authority shares command, and at times, other functions. Collectively, they direct the management of the incident to accomplish common objectives. Unified Command may be at the Incident Management Team or Area Command Level.

MULTIPLE INCIDENT MANAGEMENT/COMPLEX

Most of the time, an Incident Commander and/or Incident Management Team will be in command of only one 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" are followed (common terminology, modular organization, integrated communications, Unified Command structure, consolidated action plans, manageable span-of-control, predestinated incident facilities, and comprehensive resource management), 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.

CHAPTER 5—TRANSFER OF COMMAND

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

TRANSFER OF COMMAND

A continuous command presence must be maintained on all incidents until all resources are released. Command of incidents, and some or all personnel in the incident management organization, may change one or more times as the incident changes in size or complexity, is of long duration, or changes jurisdiction(s). A briefing that captures all essential information for continuing effective command of the incident and provides for firefighter and public safety must occur prior to transfer of command. This information should be recorded and displayed for easy retrieval and subsequent briefings.

The transfer of command authorities for an incident must be as efficient and orderly as possible. The incident commander and his/her organization in place remains in charge of the incident until the incoming commander and his/her personnel are briefed by their counterparts and, where one is required, a delegation of authority has been signed.

MANY SAFETY PROBLEMS EMERGE AS AN INCIDENT BECOMES LARGER AND/OR MORE COMPLEX. INCIDENT TRANSFER OF COMMAND HISTORICALLY HAS BEEN ONE OF THE MOST DANGEROUS PHASES OF INCIDENT MANAGEMENT. INCIDENTS SHOULD TRANSFER COMMAND AT A SPECIFIC TIME, PREFERABLY AT THE START OF A NEW OPERATIONAL PERIOD.

THE OPERATIONAL EFFORT SHOULD CONTINUE DURING TRANSFER PERIOD WITH COMMAND AND CONTROL OF THE INCIDENT FIRMLY IN PLACE, AND WITH CLEAR, ACHIEVABLE AND SOUND STRATEGY AND TACTICS COMMUNICATED TO AND IMPLEMENTED BY ALL FIREFIGHTING RESOURCES.

INCIDENT COMMANDER BRIEFING

The outgoing Incident Commander must brief the incoming incident commander upon his/her arrival. The incoming Incident Commander should not assume command until thoroughly briefed and an exact time of command transfer is determined. If the incoming Incident Commander is arriving with a team, his/her team members may also attend the briefing. Likewise, if the outgoing Incident Commander has a team in place, those team members may also attend the briefing. After the briefing, incoming team members will start phasing into their areas of responsibility, but will not assume control until the predetermined time as agreed upon by the incoming and outgoing Incident Commanders. Notification of transfer of command must be immediately communicated to ALL firefighting resources, affected dispatch office(s), and agency administrator(s) through radio communication and/or verbal briefing.

Incident Commander's Checklist

The incoming Incident Commander, at all levels of complexity, should address the following items before he/she assumes command of an incident:

- Name and location of the incident.

- Jurisdiction(s) responsible for the incident.

- Name/location/radio contact of current Incident Commander(s).

- Agency Administrator(s) objectives for the incident.

- Current status of the incident:

    - ✓ Size.

    - ✓ Legal location.

    - ✓ Current fire behavior.

    - ✓ Expected fire behavior.

    - ✓ Most current fire weather forecast for incident area. Obtain spot weather forecast if possible.

    - ✓ Fuel type(s) involved, or likely to be involved.

    - ✓ Resources assigned to the incident, their status and location.

- ✓ Resources ordered for the incident and their estimated time of arrival.

- ✓ Operations being undertaken and their level of success.

- ✓ Operations planned for next operational period.

- ✓ Location of existing incident facilities, (ICP, base, camps, helibases, helispots, staging areas, etc.) if any.

- ✓ Values to be protected.

- Current map(s) of incident.

- Point of origin preserved?

- Fuel and weather conditions; current, predicted, variations from normal (described in terms of expected fire behavior).

- Fire history of the incident area, including any unusual or potentially unusual fire behavior.

- Firefighter and public safety concerns.

- Other agencies on incident and their representatives.

- Transportation routes to/from the incident.

- Date/time for transfer of command.

- Primary contact for coordination and support.

- Radio frequencies assigned to incident.

- Necessary releases of any assigned resources.

- Reporting requirements (situation updates to dispatch, agency administrator(s), ICS-209, etc.).

- Resource ordering protocols.

- Other (use of trainees, public information).

AGENCY ADMINISTRATOR'S RESPONSIBILITY FOR THE TRANSFER OF COMMAND AND RELEASE OF INCIDENT MANAGEMENT TEAMS

The following guidelines are for the orderly transfer of command of fire management authorities to incoming Incident Commanders and their teams as well as their release. Agency administrator(s) always maintain responsibility for the incident. Some information will need to be in writing and some may be verbal.

ASSUMPTION OF AUTHORITY

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

- The operational effort should continue during transfer period with command and control of the incident firmly in place, and with clear, achievable and sound strategy and tactics communicated to and implemented by all firefighting resources. As a general rule, command transfer should occur at the end of an operational period.

- The requesting unit should specify the expected time of arrival and expected time of transfer of command 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.

  - ✓ 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 agency administrator briefing.

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

- It is the responsibility of the jurisdictional Agency Administrator(s) to ensure that, where required, a wildland fire situation analysis is completed for all fires that are not expected to be controlled before the second burning period and revise when necessary.

- The existing Incident Commander at the ICP should brief the incoming Incident Commander and his/her team. The time of transfer of command 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.

RELEASE OF AN INCIDENT MANAGEMENT TEAM

The Agency Administrator must approve the date and time for the release of an Incident Management Team. The outgoing Incident Commander should start phasing in the incoming team members prior to demobilization of outgoing team members.

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

  - ✓ A transfer of command 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 resources 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, per agency policy.

CHAPTER 6—URBAN INTERFACE

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

WILDLAND /URBAN INTERFACE
"WATCH OUT" SITUATIONS

**"REFERENCE FIRELINE HANDBOOK
CHAPTER 1, PAGE 9"**

STRUCTURE TRIAGE GUIDELINES

Firefighter safety is the primary consideration when evaluating whether a structure can be protected. There are three categories of structures:

- Those that are not threatened.

- Those that are threatened and have the potential of being saved.

- Those that are not able to be saved and too dangerous to protect.

Factors to consider during structure triage:

- FIREFIGHTER SAFETY

- Safety Zone Availability (is there time to prepare a safety zone?)

- Proximity of the fuels and predicted flame length to structure (no defensible space).

- Position on slope relative to fire spread.

- Fire behavior and intensity (the greater the intensity, the wider the defensible space needed).

- Flammability of roof and siding (wood roof and siding, vinyl siding, along with inadequate defensible space may make structure impossible to protect).

- Timing and available resources (not having time to position resources or lack of resources to protect structure).

An attempt to save a structure may be unsuccessful or too dangerous if:

- There is no safety zone and refuge available.

- There is no place to park engine safely.

- Fire is making a sustained run and there is little or no clearance.

- Fire behavior is extreme: spot fires are numerous and out pacing control.

- Water supply will not last as long as the threat.

- Fire's intensity dictates you leave the area NOW.

- Roof is more that ¼ involved.

- Fire inside structure, windows broken, and windy conditions.

- You cannot safely remain at the structure and your escape route could become not longer safe to use.

If a structure becomes well involved, leave it and move on to one that can be saved**.**

STRUCTURE ASSESSMENT CHECKLIST

Address/Property Name

- Numerical street address, ranch name, etc.

- Number of residents on site

Road Access

- Road surface (paved, gravel, unimproved, dirt)

- Adequate width, vegetation clearance and safety zones along road

- Undercarriage problems (4x4 access only)

- Turnouts and turnarounds

- Bridges (load limits)

- Stream crossings (approach angle, crossing depth and surface)

- Terrain (road slope, location on slope-near chimneys, saddles, canyon bottom)

- Grade (greater than 15%)

Structure/Building

- Single residence or multi complex, out building (barn, storage)

- Does building have unknown or hazardous materials?

- Exterior walls (stucco or other non-combustible, wood frame, vinyl, wood shake)

- Large unprotected windows facing heat source

- Proximity of any aboveground fuel tanks (LPG, propane, etc.)

- Roof material (wood shake, asphalt, non-combustible)

- Eaves (covered with little overhang, exposed with large overhang)

- Other features (wood deck, wood patio cover and furniture, wood fencing)

Clearances/Exposures/Defensible Space

- Structure location (narrow ridge, canyon, mid-slope, chimney)

- Adequate clearance around structure-minimum of 100' (steeper the slope the more clearance required)

- Surrounding fuels (larger, denser the fuels, the more clearance required)

- Flammable fuels (trees, ladder fuel, shrubs) adjacent to structure (is there time for removing these fuels?)

- Other combustibles near structure (wood piles, furniture, fuel tanks)

- Is there adequate clearance around fuel tank?

- Power lines or transformers (DO NOT park under lines)

Hazardous Materials

- Chemicals (Look for DOT/NFPA/UN symbols)

- Pesticides and herbicides

- Petroleum products

- Paint products

Water Sources

- Hydrant/standpipe (When connecting with hydrant, be aware of flow rate and gpm output, size and venting capability of engine or water tender may not be able to handle hydrants with high flow and gpm rates.)

- Storage tank

- Swimming pool

- Hot tub

- Fish pond

- Irrigation ditch

Evacuation

- Is safe evacuation possible? (Identify safe refuge for those who cannot be evacuated.)

- Coordinate with on-scene law enforcement and emergency services personnel.

Estimated Resources for Protection

- Number(s) and type(s) of engines, water tenders, crews, dozers (General Guidelines: one engine per structure, one additional engine for every four structures to be used as "back-up" and for patrol. For structures that are close together (50' or less), one engine may be adequate to protect two structures.

- Type and number of aircraft available.

STRUCTURE PROTECTION GUIDELINES

DO NOT enter a structure unless you are trained, equipped, and authorized. If safe, a structure can be used as refuge. Firefighter safety and survival is the number one priority. Supervisors must keep in close communication with those you supervise and adjoining forces in the area.

Equipment Placement

- Identify escape routes and safety zones and make them known to all crew members.

- ALWAYS STAY MOBILE and wear all of your PPE.

- Back equipment in for quick escape.

- Mark entrance to long driveways to show that protection is in place (*very important* when structure can not be seen from road).

    - Multiple ribbons at end of drive on street

    - Ribbon/flagging across drive entrance

    - Sign

    - Other pre-determined signal

- Park in a cleared area (watch for overhead hazards).

- Protect your equipment (park behind structure, placing structure between equipment and fire front; be aware of spot fires occurring behind you).

- Watch for hazards (drop-offs, pot holes, above-ground fuel storage, chemicals, septic tanks).

- Keep egress route clear:

    - park extra equipment on street
    - keep hose off driveway

- Have an engine/crew protection line charged and readily available.

- DO NOT make long hose lays.

- Try to keep sight contact with all crewmembers.

Water Use Guidelines

- Keep at least 100 gallons of water reserve in your tank.

- Top off tank at every opportunity; use garden hose.

- Draft from swimming pool, hot tub, and fishpond.

- STAY MOBILE. Do not hook up to hydrant except to refill tank. (Hydrant may not always work if system is electric powered and power is lost in area.)

- CONSERVE WATER, avoid wetting down an area.

- Apply water only if it controls fire spread or significantly reduces heating of structure being protected.

- Keep fire out of the heavier fuels.

- Extinguish fire at its lowest intensity, not when it is flaring up.

- Knock down fire in the lighter fuels.

- Have enough water to last duration of main heat wave and to protect crew.

Class A Foam Use Guidelines

- Direct Attack - apply to base of flame.

- Indirect Attack - lay out wet line and burn out.

- Apply to structure (roof and siding) 10-15 minutes before fire arrives.

Preparing Structure

- Determine if residents are home (legal responsibility for evacuation lies with law enforcement). If residents remain on-scene, advise them to use structure if it's safe to do so as refuge when fire arrives.

- For roof access, place owner's ladder at a corner of structure on side with least fire threat and away from power drop.

- Clean roof of leaves, needles, and any other combustible materials.

- Cover vents and air conditioning unit on roof.

- Remove and scatter away from structure:

  - over-hanging limbs.

  - ground/ladder fuels to prevent fire from moving into the crowns.

  - wooden fences and wood piles near structure.

- Clear area around above-ground fuel tank, shutting off tank.

- Place combustible outside furniture inside structure.

- Close windows and doors, including garage, leaving unlocked. AS A LAST RESORT, YOU MAY NEED TO USE STRUCTURE AS REFUGE.

- Have garden hose(s) charged and place strategically around structure for immediate use.

FIRELINE HANDBOOK

CHAPTER 7—COMMON RESPONSIBILITIES

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

INITIAL OUT OF 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 and number

- Fire job assignment

- Reporting location

- Specific location of the fire

- Location of the check-in point

- Reporting time

- Any special communications instructions

- Resource Order number and request number (if applicable)

- Travel instructions/chief of party

- Unit designator (if applicable)

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.

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 or other line Supervisor.

OBTAIN BRIEFING AND BRIEF SUBORDINATES

After check-in, locate your incident supervisor and obtain your initial briefing. The items 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, and 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 such as March 15, 2004 or 3/15/04.

- 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 supervisors to review their employee's unit log each day.

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:

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 en route, 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 a boarding pass. **ALSO, BE AWARE OF AND COMPLY WITH AIRPORT SECURITY POLICIES.**

Recommended Minimum Items

Personal Protective Equipment (PPE) required by your agency (fire shelter, flame resistant clothing, hard hat with chin strap, goggles, and headlight clips).

- Red Card or other documentation of ICS qualifications

- Small packsack 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 or other appropriate authority, 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, must 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.

UNIT LEADER RESPONSIBILITIES

In ICS, a number of the Unit Leader's responsibilities are common to all units in all parts of the organization. Common responsibilities of Unit Leaders are listed below.

- Participate in planning meetings, as required.

- Determine and monitor current status of unit activities.

- Confirm dispatch and estimated time of arrival of staff, equipment, and supplies.

- Assign specific duties to staff and supervise their performance.

- Develop and implement accountability, safety, and security measures for personnel and resources.

- Supervise demobilization of unit personnel, equipment, and supplies.

- Provide Supply Unit Leader with a list of supplies to be replenished.

- Maintain unit records, including Unit Log (ICS Form 214).

Fireline Leadership

Fireline leadership is the process of influencing firefighters to accomplish their mission by providing them with purpose, direction, and motivation.

Purpose: The fireline leader must establish priorities, explain the importance of the mission, and focus the firefighters on the task so they will function safely and efficiently.

Direction: The fireline leader must give clear instructions on the tasks to be accomplished.

Motivation: The fireline leader must give firefighters the drive and desire to do everything they are capable of doing to accomplish the mission.

Common Responsibilities of the Fireline Leader

- Know yourself and seek improvement.

- Seek responsibility and take responsibility for your actions.

- Make sound and timely decisions.

- Set a good example.

- Know your firefighters and take care of them.

- Develop a sense of responsibility in your subordinates.

- Ensure the task is understood, supervised, and accomplished.

- Build your firefighters into a team.

- Keep your firefighters informed.

- Use your firefighters in accordance with their level of training and experience.

MEDIA INTERVIEWS

- Prepare. Know the facts. Develop 2-3 key messages and deliver them. Prepare responses to potential tough questions. If possible, talk to reporter beforehand to get an idea of subjects, direction, and slant of the interview.

- Be concise. Give 10-20 second, simple answers, and when you're done, be quiet. If you botch the answer, simply ask to start again.

- Be honest, personable, professional, presentable (remove sunglasses and hats).

- Look at the reporter, not the camera.

- Ensure media are escorted and wearing PPE when going to the fireline or hazardous sites.

- Ensure local Public Affairs office is aware of media visits.

- NEVER talk "off the record," exaggerate, or try to be cute or funny.

- DON'T guess or speculate or say "no comment." Either explain why you can't answer the question or offer to track down the answer.

- DON'T disagree with the reporter. Instead, tactfully and immediately clarify and correct the information.

- DON'T speak for other agencies or offices; or use jargon or acronyms.

CHAPTER 8—COMMAND

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

ORGANIZATION CHART

INCIDENT COMMANDER

- Safety Officer
- Information Officer
- Liaison Officer
  - Agency Representatives
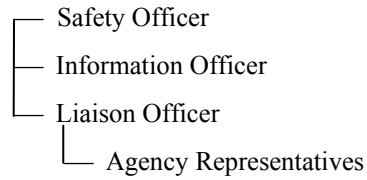
POSITION CHECKLISTS

Incident Commander (ICT1/2/3/4/5)

The Incident Commander is responsible for all incident activities.

Critical Safety Responsibilities:

- Ensure that safety receives priority consideration in the analysis of strategic alternatives, the development of the Incident Action Plan, and in all incident activities.

- Assess incident situation, both immediate and potential.

- Conduct risk assessment for all strategic alternatives.

- Maintain command and control of the incident management organization.

- Ensure safety and welfare of all incident personnel and the public is maintained.

- Ensure transfer of command is announced to host unit dispatch and to all incident personnel.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Obtain briefings from Agency Administrator and/or prior Incident Commander.

- Obtain Delegation of Authority from Agency Administrator.

- Set incident objectives.

- 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, if delegated by Agency Administrator.

- Ensure Incident Status Summary (ICS Form 209) is completed and forwarded to agency dispatch center(s) on schedule.

- Approve Demobilization Plan.

- Conduct strategy meetings, reviewing/ validating/revising the Wildland Fire Situation Analysis, incident objectives, strategies, and tactics.

- Determine effects of control actions on environmental and ecological processes.

- Ensure that strategic/tactical options consider all resource values.

- Foster an atmosphere free of discrimination, sexual harassment, and other forms of inappropriate behavior.

- Supervise staff activities; ensure functional performance is maintained; take corrective action.

- Participate in external incident affairs as required.

- Ensure incident financial accountability and expenditures are maintained to agency standards.

- Ensure incident documentation package is complete.

- Debrief with Agency Administrator.

Safety Officer (SOF1/2/3)

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.

Only one Safety Officer will be assigned for each incident. The Safety Officer may have assistant Safety Officers as necessary, and the assistant Safety Officer may represent assisting agencies or jurisdictions. Assistant Safety Officers may have specific responsibilities such as air operations, hazardous materials, etc.

Critical Safety Responsibilities:

- Analyze proposed and selected strategic alternatives from a safety perspective, ensuring that risk management is a priority consideration in the selection process.

- **DIRECT INTERVENTION WILL BE USED TO IMMEDIATELY CORRECT A DANGEROUS SITUATION.**

- Prepare the safety message included in the Incident Action Plan.

- Develop the Incident Safety Analysis (ICS Form 215A) planning matrix with the Operations Section Chief.

- Present safety briefing to overhead. Safety briefing should emphasize hazards and risks involved in action plan components.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Obtain briefing and operating procedures from the Incident Commander.

- Participate in planning meetings.

- 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.

- Establish operating procedures for assistant Safety Officers.

- Evaluate operating procedures. Update or modify procedures to meet the safety needs on the fire.

- Review and approve Medical Plan (ICS Form 206).

- Review Incident Action Plans to ensure that safety issues have been identified and mitigated.

- Analyze observations from staff and other personnel.

- Ensure accidents are investigated.

- Prepare accident report upon request of the Incident Commander.

- Monitor operational period lengths of incident personnel to ensure work/rest guidelines are followed; recommend corrective action to Incident Commander.

- Monitor food, potable water, and sanitation service inspections. Request assistance from health departments as needed.

- Monitor incident Personal Protective Equipment (PPE) needs.

- Inspect incident facilities, handtools, power equipment, vehicles, and mechanical equipment.

- Monitor driver/operator qualifications and operational periods.

- Monitor all air operations; review aircraft incidents/accident reports.

- Ensure appropriate accident/incident reports and other safety reports (such as SAFECOMS and SAFENETS) are completed and submitted.

- Prepare final Safety Report upon request of the Incident Commander.

- Maintain Unit Log (ICS Form 214).

Information Officer (IOF1/2/3)

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 Incident Status Summaries (ICS Form 209).

- Develop policy with Incident Commander, Agency Administrator, agency Public Affairs Officer, incident management team members, and/or incident investigators regarding information gathering and sharing. Observe constraints on release of information.

- Develop and receive Incident Commander's approval of a comprehensive, proactive communications strategy that reflects both immediate and long-term goals.

- Prepare initial information summary as soon as possible after arrival.

- 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 VIPs; provide PPE as necessary.

- Respond to special requests for information.

- Organize and supervise an adequate staff, equipment, and facilities.

- Keep informed of incident developments and control progress through planning meetings and regular contacts with other incident staff, host unit, and cooperating agencies.

- Keep the Incident Commander informed of any potential issues involving the general public, news media, or other sources.

- Maintain Unit Log (ICS Form 214).

- Review Common Responsibilities (Chapter 7, Page 158).

Liaison Officer (LOFR)

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.

- Maintain a current list of cooperating and assisting agencies assigned. Confirm resource list with Resource Unit Leader.

- 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.

    ✓ Operational period change information if crews are to be replaced.

    ✓ Expected demobilization schedule.

- Remain visible on the incident to incoming cooperators and assisting agencies.

- Respond to requests for information and resolve problems.

- Participate in planning meetings providing current resource status, limitations, and capability of other agency resources.

- Keep cooperating and assisting agencies informed of planning actions.

- Maintain Unit Log (ICS 214).

- Review Common Responsibilities (Chapter 7, Page 158).

Agency Representative (AREP)

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 and constraints of agency resources.

- Cooperate fully with Incident Commander, Command, 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 ensure 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.

- Review Common Responsibilities (Chapter 7, Page 158).

COMMAND AND GENERAL STAFF PLANNING CYCLE

Additional Command and General staff meetings should be scheduled to address issues and resolve problems.
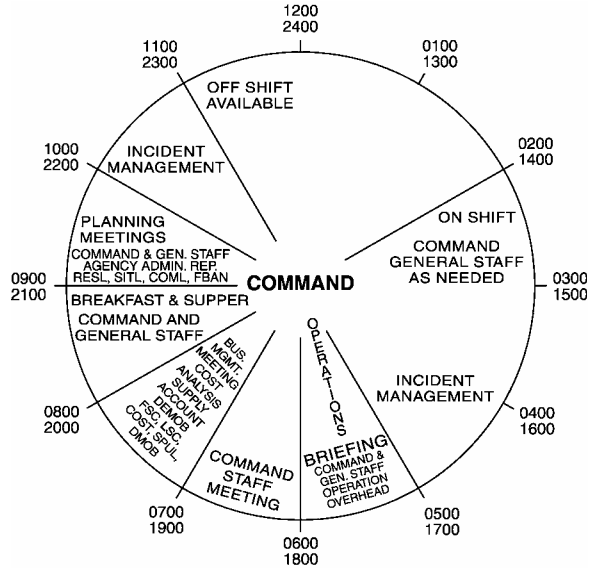
FIRELINE HANDBOOK

CHAPTER 9—OPERATIONS

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

ORGANIZATION CHART

OPERATIONS SECTION CHIEF

- Staging Area Manager
- Operations Branch Director
  - Division/Group Supervisor
    - Task Force Leader
    - Strike Team Leader
    - Firing Boss
    - Dozer Boss
      - Dozer/Tractor Plow Operator
    - Engine Boss
- Crew Representative
  - Crew Boss
    - Advanced Firefighter/Squad Boss
      - Firefighter
- Air Operations Branch Director
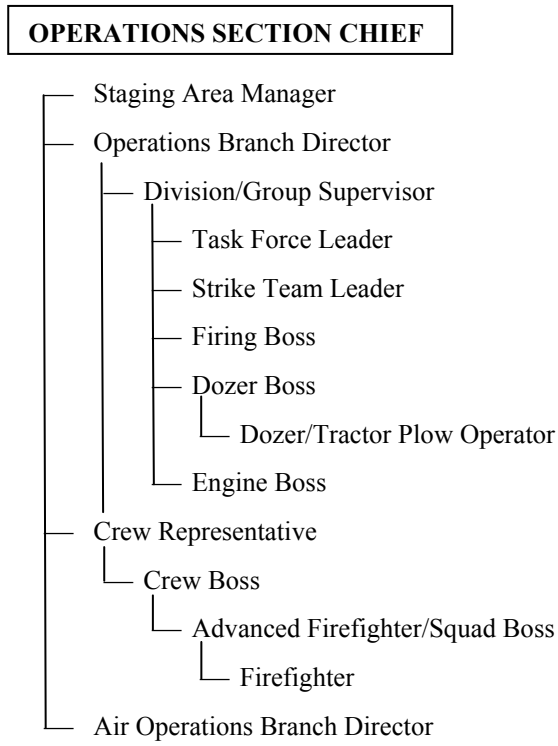
POSITION CHECKLISTS

Operations Section Chief (OSC1/2)

The Operations Section Chief, a member of the General Staff, is responsible for the management of all operations directly applicable to the primary mission.

Critical Safety Responsibilities:

- Obtain briefing from the Incident Commander.

- Supervise operations.

- Determine needs and request additional resources.

- Develop Incident Safety Analysis (215-A) with Safety Officer.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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.

- 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).

Staging Area Manager (STAM)

A Staging Area Manager is responsible for managing all activities within a Staging Area.

Critical Safety Responsibilities:

- Respond to requests for resource assignments.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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.

- Report resource status changes as required.

- Maintain staging area in orderly condition.

- Maintain Unit Log (ICS Form 214).

Operations Branch Director (OPBD)

The Operations Branch Director, when activated, is responsible for implementation of the portion of the Incident Action Plan applicable to the assigned Branch.

Critical Safety Responsibilities:

- Obtain briefing from the Operations Section Chief.

- Supervise Branch operations.

- Develop alternatives for Branch control operations.

- Resolve logistic problems reported by subordinates.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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.

- Approve accident and medical reports.

- Maintain Unit Log (ICS Form 214).

Division/Group Supervisor (DIVS)

The Division/Group Supervisor is responsible for the implementation of the assigned portion of the Incident Action Plan.

Critical Safety Responsibilities:

- Obtain briefing from Supervisor.

- 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.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Review the assignments with subordinates.

- Inform Incident Communications and/or Resource Unit of all status changes of resources assigned to the Division/Group.

- 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 Leader (TFLD)

The Task Force 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 his/her supervisor and maintains work records on assigned personnel.

Critical Safety Responsibilities:

- Obtain briefing from Supervisor.

- Monitor and inspect progress and make changes as necessary.

- Coordinate activities with adjacent strike team/task forces and single resources.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page158).

- Review assignments with subordinates and assign tasks.

- Travel to and from line with assigned resources.

- Keep supervisor advised of situation and resource status.

- Retain control of assigned resources while off line (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.

Strike Team Leader (STCR, STDZ, STEN, STPL)

The 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 his/her supervisor and maintains work records on assigned personnel.

Critical Safety Responsibilities:

- Obtain briefing from Supervisor.

- Monitor and inspect progress and make changes as necessary.

- Coordinate activities with adjacent strike team/task forces and single resources.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page158).

- Review assignments with subordinates and assign tasks.

- Travel to and from line with assigned resources.

- Keep supervisor advised of situation and resource status.

- Retain control of assigned resources while off line (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.

Crew Representative (CREP)

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.

Critical Safety Responsibilities:

- Maintain communications between the crew
  and the appropriate supervisors regarding the
  crew's safety and welfare.

Other Duties:

- Review Common Responsibilities
  (Chapter 7, Page 158).

- Look after the crew's welfare on and off the
  line.

- Report crew status to plans.

- As needed, maintain 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.

Dozer/Tractor-Plow Operator (DOZ1/TPL1)

Critical Safety Responsibilities:

- 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.

- Report all accidents, injuries, or hazardous conditions to supervisor.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Construct fireline with assigned equipment.

- Keep personal clothing and equipment in serviceable condition.

- Maintain use records on equipment and ensures timely posting.

Single Resource Boss (CRWB, DOZB, ENGB, FELB, HELB, TRPB, FIRB)

A Single Resource Boss is responsible for supervising and directing a fire suppression module such as a hand crew, engine, helicopter, dozer, tractor-plow, firing team, or one or more fallers.

Critical Safety Responsibilities:

- Obtain briefing from the Task Force/Strike Team Leader.

- Review assignments with subordinates and assign work tasks.

- Review current and predicted weather conditions and brief subordinates of expected fire behavior.

- 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 subordinates on safety items including escape routes and safety zones.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Obtain necessary equipment and supplies.

- Provide for their welfare.

- Monitor work progress.

- 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 affect personnel safety.

- 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).

- Turn time into Task Force/Strike Team Leader.

Advanced Firefighter/Squad Boss (FFT1)

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.

Critical Safety Responsibilities:

- 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.

- Look after the safety of assigned personnel.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Ensure that personnel have water and lunches.

- Keep time when requested by supervisor.

- Report problems with personnel to supervisor.

Firefighter (FFT2)

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.

Critical Safety Responsibilities:

- 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.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

OPERATIONS PLANNING CYCLE

The diagram shows a circular clock face with time markings around the perimeter:

- 1200 / 2400 (top)
- 1100 / 2300
- 1000 / 2200
- 0900 / 2100
- 0800 / 2000
- 0700 / 1900
- 0600 / 1800 (bottom)
- 0500 / 1700
- 0400 / 1600
- 0300 / 1500
- 0200 / 1400
- 0100 / 1300

Sectors and labels:

SUPERVISION

PLANNING MEETINGS
COMMAND & GEN. STAFF
AGENCY ADMIN. REP.
RESL. SITL. COML. FBAN
AIR TANKERS OVER FIRE

OFF DUTY

OPERATIONS
PREPARE MINI 215
AIR OPERATION PLANS

CREWS OFF LINE

COORD/DEBRIEF

DAY/NITE OPER.

HELIBASE OPER.

SHUT DOWN 2000

LIFT OFF 0700

PILOT 0600

OPERATIONS

OPERATION DUTY

CREWS ON LINE

AIR TANK. SECOND PRIORITY TO HELICOPTER

BRIEFING
COMMAND & GEN. STAFF
OPERATIONS OVERHEAD

OPERATIONS AIR AND HELICOPTER COORDINATION MEETING

FIRELINE HANDBOOK

CHAPTER 10—AIR OPERATIONS

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

ORGANIZATION CHART

AIR OPERATIONS BRANCH DIRECTOR

- Air Support Group Supervisor
    - Helibase Manager
        - Helicopter Boss (Single Resource) /Helicopter Manager (CWN)
        - Helispot Manager
        - Take-Off and Landing Coordinator
        - Aircraft Base Radio Operator
        - Aircraft Timekeeper
        - Deck Coordinator
            - Loadmaster
            - Parking Tender
    - Fixed-Wing Base Manager for Temp. Base
        - Mixmaster
    - Single Engine Air Tanker Manager
- Air Tactical Group Supervisor
    - Air Tanker-Fixed Wing Coordinator
    - Helicopter Coordinator

POSITION CHECKLISTS

Air Operations Branch Director (AOBD)

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.

Critical Safety Responsibilities:

- Obtain briefing from Operations Section Chief.

- Request declaration (or cancellation) of Temporary Flight Restriction.

- Coordinate airspace with other incidents and local or regional airspace coordinators.

- Apply risk management practices to all aviation operations.

- Ensure that agency aviation policies are established and followed.

- Establish procedures for emergency reassignment of aircraft on the incident.

- Inform the Air Tactical Supervisor of the air traffic situation external to the incident.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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 and coordinate with appropriate Operation Section personnel (Branch, Division, etc.).

- Orders and releases incident aircraft as needed.

- Supervise all Air Operations activities associated with the incident.

- Schedule approved flights of non-incident aircraft in the restricted airspace area.

- 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 (ASGS)

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.

Critical Safety Responsibilities:

- Obtain briefing from Air Operations Branch Director.

- Obtain assigned ground to air frequency for helibase operations from Communications Unit Leader or Communications Plan (ICS Form 205).

- Obtain appropriate crash-rescue service for helibases and helispots.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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.

- 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.

- Provide helicopter fueling, maintenance, and repair services.

- Maintain Unit Log (ICS Form 214).

Helibase Manager (HEB1/2)

Critical Safety Responsibilities:

- Obtain briefing from Air Support Supervisor.

- Conduct briefings for helibase/helispot personnel and pilots.

- Ensure helibase is posted and cordoned.

- Ensure air traffic control operations are in effect.

- Manage appropriate crash-rescue services for the helibase and helispots.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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.

- 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.

- 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 (CWN)/Helicopter Boss (HCWN/HELB)

Critical Safety Responsibilities:

- Obtain briefing from helibase manager.

- Ensure fundamental helicopter safety rules are used.

- Administer contracts and verify helicopter and pilot qualifications.

- 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.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Supervise and provide leadership for all aspects of helicopter operations.

- Coordinate activities of helicopter module personnel (if assigned).

- Conduct appropriate briefings.

Helispot Manager (HESM)

The Helispot Manager reports to the Helibase Manager and is primarily responsible for managing all activities at the assigned helispot.

Critical Safety Responsibilities:

- Obtain briefing from Helibase Manager.

- Ensure helispot air traffic control operations are in effect.

- Perform manifesting and loading of personnel and cargo.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Inform Helibase Manager of helispot activities.

- Manage resources and supplies dispatched to helispot.

- Coordinate requests from Helibase Manager for air support.

- Ensure adequate dust abatement.

- Supervise or perform retardant loading at helispot.

- Maintain agency records and reports of helicopter activities.

Takeoff and Landing Coordinator (TOLC)

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.

Critical Safety Responsibilities:

- 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.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Coordinate with Deck Coordinator and Parking Tender.

Aircraft Base Radio Operator (ABRO)

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 Take-Off and Landing Coordinator.

Critical Safety Responsibilities:

- Obtain briefing from Base Manager.

- Maintain a log of all aircraft takeoffs and landings, ETAs, ETDs, 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.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Obtain Air Operation Summary Worksheet (ICS Form 220).

- Notify Take-Off and Landing Coordinator of incoming aircraft.

- Verify daily radio frequencies with Base Manager.

Aircraft Timekeeper (ATIM)

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 (DECK)

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.

Critical Safety Responsibilities:

- Obtain briefing from supervisor.

- Establish emergency landing areas.

- Ensure deck personnel understand crash/rescue procedures.

- Establish and mark landing areas.

- Ensure sufficient personnel are available to safely load and unload personnel and cargo.

- Ensure deck area is properly posted.

- Ensure proper manifesting and load calculations are done.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Supervise deck management personnel.

- Apply dust abatement when necessary.

- Ensure Air Traffic Control operation is coordinated with the Take-Off and Landing Coordinator.

- Maintain agency records.

Loadmaster (Personnel/Cargo) (LOAD)

The Loadmaster reports to the Deck Coordinator and is responsible for the safe operation of loading and unloading of cargo and personnel.

Critical Safety Responsibilities:

- 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 Take-Off and Landing Coordinator.

- Ensure that appropriate hazardous materials regulations are enforced.

Parking Tender (PARK)

The Parking Tender reports to the Deck Coordinator and is responsible for parking aircraft.

Critical Safety Responsibilities:

- Obtain briefing from the Deck Coordinator.

- Know and understand the crash/rescue procedures.

- Check personnel seat belts, cargo restraints, and aircraft doors.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Supervise activities at the landing area.

- Ensure landing area is properly maintained.

Fixed-Wing Base Manager (FWBM) (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.

Critical Safety Responsibilities:

- 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.

- Request necessary communications and operators through the Air Support Group Supervisor.

- Coordinate all flights with the Air Tactical Group Supervisor.

- Regulate movement of assigned aircraft, motor vehicles, and personnel on the airfield.

- Be thoroughly familiar with and enforce all safety requirements of the operation.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Secure a priority list of air missions and schedule all flights.

- Secure and provide all necessary ground facilities, supplies, and services required at operating base.

- 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.

Mixmaster (MXMS)

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.

Critical Safety Responsibilities:

- Obtain briefing from supervisor.

- Check accessory equipment, such as valves, hoses, and storage tanks.

- Supervise crew in loading retardant into aircraft.

- Attend to the safety and welfare of crew.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Make sure supply of retardants is kept ahead of demand.

- Keep necessary agency records.

Single Engine Air Tanker Manager (SEMG)

The Single Engine Air Tanker Manager reports to the Fixed Wing Base Manager or Air Support Group Supervisor, if assigned to an Incident Management Team.

Critical Safety Responsibilities:

- Conduct pre-use and daily briefing with pilot and support crew.

- Regulate all aircraft and ground traffic on and around SEAT base of operation.

- Verify correct communications and frequency procedures are followed.

- Suspend operations due to safety issues or other appropriate concerns.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Conduct pre-use walk around inspection of aircraft and ground support equipment.

- Order aircraft services as provided in contract specifications.

- Perform as liaison with airport/airstrip management.

- Perform as liaison between the SEAT vendor and the user agency.

- Initiate and sign correspondence and other contract administration documents.

- Complete all required forms, records, reports, and documents as required by using agency.

- Record and approve availability and flight times.

- Ensure all accepted retardant/suppressant mixing and loading procedures are followed.

- Act as liaison between vendor and Air Tanker Base Manager when operating for an established air tanker base.

- Perform SEAT logistical coordination according to the Interagency SEAT Operations Guide.

- Coordinate with the local dispatch organization or Air Support Group Supervisor, if assigned to Incident Management Team for mission assignments.

Air Tactical Group Supervisor (ATGS)

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.

Critical Safety Responsibilities:

- Obtain briefing from Air Operations Branch Director.

- Determine what aircraft are operating within area of assignment.

- Ensure that a good flight following plan is in place for all aircraft.

- Determine that adequate and appropriate FM and VHF radio frequencies are used.

- Identify aviation safety issues and mitigate any hazards.

- Establish and maintain communications with Air Operations Branch Director, Air Tanker and Helicopter Coordinators, Incident Helibase, and Fixed-Wing Support bases.

- Receive and act on reports of non-incident aircraft violating Temporary Flight Restriction (TFR).

- Manage air attack activities based upon Incident Action Plan.

- Coordinate approved flights of non-incident aircraft or non-tactical flights in 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.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Report on incidents or accidents.

- Maintain Unit Log (ICS Form 214).

Air Tanker/Fixed Wing Coordinator (ATCO)

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.

Critical Safety Responsibilities:

- 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 correct unsafe practices or conditions.

Other Duties:

- Review Common Responsibilities
  (Chapter 7, Page 158).

- 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 (HLCO)

The Helicopter Coordinator reports to the Air
Tactical Group Supervisor and is responsible for
coordinating tactical or logistical helicopter
mission(s) at the incident.

Critical Safety Responsibilities:

- 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 Air Tactical 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 correct unsafe practices or conditions.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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

- Conduct high-level recon before low-level flight

- Established flight routes, helispot locations, marking, etc.

- Flight path obstructions/wires, towers, etc.

- Topographic problems

- Working altitude Mean Sea Level (MSL)

- Local wind turbulence

- High wind predictions

- Known downdraft areas

- Other aircraft operations over the incident

- Receive briefing on all Temporary Flight Restrictions (TFR) in the area when transitioning from one incident/fire to another or being released to another location.

- Work schedules

- Flight and duty limitations

- Communications frequencies

- Parking areas

- Taxi ways

- Fueling procedures

Airport Facilities and Procedures

<u>Facilities</u>. 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, APUs, 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.

- As needed develop memorandum of understanding or other agreement including any financial arrangements.

Air Traffic Operations

Following are factors to be considered in air traffic operations:

En route 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 checkpoint areas on reporting into Temporary Flight Restriction (TFR).

- Maintain primary and secondary radio frequencies for all aircraft that are en route 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:

- Use appropriate ICS Forms found in the Interagency Helicopter Operations Guide (IHOG).

- Use appropriate ICS Forms for Interagency Fixed-Wing Base Operations.

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.

Aerial Retardant Use Considerations

<u>Main Principle</u>: 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.

Paracargo and Aerial Retardant Operations Safety

The paracargo danger zone is a strip of 200 feet on each side of the flight path, 300 feet in the direction of approach, and 1300 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 with top of "T" into the wind. Erect paper streamer or flagging on long pole to indicate wind direction.

- An individual 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.

- Camps should be at least 600 feet from target area and outside of danger zone.

- Allow no one in danger zone until drop is complete.

- Beware of "streamers" or parachutes that don't open.

Personnel can be injured by the impact of material dropped by aircraft. Clear personnel out of target area when drop is to be made. If you can't escape:

- Hold your hand tool away from your body.

- Lie face down with head toward oncoming aircraft and hardhat 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.

Drop-Site Marking

- A white or orange "T" made with two strips of cloth or crepe paper should be staked or held in place with rocks to identify the target as follows:

   ✓ Letters should be at least 7 feet long.

   ✓ Top of the "T" should be toward the wind to indicate direction.

   ✓ When several drop sites are used in the same vicinity, a number will be placed below and to the right of the "T" to designate individual drop site.

   ✓ In all cases, prior to abandoning a drop site, the marker shall be removed or destroyed.

Retrieving Cargo

- All cargo parachutes should be returned to base for repacking at first opportunity.

- Care must be exercised to prevent damage in recovering parachutes if they are tangled in brush or trees.

Other Considerations

- Place all paracargo orders well in advance of need.

- Keep all personnel, animals, and vehicles clear of danger zone. Danger zone is 200 feet on each side, 300 feet on approach, and 1,300 feet on getaway leg of flight line.

- Do not have camp closer than 600 feet from target and outside danger zone.

FIRELINE HANDBOOK

CHAPTER 11—PLANNING

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

ORGANIZATION CHART

| PLANNING SECTION CHIEF |

— Resources Unit Leader
    └— Status/Check-in Recorder
— Situation Unit Leader
    ├— Field Observer
    ├— Infrared Interpreter
    ├— Display Processor
    └— Fire Behavior Analyst
        └— Incident Meteorologist
— Documentation Unit Leader
— Demobilization Unit Leader
— Interagency Resource Representative
— Human Resource Specialist
└— Training Specialist
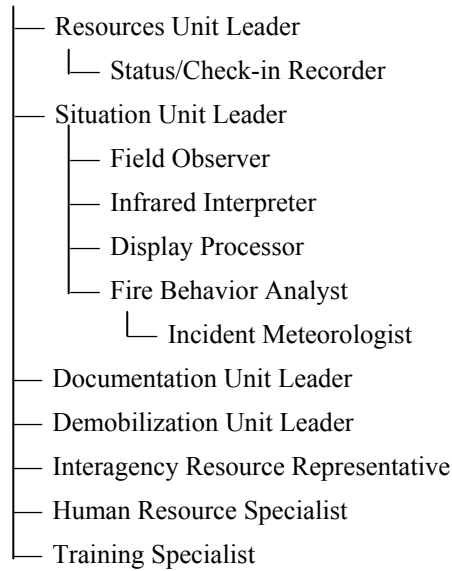
POSITION CHECKLISTS

Planning Section Chief (PSC1/2)

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.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 and operational briefings.

- 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.

Resources Unit Leader (RESL)

The Resources Unit Leader is responsible for establishing all incident check-in activities; the preparation and processing of resource status 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.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Planning Section Chief.

- Establish check-in function at incident locations.

- Verify that all resources are 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).

- 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.

- Maintain Unit Log (ICS Form 214).

Status/Check-in Recorder (SCKN)

Status/Check-in Recorders are used at each check-in location to ensure that all resources assigned to an incident are accounted for. (Where practical, employ Demobilization Unit Leader as a Status/Check-in Recorder to ensure complete information is obtained at check-in.)

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Resources 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 Resources Unit on regular, prearranged schedule.

- Forward completed Check-in Lists (ICS Form 211) to the Resources Unit.

- Prepare, post, and maintain Resource Status Cards (ICS Form 219).

Situation Unit Leader (SITL)

The Situation Unit Leader is responsible for the collection and organization of incident status and information and the evaluation, analysis, and display of that information for use by ICS personnel and agency dispatchers.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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.

- Maintain Situation Unit records.

- Maintain Unit Log (ICS Form 214).

- Maintain incident history on maps and narrative from initial attack to final demobilization.

Field Observer (FOBS)

The Field Observer is responsible for collecting incident status information from personal observations at the incident, and providing this information to the Situation Unit Leader.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 appropriate Operations overhead know you are in the area.

- Attend end-of-shift debriefings of operations personnel, and at other times as appropriate, to obtain situation information.

- Identify possible facilities locations: access routes, road conditions, and possible control line locations.

- Make weather observations as requested.

- Immediately report any condition that may cause danger or be a safety hazard to personnel.

- Assist in preparation of maps for use in Situation Unit, Command Post, and Incident Action Plan to ensure accuracy.

Infrared Interpreter (IRIN)

The Infrared Interpreter directs infrared mapping operations when assigned.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 Planning Section currently advised of findings.

- Obtain direct communications with infrared crew liaison.

Display Processor (DPRO)

The display processor is responsible for the display of incident status information obtained from field observers, aerial and ortho photographs, and infrared data.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Situation Unit Leader.

- Determine:

  - ✓ Location of work assignments.

  - ✓ Numbers, types, and locations of displays required.

  - ✓ Priorities.

  - ✓ Map requirements for incident action plans.

  - ✓ Time limits for completion.

      ✓ Field observer assignments and communications means.

- Obtain necessary equipment and supplies.

- Obtain copy of incident action plan for each operational period.

- Assist situation unit leader in analyzing and evaluating field reports.

- Develop required displays in accordance with time limits for completion.

- Support special requirements for development of incident maps.

- Demobilize incident displays in accordance with incident demobilization plan.

Fire Behavior Analyst (FBAN)

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.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 that includes safety considerations for each operational period.

- Participate in operational briefings to present fire behavior predictions and to answer questions related to fire behavior, interpretations, and safety.

- Monitor actual fire behavior to validate predictions, document behavior, and anticipate potential safety problems.

- Ensure all affected incident personnel are advised of anticipated changes in weather conditions and/or predictions.

- Provide site-specific fire behavior predictions, as requested.

Incident Meteorologist (IMET)

Furnishes detailed microclimatic weather information, both actual and predicted, for the incident to ensure safe and effective operations.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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.

Documentation Unit Leader (DOCL)

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.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 (DMOB)

The Demobilization Unit Leader is responsible for the preparation of the Demobilization Plan and schedule. The Demobilization Unit Leader assists the Command and General Staff in ensuring an orderly, safe, and efficient movement of personnel and equipment from the incident.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 (IC, PSC, Agency, etc.).

- Distribute plan and any amendments.

- Monitor and supervise implementation of Demobilization Plan.

- Maintain Unit Log (ICS Form 214).

Interagency Resource Representative (IARR)

The Interagency Resource Representative may be assigned to an incident to serve as the sending area's representative for crews, overhead, and equipment assigned to an incident. The Interagency Resource Representative is responsible to the home unit to coordinate, through the incident management team, the well being of all resources assigned from the home unit. This position will normally check-in with the Planning Section, but is not an incident resource.

- Review Common Responsibilities
  (Refer Chapter 7, Page 158).

- 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. Verify and update list(s) as needed at the incident.

- 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 pertinent paperwork and evaluations relating to the resources for which responsible.

Human Resource Specialist (HRSP)

The Human Resource Specialist is responsible for monitoring civil rights and related human resource activities to ensure 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.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Establish contact with the Planning Section Chief to determine placement within the organization.

- Obtain briefing from the assigned supervisor.

- Arrange for necessary workspace, 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 for inclusion in Incident Action Plan(s).

- 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 (TNSP)

A Training Specialist may help achieve and oversee training opportunities on an incident. Training activities, to be effective, must be coordinated at all levels.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 Form 214).

PLANNING PROCESS

The checklist below 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 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. In addition, an Incident Safety Analysis (LCES) (ICS Form 215A) must be completed for each planning meeting. The form should be completed as a draft prior to the meeting and discussed as part of the planning process.

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. Briefing on situation and resource status.	Planning Section Chief
2. Set/review incident objectives.	Incident Commander
3. Plot control lines, establish branch and division boundaries, and identify group assignments.	Operations Section Chief
4. Specify tactics for each division/group.	Operations Section Chief
5. Specify safety mitigation measures for identified hazards in divisions/groups.	Safety Officer
6. Specify resources needed by division and group.	Operations Section Chief Planning Section Chief
7. Specify Operations facilities and reporting locations. Plot on map.	Operations Section Chief Planning Section Chief Logistics Section Chief
8. Develop resource and personnel order.	Logistics Section Chief
9. Consider Communications, Medical, and Traffic Plan requirements.	Logistics Section Chief Planning Section Chief
10. Finalize, approve, and implement Incident Action Plan.	Planning Section Chief Incident Commander Operations Section Chief

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. Utilizing the Demobilization Unit Leader as a Status/Check-in Recorder early in the incident, where possible, facilitates the collection of resource information necessary to develop a demobilization plan. The complexity of the incident, kinds and types of resources, and the level of resources involved (local, regional, or national) dictate 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.

THE PLANNING CYCLE
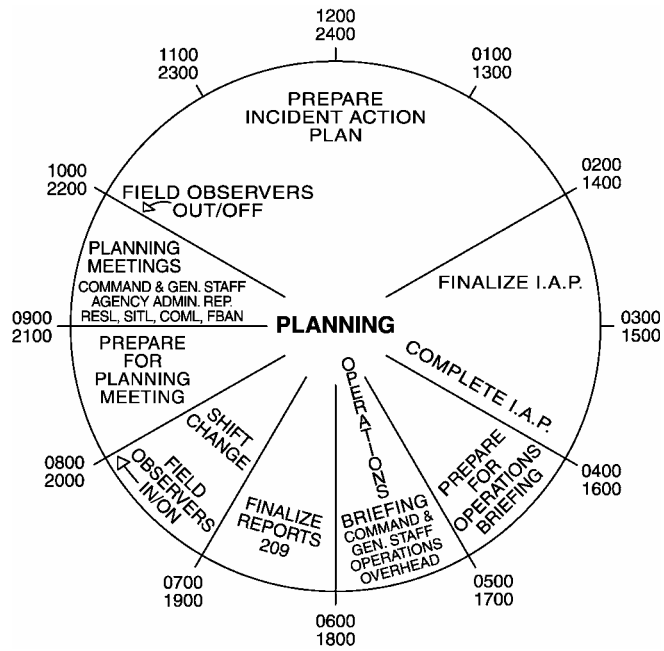
CHAPTER 12—LOGISTICS

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

ORGANIZATION CHART

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┌─────────────────────────┐
│ LOGISTICS SECTION CHIEF │
└─────────────────────────┘

── Service Branch Director
        ── Communications Unit Leader
                ── Communications Technician
                └─ Incident Communications Center
                   Manager
        ── Medical Unit Leader
        └─ Food Unit Leader
── Support Branch Director
        ── Supply Unit Leader
                ── Ordering Manager
                └─ Receiving/Distribution Manager
                        └─ Tool/Equipment Specialist
        ── Facilities Unit Leader
                └─ Base/Camp Manager
                        └─ Facility Maintenance
                           Specialist
        ── Ground Support Unit Leader
                └─ Equipment Manager
        └─ Security Manager
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POSITION CHECKLISTS

Logistics Section Chief (LSC1/2)

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.

Critical Safety Responsibilities:

- Obtain briefing from agency administrator/ outgoing incident commander and gather intelligence.

- Collect information from outgoing Logistics personnel responsible for incident prior to your arrival.

- Obtain briefing from Incident Commander.

- Provide for the safety and welfare of assigned personnel.

- Gather information necessary to assess incident assignment and determine immediate needs and actions.

- Identify service and support requirements for planned and expected operations.

- Supervise Logistics Section personnel.

- Participate in preparation of Incident Action Plan.

- Conduct logistics section meeting and/or briefing.

- Ensure Communication Plan, Medical Plan, and Transportation Plan are updated and provided to Planning Section.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Obtain and assemble information and materials needed for logistics kit.

- Establish and maintain positive interpersonal and interagency working relationships.

- Advise on current service and support capabilities.

- Plan organization of Logistics Section.

- Assign work locations and preliminary work tasks to Section Leaders.

- Participate in the operational period briefing.

- Interact and coordinate with all Command and General Staff to ensure role as a team player.

- Update Incident Commander on accomplishments and/or problems.

- Maintain Unit Log (ICS Form 214).

- Ensure all personnel and equipment time is completed at the end of each operational period.

- Consider demobilization prior to the actual need to release excess section resources.

- Ensure that performance ratings are completed.

- Assist in the development, approval, and implementation of Demobilization Plan.

Service Branch Director (SVBD)

The Service Branch Director is responsible for the management of all service activities at the incident. The Service Branch Director supervises the operations of the Communications, Medical, and Food Unit Leaders.

Critical Safety Responsibilities:

- Obtain briefing from Logistic Section Chief.

- Provide for the safety and welfare of assigned personnel.

- Gather information necessary to assess incident assignment and determine immediate needs and actions.

- Supervise Service Branch Leaders.

- Ensure Communications Plan and Medical Plan are updated and provided to Plans.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Establish and maintain positive interpersonal and interagency working relationships.

- Advise on current service capabilities.

- Identify service requirements for planned and expected operations.

- Plan organization of Service Branch.

- Coordinate activities of Branch Units.

- Assign work locations and preliminary work tasks to Service Branch Leaders.

- Inform Logistics Chief of Branch activities.

- Resolve Service Branch problems.

- Participate in Logistics Section planning.

- Update Logistics Section Chief on accomplishments and/or problems.

- Maintain Unit Log (ICS Form 214).

- Ensure all personnel and equipment time is completed at the end of each operational period.

- Consider demobilization prior to the actual need to release excess branch resources.

- Ensure that performance ratings are completed.

- Assist in the development and implementation of Demobilization Plan.

Communications Unit Leader (COML)

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.

Critical Safety Responsibilities:

- Prepare and implement the Incident Communications Plan (ICS Form 205).

- Establish adequate communications over the incident.

- Advise on communications capabilities and limitations.

- Provide technical information, as required, on limitations and adequacy of communications systems in use, equipment capabilities, equipment available, and potential problems.

Other Duties:

- Review Common Responsibilities
  (Chapter 7, Page 158).

- Establish the Communications and Message
  Centers.

- Set up telephone and public address systems.

- Establish appropriate communications
  distribution and maintenance centers within
  base/camp(s).

- Establish an equipment accountability system.

- Maintain records on communications
  equipment.

- Recover equipment from relieved or released
  units.

- Maintain Unit Log (ICS Form 214).

Communications Technician (COMT)

The Incident Communications Technician works
under the direction of the Communication Unit
Leader and is responsible for installation,
maintenance, and tracking of communication
equipment.

Critical Safety Responsibilities:

- Assist in designing communication system for
  incident to meet operational needs.

- Install and test communication equipment.

- Clone or program radios

- Repair and/or replace communication
  equipment

Other Duties:

- Review Common Responsibilities
  (Chapter 7, Page 158).

- Issue and track communication equipment.

- Identify operational restrictions.

- Maintain Unit Log (ICS Form 214).

Incident Communications Center Manager (INCM)

The Incident Communications Center Manager is
responsible to receive and transmit radio and
telephone messages among and between personnel
and to provide dispatch services at the incident.

Critical Safety Responsibilities:

- Establish communications procedures.

- Determine frequencies in use.

- Determine nets established or to be
  established.

- Determine location of repeaters.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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 (MEDL)

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.

Critical Safety Responsibilities:

- 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.

- Audit use of "over-the-counter" drugs being dispensed by the Medical Unit to discourage improper use or abuse.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Participate in Logistics Section/Service Branch planning.

- Prepare medical reports.

- Contact Compensation-for-Injury Specialist to establish coordination procedures.

- Provide space for Compensation-for-Injury Specialist as needed.

- Maintain Unit Log (ICS Form 214).

Food Unit Leader (FDUL)

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.

Critical Safety Responsibilities:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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 (SUBD)

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.

Critical Safety Responsibilities:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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 (SPUL)

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.

Critical Safety Responsibilities:

- Develop and implement safety and security requirements.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Participate in Logistics Section/Support Branch planning.

- Determine the type and amount of supplies needed to support incident.

- Arrange for receiving ordered supplies.

- 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 (ORDM)

The Ordering Manager is responsible for placing all orders for supplies and equipment for the incident.

- Review Common Responsibilities (Chapter 7, Page 158).

- 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 (RCDM)

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.

Critical Safety Responsibilities:

- Develop security needs for supply area.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- 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.

- Submit necessary reports to Supply Unit Leader.

- Notify Ordering Manager and Finance Section of supplies and equipment received.

Tool and Equipment Specialist (TESP)

The Tool and Equipment Specialist is responsible for sharpening, servicing, and repair of all hand tools.

Critical Safety Responsibilities:

- Ensure safety practices are followed in tool conditioning area.

Other Duties:

- Review Common Responsibilities
  (Chapter 7, Page 158).

- 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.

Facilities Unit Leader (FACL)

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.

Critical Safety Responsibilities:

- Provide facility maintenance services:
  sanitation, lighting, clean up, and potable
  water.

Other Duties:

- Review Common Responsibilities
  (Chapter 7, Page 158).

- 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.

- Maintain Unit Log (ICS Form 214).

Base/Camp Manager (BCMG)

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:

Critical Safety Responsibilities:

- Ensure compliance with all applicable safety
  regulations.

- Determine or establish special requirements or
  restrictions on facilities or operations.

- Ensure that all facilities and equipment are set
  up and functioning properly.

- Supervise the set-up of sleeping, shower, and
  sanitation facilities.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Obtain necessary equipment and supplies.

- Provide all necessary facility maintenance services.

Facility Maintenance Specialist (FMNT)

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.

Critical Safety Responsibilities:

- Ensure that all facilities are maintained in a safe condition.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Obtain supplies, tools, and equipment.

- Supervise and perform assigned work.

- Disassemble temporary facilities when no longer required.

- Restore area to pre-incident condition.

Ground Support Unit Leader (GSUL)

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.

Critical Safety Responsibilities:

- Prepare a transportation plan for approval by the Logistics Section Chief (obtain traffic data from the Planning Section).

- Mark and correct road system safety hazards and maintain incident roads.

- Ensure driver familiarity with conditions. Coordinate with Safety Officer and Agency Representatives.

- 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.

- Notify Resources Unit of all status changes on support and transportation vehicles.

- Arrange for, activate, and document fueling, maintenance, and repair of ground resources.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Participate in Support Branch/Logistics Section planning activities.

- 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 (fuel, spare parts).

- Submit reports to Support Branch Director as directed.

- Sign drop points, water sources, road junctions, etc.

- Maintain Unit Log (ICS Form 214).

Equipment Manager (EQPM)

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.

Critical Safety Responsibilities:

- Ensure all appropriate safety measures are followed.

- Inspect equipment condition and ensure coverage by equipment agreement.

- Obtain Incident Action Plan to determine locations for assigned resources, Staging Area locations, fueling, and service requirements.

- Coordinate with Agency Representatives on service and repair as required.

- Determine supplies (gasoline, diesel, oil, and parts) needed to maintain equipment in efficient operating condition).

- Provide maintenance and fueling according to schedule.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Prepare schedules to maximize use of equipment.

- Provide transportation and support vehicles.

- Maintain Support Vehicle Inventory (ICS Form 218).

- Maintain equipment rental records.

- Maintain equipment service and use records.

- Ensure all equipment time reports are accurate and turned in daily to the Equipment Time Recorder.

Security Manager (SECM)

The Security Manager is responsible for providing safeguards needed to protect personnel and facilities from loss or damage.

Critical Safety Responsibilities:

- 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.

Other Duties:

- Review Common Responsibilities (Chapter 7, Page 158).

- Document all complaints and suspicious occurrences.

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 and 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 mealtime 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 such as radio telephone interconnect (RTI) voice, Satellite (voice and data), landline 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 that 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
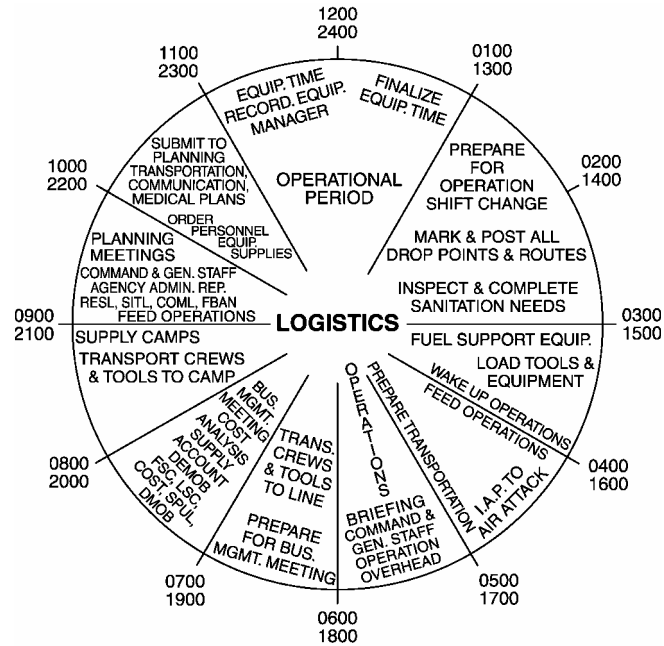
CHAPTER 13—
FINANCE/ADMINISTRATION

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

ORGANIZATION CHART

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┌─────────────────────────────────────┐
│   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
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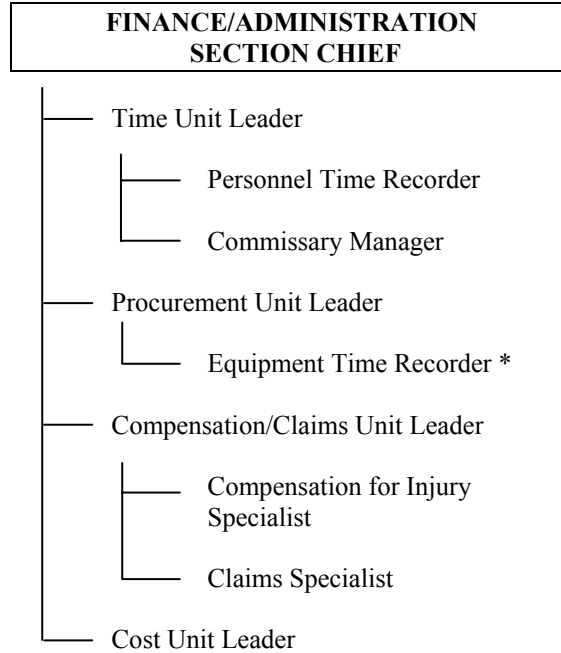
* On some incidents the Equipment Time
Recorder is assigned to and reports to the
Procurement Leader; however, this is a skill
position and can be assigned anywhere in the
Incident Command organization. Some
managers prefer to keep all time keeping under
the Time Unit and assign the Equipment Time
Recorder the Time Unit Leader.

POSITION CHECKLISTS

Finance/Administration Section Chief (FSC1/2)

The Finance/Administration Section Chief is responsible for all financial, administrative, and cost analysis aspects of the incident and for supervising members of the Finance/ Administration Section.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Incident Commander.

- Gather pertinent information from briefings with responsible agencies.

- Participate in planning meetings and IAP preparation and review.

- Develop an operating plan for the Finance/Administration Section; fill supply and support needs.

- Review contacts, memoranda of understanding, and cooperative agreements for Incident impact and application.

- 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.

- Maintain Unit Activity Log (ICS Form 214).

Time Unit Leader (TIME)

The Time Unit Leader is responsible for personnel time recording and for managing the commissary operation.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 agency(s) 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.

- Release time reports from assisting agency personnel to the respective Agency Representatives prior to demobilization.

- Brief Finance/Administration Section Chief on current problems and recommendations, outstanding issues, and follow-up requirements.

Personnel Time Recorder (PTRC)

Under supervision of the Time Unit Leader, Personnel Time Recorder is responsible for overseeing the recording of time for all personnel assigned to an incident.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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 (CMSY)

Under the supervision of the Time Unit Leader, Commissary Manager is responsible for commissary operations and security.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Time Unit Leader.

- Set up and provide commissary operation to meet incident needs.

- 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. 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 all records are closed out and commissary stock is inventoried and returned to Supply Unit prior to demobilization.

Procurement Unit Leader (PROC)

The Procurement Unit Leader is responsible for administering all financial matters pertaining to vendor contracts, leases, and fiscal agreements.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Review incident needs and any special procedures with Unit Leaders, as needed.

- Coordinate 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 and agreements with local supply vendors as required.

- Ensure that a system is in place that meets agency property management requirements and accounting for all new property purchases.

- Interpret contracts/agreements and resolve claims or disputes within delegated authority.

- Provide for coordination between the Ordering Manager, agency dispatch, and all other procurement organizations supporting the incident.

- Coordinate with Compensation/Claims Unit on procedures for handling claims.

- Complete final processing of contracts and agreements, process documents for payment.

- Coordinate cost data, in contracts, with Cost Unit Leader.

- Brief Finance/Administration Section Chief on current problems and recommendations, outstanding issues, and follow-up requirements.

- Maintain Unit Log (ICS Form 214).

Equipment Time Recorder (EQTR)

Under supervision of the Procurement Unit Leader, Equipment Time Recorder is responsible for overseeing the recording of time for all equipment assigned to an incident.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from supervisor.

- Set up Equipment Time Recorder function in location designated by Supervisor.

- Assist resources, ground support, and facilities 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 and deductions 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 (COMP)

The Compensation/Claims Unit Leader is responsible for the overall management and direction of all administrative matters pertaining to compensation for injury and claims-related activities kept for an incident.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Finance/Administration Section Chief.

- Establish contact with Safety Officer, Liaison Officer, and Agency Representatives.

- Coordinate with Interagency Resource Representative, if any are assigned.

- Establish a Compensation for Injury work area within or as close as possible to the Medical Unit.

- Determine the need for Compensation for Injury and Claims Specialists and order personnel as needed.

- Review Incident Medical Plan.

- Coordinate with Procurement Unit on procedures for handling claims.

- Periodically review logs and forms produced by Compensation/Claims Specialists to ensure compliance with agency requirements and policies.

- 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 logs and forms are complete and routed to the appropriate agency for post-incident processing prior to demobilization.

- Maintain Unit Log (ICS Form 214).

Compensation for Injury Specialist (INJR)

Under the supervision of the Compensation/Claim Unit Leader, the Compensation for Injury Specialist is responsible for administering financial matters resulting form serious injuries and fatalities occurring on an incident. Close coordination is required with the Medical Unit.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Compensation/Claims Unit Leader.

- Co-locate 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 injures occurring on incident.

- Coordinate with appropriate agency(s) to look after injured personnel in local hospitals after demobilization.

Claims Specialist (CLMS)

Under the supervision of the Compensation/Claims Unit Leader, the Claims Specialist is responsible for managing all claims-related activities (other than injury) for an incident.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- 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.

- Request skilled investigation from appropriate agency, when needed.

- 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.

- Document any incomplete investigations.

Cost Unit Leader (COST)

The Cost Unit Leader is responsible for collecting all cost data, performing cost effectiveness analyses, providing cost estimates, and cost saving recommendations.

- Review Common Responsibilities (Refer Chapter 7, Page 158).

- Obtain briefing from Finance/Administration Section Chief.

- Coordinate with agency on cost reporting procedures.

- Collect 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
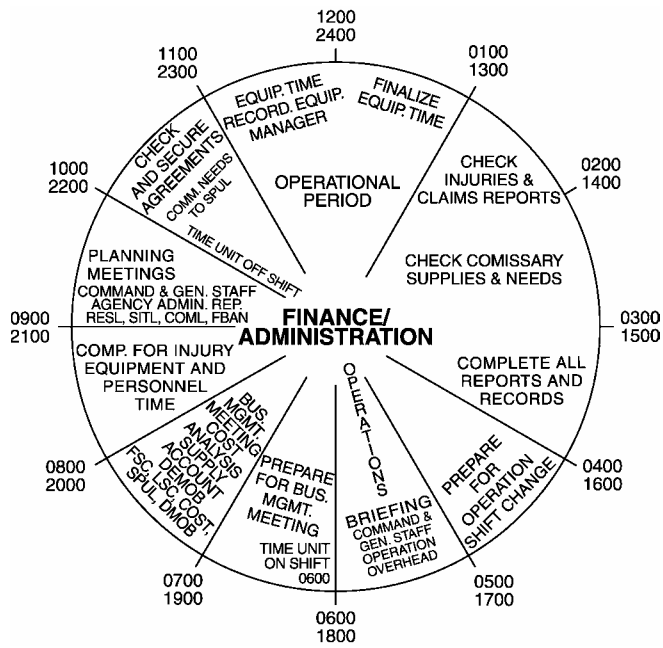
CONTENTS

SAFETY FIRST—NO EXCEPTIONS

FIRE INVESTIGATION

Investigation Procedures

Protect area of origin and consider the need for a qualified Fire Investigator. The success of the investigation and law enforcement will depend upon your actions. Secure all information and evidence possible.

EN ROUTE TO FIRE

- Make note of the smoke column. Note color, size, direction of travel, and any changes in its appearance.

- When practical, note the license number, make, model, and color of any vehicles that you pass en route to the scene. Note the time and direction of travel. Attempt to determine the number of occupants and a description of them if possible.

- Note the condition (open, closed, locked, unlocked) of any gates accessing the fire area.

- Note any activities near the fire area that might be associated with the cause (road construction, logging, blasting, etc.).

AT FIRE AREA

- Note any campers in the area.

- Note any evidence of a large gathering of people, such as:

  - ✓ Large accumulations of trash.

  - ✓ Fire circles.

  - ✓ Areas of large amounts of soil disturbance by motorcycles, dune buggies, and four-wheel drive vehicles.

- Locate and protect the general area of origin. There may be more than one ignition area.

- Secure this area with barrier tape or flagging and keep vehicles and suppression activities away from this area.

- Check for evidence of lightning, being careful not to disturb the general area of origin.

- Look over the area for apparent human causes.

- If evidence or any material foreign to area indicates fire is human-caused, a qualified investigator should be obtained. Do not attempt to collect physical evidence or disturb the general area or origin. The qualified investigator will conduct further investigation. If fragile physical evidence is discovered, protect it from damage by flagging it off and keeping suppression activities away from it.

- Upon arrival, take weather readings that as a minimum include temperature, wind direction and speed, and relative humidity. Provide this information to the qualified investigator.

- Note any vehicles that drive by the origin area. Record license numbers, make, model, color, and descriptions of any occupants, and note the time and how many times they pass by.

- Persons at the scene should be interviewed when possible. The interview is an **INFORMAL DISCUSSION** with persons(s) that may have knowledge of the fire cause.

  Information obtained will be voluntary. The informant will not be coerced into providing any information. It is not necessary for the person being interviewed to sign any document connected with the fire, nor is it necessary to read him the "Notice of Rights." The interview should provide the skilled investigator with leads to continue the investigation. The interview should contain the following basic information:

  ✓ Time and date.

  ✓ Name(s), address(es), and telephone number(s) of those interviewed.

  ✓ Write down the information as told by those you are interviewing. Don't discourage them from telling what they saw and heard.

✓ Note description and license number of vehicles that remain in area when you arrive. They may belong to individuals who were not interviewed.

AIDS TO FINDING ORIGIN OF FIRE

The fire origin is the key to fire investigation. Evidence at the origin can provide important information regarding the cause of the fire. Therefore, identifying and protecting this area should be a high priority for the first responder. Protect the fire origin.

When the fire scene is reached, set up a systematic search of the area surrounding the origin. Look for the obvious to the most minute.

Burned fence post shown below will help locate the origin. Fire will usually burn hot on the side toward the origin. Grey ash will be prevalent on the hot side.

DIRECTION OF ORIGIN

NO CHAR

CHAR

FENCE POST

2'

2'

FLAG OR ROPE

BURN AREA
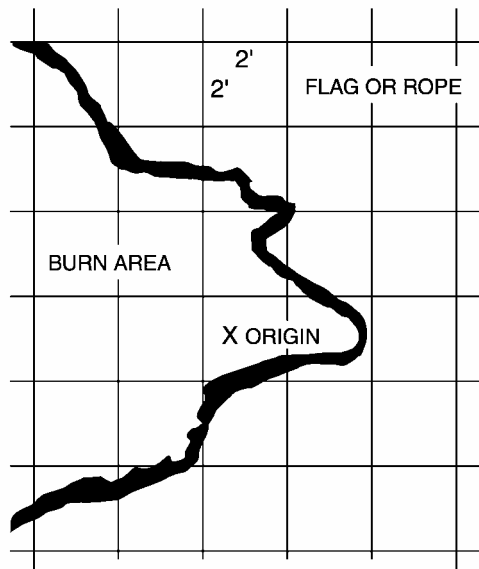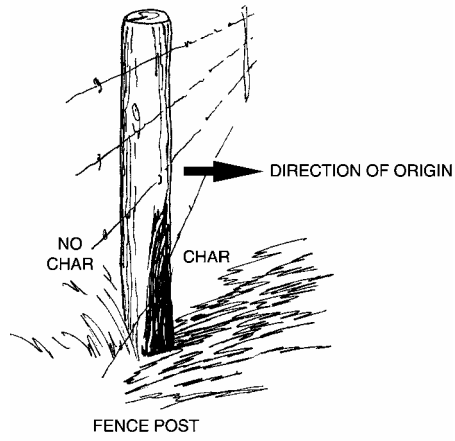
X ORIGIN

GRID BLOCK METHOD OF SEARCH.
SEARCH EACH BLOCK COMPLETELY.

Fire moving uphill will usually defoliate the side away from the origin. Wind will force the flame to remain on the ground on the windward side but will allow them to get into the crown on the lee side.
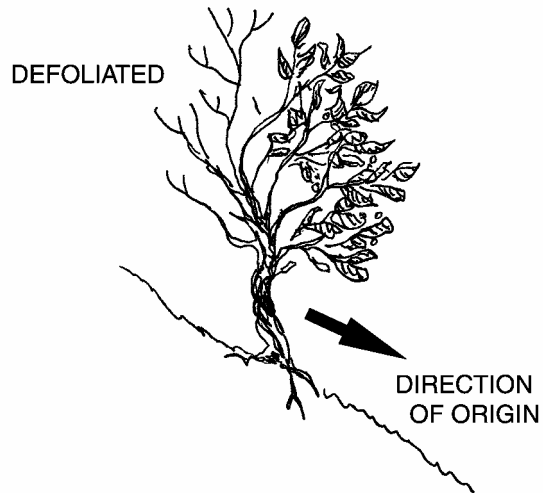
Tin cans will be stained with gases and heat on the side facing the point of origin. Unburned foliage may be found on the protected side.
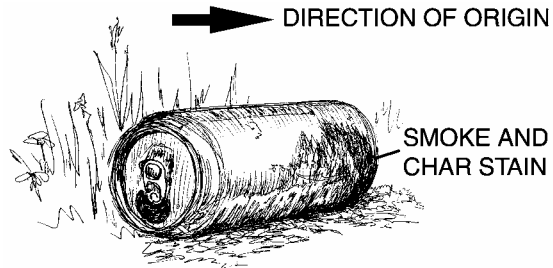
Manure will be scorched and have all debris burned away from the side facing the point of origin.
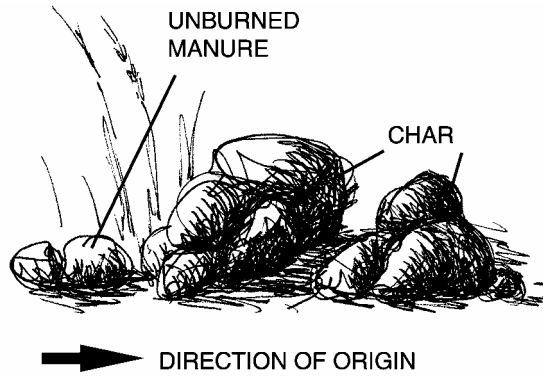
Pine needles will be at times heated to the point that the wind accompanying the fire will force them to point directly away from the point of origin. After cooling, they will remain in the configuration.

DIRECTION OF BURN
CHAR INDICATES FAST-
MOVING, HOT FIRE
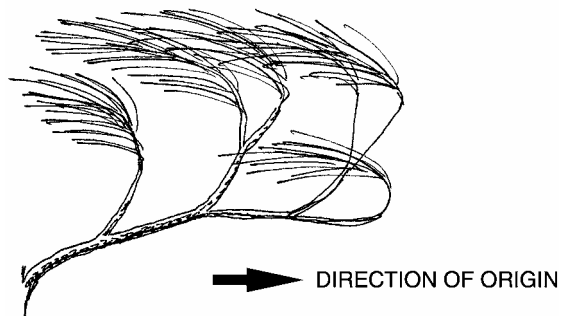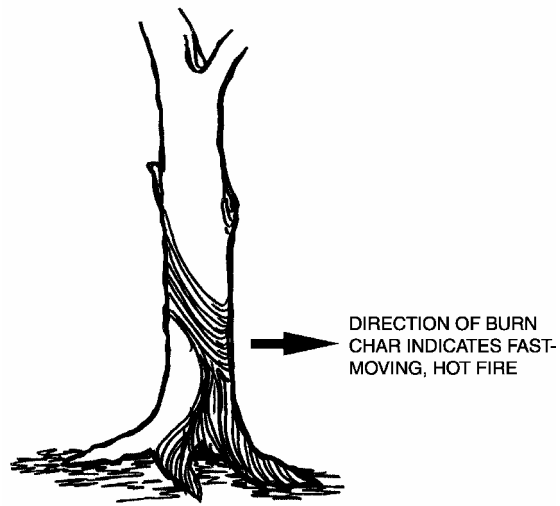
Trees and rocks, like everything else, will normally
receive the most severe char on the side facing the
origin. Often, debris and foliage can be found on
the protected side.

CHAR

DIRECTION OF ORIGIN

ROCK TOP VIEW

CHAR

DIRECTION OF ORIGIN

ROCK SIDE VIEW

CHAR PATTERN TOWARD ORIGIN

MISSING FINE FOLIAGE

TOP OF TWIGS UNBURNED

DIRECTION OF ORIGIN

FINE FUELS
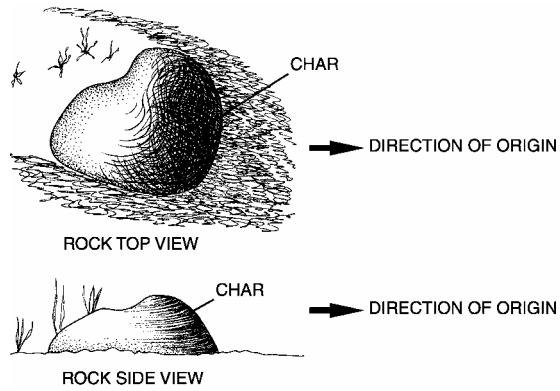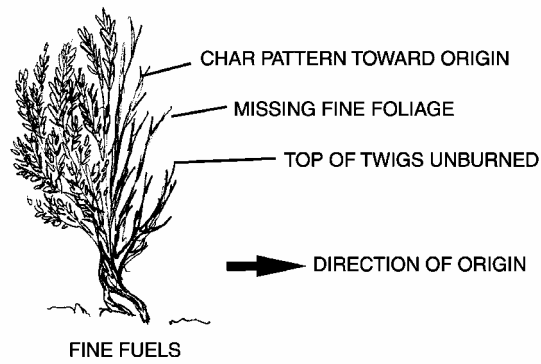
Smaller objects can help point out the origin. Small brush will usually be burned so that fine twigs are burned off on the side facing toward the origin.

HEADS OF CHARRED GRASS TOWARD ORIGIN
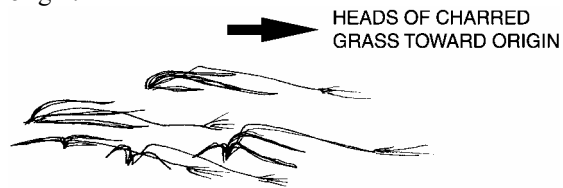
Backing of fire into grass will often allow the grass to fall into the burned area. The heads of the grass will usually point to the origin.

X ORIGIN

ANGLE ON BOARD
LYING ON GROUND
DIRECTS TOWARD
ORIGIN
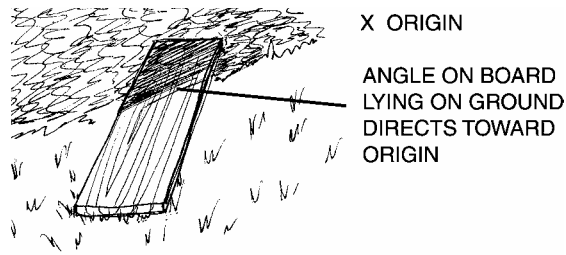
Look for flat objects such as boards that are on the perimeter of the fire half in/half out. Fast-spreading fires may leave the angle that is a radial from the point of origin.

GENERAL PRINCIPLES FOR IDENTIFYING THE ORIGIN

- Fires start small and tend to burn with lower intensity at the origin areas. The majority of origins can be identified by areas of less damage.

- Many fires start along roads and trails. The origin area will usually be at a point close to the edge of the road or trail.

- Fires burning in homogenous fuels, on relatively flat terrain, with little or no wind influence will tend to burn in a roughly circular shape. The origin will be located more toward the center of the fire when this occurs.

- Fires burning with the wind or uphill will generally burn in a "V" shape while in the early stages. The origin will usually be within or very near the apex of the "V."

- As the fire comes under the influence of wind, slope, or changes in the fuel type, it will form transition zones between the backing (heel), the lateral (flanks), and the advancing (head) areas that will surround the specific origin area. Look for differences in the overall indicators to identify these areas as outlined below:

  ✓ Advancing Fire (Head)

  The advancing areas of the fire will be generally characterized by indicators of increased intensity and rate of spread, deeper charring, more white ash, more damage to foliage crowns, foliage freezing, an angle of char that is steeper than the slope, and a lack of grass stem indicators.

  ✓ Lateral Fire (Flanks)

  The areas of lateral fire spread will be characterized by damage to combustible fuels that is generally at a 45- or 90-degree angle to the advancing areas of the fire. Fire damage overall will generally be less noticeable when compared to the advancing area. In grass fuels, a littering of unburned grass stems and/or seed heads may outline the flanks.

✓ Backing Fire (Heel)

The backing areas of the fire will be characterized by indicators of less intense fire that can include less charring, less white ash, minimal damage to foliage crowns, die-out patterns, an angle of char that is parallel to the slope, and grass stems and seed heads that are unburned and laying on the ground, pointing toward the origin.

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.

AERIAL TORCH: An ignition device suspended under a helicopter, capable of dispensing ignited fuel to the ground for assistance in burning out or backfiring.

AGENCY ADMINISTRATOR: Line officer (or designee) of the agency or jurisdiction that has responsibility for the incident.

AGENCY DISPATCHER: A person working within an agency organization who processes resources to and from incidents.

AGENCY REPRESENTATIVE: An individual assigned to an incident from an assisting or cooperating agency that has been delegated authority to make decisions on matters affecting that agency's participation at the incident.

AIR TANKER: Fixed-wing aircraft certified by FAA as being capable of transport and delivery of fire retardant solutions.

ALLOCATED RESOURCES: Resources dispatched to an incident.

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.

APPARATUS: A fire engine or other firefighting piece of equipment, or grouping of such equipment.

AREA COMMAND: An organization established to (1) oversee the management of multiple incidents that are being handled by an Incident Command System organization; or (2) to oversee the management of a very large incident that has multiple Incident Management Teams (IMT) assigned. Area Command has the responsibility to set overall strategies and priorities, allocate critical resources based on priorities, ensure that incidents are properly managed, and ensure that objectives are met and strategies followed.

ARSON: The set of fires to defraud or for other illegal or malicious purposes.

AREA IGNITION: The ignition of a number of individual fires throughout an area either simultaneously or in quick succession; and spaced that they soon influence and support each other to produce fast, hot spread of fire throughout the area.

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 LINE: Line of hose on an engine or water tender, used to fight or attack the fire directly.

ATTACK TIME: The starting date, hour, and minute of the first suppression work on a fire.

ATTACK A FIRE: Limit the spread of fire by cooling, smothering, or removing or otherwise treating the fuel around fire perimeter.

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.

BLACK LINE: Fuel between the fireline and the fire that has been burned out. Line is not complete until fuel is burned out between fireline and fire.

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 (service, support).

BREAKOVER: A fire edge that crosses a control line or natural barrier intended to confine the fire.

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 that 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.

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 OUT: Setting fire inside a control line to consume fuel between the edge of the fire and the control line.

BURNING PERIOD: The part of each 24-hour period when fires spread most rapidly; typically from 10:00 AM to sundown.

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.

CHAIN OF COMMAND: A series of management positions in order of authority.

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, 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.

COLD LINE: Fireline that has been controlled. The fire has been mopped up for a safe distance inside the line and can be considered safe to leave.

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: The act of directing, ordering, and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

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.

COMPLEX: Two or more individual incidents located in the same general area that 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.

CONFLAGRATION: A raging, destructible fire. Often used to describe a fire that has a fast moving fire front.

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 that can be expected to keep the fire within established boundaries of constructed firelines under prevailing conditions.

CONTAINMENT: When a fire is encircled by a fireline, but not under control.

CONTROL: To complete a fireline around a fire, and cool down all hot spots that are immediate threat to control line.

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 (Red Cross, law enforcement agency, telephone company, etc.).

COST-SHARE AGREEMENT: Agreement between agencies or jurisdictions to share designated costs related to an incident. Cost share agreements are normally written but may also be verbal between authorized agency or jurisdictional representatives at the incident.

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 rises from ground into the tree crowns and advances from tree top to tree top. To intermittently ignite tree crowns as a surface fire advances.

DELEGATION OF AUTHORITY: A statement provided to the Incident Commander by the Agency Administrator delegating authority and assigning responsibility. The Delegation of Authority can include objectives, priorities, expectations, constraints, and other considerations or guidelines as needed.

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.

DIRECT LINE: Any treatment of burning fuel by wetting, smothering, or chemically extinguishing the fire or by physically separating the burning from the 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.

DROP POINT: A pre-identified location where personnel, equipment, and supplies are to be delivered or picked-up.

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.

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.

ESCAPE ROUTE: A pre-planned and clearly identified route of travel that firefighting personnel are to take to access safety zones or other low risk areas.

ESCAPED FIRE: Fire that 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, caused by wind shift or change in topography.

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.

FIRESTORM: Violent convection caused by a large continuous area of intense fire, often characterized by destructive violent surface updrafts near or beyond the fire perimeter and sometimes by tornado like whirls.

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.

FIRING OUT: The act of setting fire to fuels between the control line and main fire in burning out operation.

FLAMMABILITY: The relative ease with which fuels ignite and burn regardless of the quantity of the fuels. Preferred to "inflammability."

FLANKING ACTION: 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.

FREE-BURNING: The condition of a fire or part of a fire that has not been checked 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.

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.

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.

GROUND FIRE: Fire that consumes the organic material beneath the surface litter ground, such as peat fire.

HAND CREW: A number of individuals that have been organized and trained and are supervised principally for operational assignments on an incident.

HAND LINE: Line constructed using hand tools.

HAZARD: A fuel complex defined by kind, arrangement, volume, condition, and location that form 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 limbs, 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: An aircraft that depends on the lift generated by one or more rotors for its in-flight support.

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.

HELICOPTER BOSS: A supervisory firefighter trained in the tactical use of helicopters for fire suppression.

HELITANKER: A helicopter equipped with a fixed tank that is used only 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.

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. An IAP may be verbal or written. When written, the IAP may have a number of attachments including: incident objectives, organization assignment list, division assignment, communication plan, medical plan, traffic plan, safety plan, and incident map.

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.

INCIDENT MANAGEMENT TEAM (IMT): The Incident Commander and appropriate Command and General Staff personnel assigned to an incident.

INCIDENT OBJECTIVES: Statements of guidance and direction necessary for the selection of appropriate strategy(s), and tactical direction of resources, based on expectations of what can be accomplished when allocated resources have been effectively deployed. Incident objectives must be achievable, measurable, and flexible to allow for strategic and tactical alternatives.

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 (IR) GROUNDLINK: 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.

ISLANDS: Patches of unburned fuels located inside the fire's perimeter.

JUMP SPOT: Selected landing area for smokejumpers.

JURSIDICTION: The range of authority an agency has related to legal responsibilities and authority for incident mitigation based on geographic, political, and/or function.

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.

LIFE-SAFETY: Refers to the joint consideration of life and physical well being of individuals.

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 fighter assigned to observe the fire and warn the crew when there is danger of becoming trapped.

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.

MULTI-AGENCY INCIDENT: An incident where one or more agencies assist a jurisdictional agency(s). May be single or unified command.

MULTI-JURSIDICTIONAL INCIDENT: An incident managed under unified command requiring action from multiple agencies that have statutory responsibility for incident mitigation.

MUTUAL AID AGREEMENT: Written agreement between agencies and/or jurisdictions in which they agree to assist one another upon request, furnishing personnel and/or equipment.

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.

OPEN LINE: Refers to open fire front, where no line has been constructed.

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.

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 slop over, 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.

PREPAREDNESS: 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.

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.

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.

RESOURCES: (1) Personnel, equipment, services, and supplies available, or potentially available, for assignment to incidents. Personnel and equipment are described by kind and type (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.

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 that 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, and 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 such as A-1, etc., and are not to be used as radio designators.

SIMPLE HOSE LAY: A hose lay 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.

SINGLE RESOURCE: An individual, piece of equipment and personnel complement, or crew/team of individuals with an identified supervisor.

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 under story trees or brush.

SLASH DISPOSAL: Treatment of slash to reduce fire hazard or for other purposes. (Preferred to Brush Disposal.)

SLOPEOVER: Place where the fire crosses the fiireline.

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.

SPAN OF CONTROL: The supervisory ratio of from three-to-seven individuals, with five-to-one being established as optimum.

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) that rates 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 minute available basis. Staging Areas are assigned within 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 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 that 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.

SWAMPER: A firefighter that leads a bulldozer or other piece of heavy equipment.

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, and 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.

TRANSFER OF COMMAND: The process in which command responsibility is handed off from one individual to another individual.

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.

UNITY OF COMMAND: The concept by which each individual within an organization reports to one supervisor.

URBAN INTERFACE: The area where structures and other human development meet or intermingle with natural wildland vegetation.

WATER TENDER: Any ground vehicle capable of transporting specified quantities of water.

WET LINE: Line that has been constructed using water or foam. Wet line is constructed to extinguish the flame front or to be used to fire out.

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.

WILDLAND: An area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

WILDLAND FIRE: A fire occurring on wildland that is not meeting management objectives and thus requires a suppression response.

FIRELINE HANDBOOK

APPENDIX A – GENERAL OPERATIONAL GUIDES

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

DOZER/TRACTOR HAND SIGNALS

STOP - *back and forth, waist high, swinging motion.*
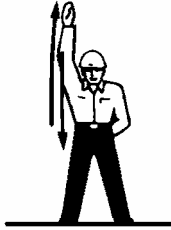
COME AHEAD - *up and down in front of spotter, from waist to arm's length above.*
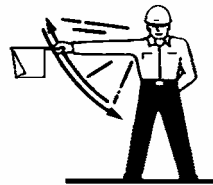
TURN - *swing flag or light on side to which operator is to turn.*
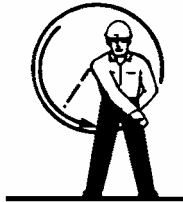
REVERSE or BACK UP - *full circle in front of spotter.*
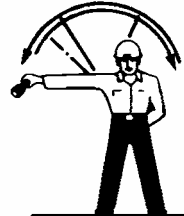
CAUTION - *wave flag or light in half circle at arm's length above head.*
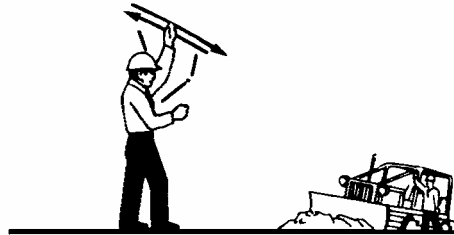
ATTRACT OPERATOR'S ATTENTION - *may also use one blast on a police whistle or suitable substitute.*

WATER USE HAND SIGNALS

HOW FULL IS TANK? FULL HALF FULL LOW

REPLY

DELIVER WATER AT NOZZLE INCREASE PRESSURE DECREASE PRESSURE

MORE HOSE BROKEN HOSE SHUT DOWN

ROLL UP HOSE
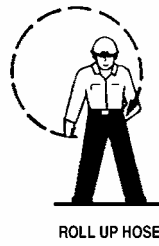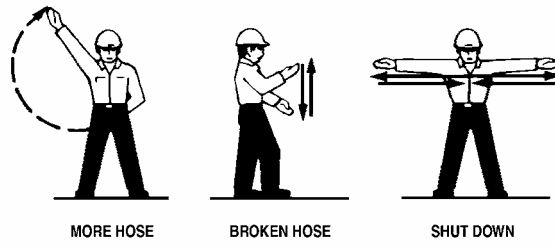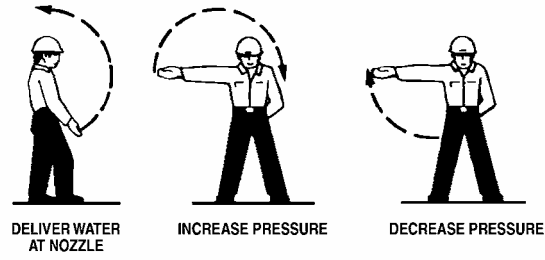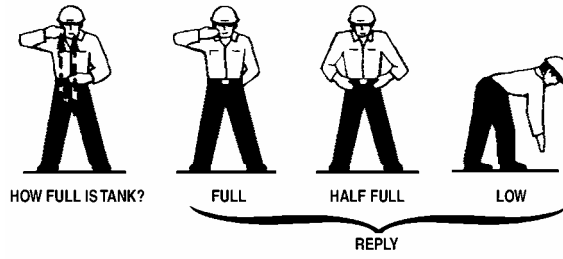
HELICOPTER HAND SIGNALS

CLEAR TO START ENGINE
*make a circular motion
above head with right arm.*

HOLD ON GROUND
*extend arms out at 45,
thumbs pointing down.*

MOVE UPWARD
*arms extended
sweeping up.*

MOVE DOWNWARD
*arms extended
sweeping down.*

HOLD HOVER
*arms extended with
clenched fists.*

CLEAR TO TAKE OFF
*extend both arms above
head in direction of takeoff.*

**LAND HERE, MY BACK IS INTO
THE WIND** *extend arms toward
landing area with wind at your back.*

MOVE FORWARD
*extend arms forward and
wave helicopter toward you.*

MOVE REARWARD
*arms extended downward
using shoving motion.*

MOVE LEFT
*right arm horizontal, left
arm sweeps over head.*

MOVE RIGHT
*left arm horizontal, right
arm sweeps over head.*

MOVE TAIL ROTOR
*rotate body with one
arm extended.*

SHUT OFF ENGINE
*cross neck with right
hand, palm down.*

FIXED TANK DOORS
*open arms outward,
close arms inward.*

RELEASE SLING LOAD
*contact left forearm with
right hand.*

WAVE OFF DO NOT LAND
*wave arms from horizontal
to crossed overhead.*

HELISPOT LOCATION AND CONSTRUCTION

A helispot is a natural or improved takeoff 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 drop-off exists for helicopter takeoffs. The higher the elevation, the more important the drop-off. 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 drop-off.

- 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 drop-off. If no drop-off 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
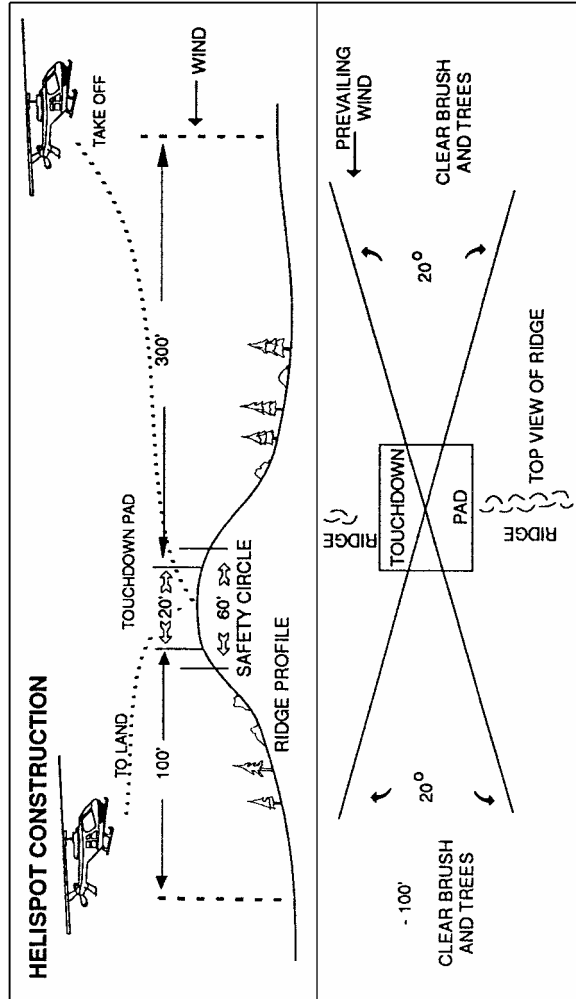
PORTABLE PUMPS/HYDRAULICS

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 (PUMP PRESSURE, NOZZLE PRESSURE, HEAD GAIN OR LOSS, FRICTION LOSS, ETC.) IS POUNDS PER SQUARE INCH (PSI).

PP = **(NP)** + **or** - **H** + **(FL** + **A)** where:

PP = Pump pressure at the discharge side of pump.

NP = The pressure required at the nozzle for the most efficient operation.

Remember: The larger the nozzle tip the more PP (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 1½" 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) 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 <u>followed</u>.

- 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 drafting 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" valve or "Gated Y" valve 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 1½" hose, a 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
Mark 3	250	400
Honda WX10*	50	23
Mini Mark	25-30	10

*Note: This pump is currently being tested as of 4/03.

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
	= 3.79 Liters
	= 231 cubic inches

Friction Loss By Hose Size And Type

	Friction Loss in lbs./100 feet of Hose				
	Hose Size (Inside Diameter) and Type				
Flow (GPM)	5/8" 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 Feet	Nozzle Above Pump in Feet	Tip Sizes in Inches				
		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 of Hose in Feet	Nozzle Above Pump in Feet	Tip Size In Inches				
		1/8	3/16	1/4	5/16	3/8
100	0	51	51	51	52	53
	100	94	94	94	95	96
300	0	51	52	53	56	60
	100	94	95	96	99	103
	200	138	139	140	143	147
500	0	51	53	55	60	66
	100	94	96	98	103	109
	200	138	140	142	147	153
	300	181	183	185	190	196
1000	0	51	55	59	68	82
	200	138	142	146	155	169
	400	224	228	232	241	255
	600	311	315	319	328	342
2000	0	52	59	67	84	114
	200	139	146	155	171	201
	400	225	232	241	257	287
	600	312	319	328	344	374
	800	298	405			
3000	0	53	64	75	100	146
	200	140	151	162	187	283
	400	226	237	248	273	319
	600	313	324	335	360	
	700	356	367	378	403	
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	3/4	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	1½	300	33	9.2	77	110
CSJRL	1½	450	26	9.2	77	103
SJRL	1½	450	15	9.2	77	92
Linen, Unlined	1½	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 solution 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 five 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 burnout has begun.

Mop-Up

- For best penetration, apply foam solution 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 solution for deep-seated fires in stumps, landings, log decks, etc.

- "Forester" nozzles also work well with foam solution in mop-up.

Exposure Protection

- Foam is most effective when applied shortly before heat exposure. Apply enough foam 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 one 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 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 2½ 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 or foam solution 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.

- Use caution as any surface covered with foam can be very slippery.

FIRELINE EXPLOSIVES

<u>Advantages</u>:

- 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 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.

Although each state has specific rules governing the use of inmates, the following guidelines will 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.

- Consult the officer-in-charge before giving supervision to crew members over fellow inmates.

- 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	30	18
	Tundra	9	5
2 Open Timber/ Grass Understory	All	24	16
3 Tall Grass	All	5	3
4 Chaparral	Chaparral	5	3
	High Pocosin	4	2
5 Brush	All	6	4
6 Dormant Brush/ Hardwood Slash	Black Spruce	7	5
	Others	6	4
7 Southern Rough	All	4	2
8 Closed Timber Litter	Conifers	7	5
		40	24
9 Hardwood Litter	Conifers	28	16
	Hardwoods	40	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

	Fire Behavior Fuel Model	Specific Conditions	Construction Rate in Chains per Person per Hour
1	Short Grass	Grass	4.0
		Tundra	1.0
2	Open Timber/ Grass Understory	All	3.0
3	Tall Grass	All	0.7
4	Chaparral	Chaparral	0.4
		High Pocosin	0.7
5	Brush	All	0.7
6	Dormant Brush/ Hardwood Slash	Black Spruce	0.7
		Others	1.0
7	Southern Rough	All	0.7
8	Closed Timber Litter	Conifers	2.0
		Hardwoods	10.0
9	Hardwood Litter	Conifers	2.0
		Hardwoods	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

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 construction and hotspotting.

Line Production Rates for Initial Action by
Engine Crews in Chains per Crew per Hour

Fire Behavior Fuel Model	Specific Conditions	Chains per Crew Hour				
		Number of Persons in Crew				
		1	2	3	4	5+
1 Short Grass	Grass	6	12	24	35	40
	Tundra	2	8	15	24	30
2 Open Timber/ Grass Understory	All	3	7	15	21	25
3 Tall Grass	All	2	5	10	14	16
4 Chaparrel	Chaparrel	2	3	8	15	20
	High Pocosin	2	4	10	15	18
5 Brush (2 ft)	All	3	6	12	16	20
6 Dormant Brush/ Hardwood Slash	Black Spruce	3	6	10	16	20
	Others	3	6	12	16	20
7 Southern Rough	All	2	5	12	16	20
8 Closed Timber Litter	Conifers	3	8	15	20	24
	Hardwoods	10	30	40	50	60
9 Hardwood Litter	Conifers	3	7	12	18	22
	Hardwoods	8	25	40	50	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

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.

Fireline Explosives Production Comparisons

**Production Rate Comparison Between a
7-Person Fireline Explosives Crew
and a 20-Person Hand Crew
Over a 10-Hour Shift**

Fuel Type	Constructed Fireline in Chains	
	Explosives Crew	Hand Crew
Grass	360	360
Second Growth Conifers	240	180
Light Slash	210	90
Heavy Slash	120	45

Note: This is based upon Washington State
Department of Natural Resources experience.

Dozer Fireline Construction Rates
(Single Pass) in Chains per Hour

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 1, 2	Up	55-90	30-55	8-30	0-8
	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 1, 2	Up	85-125	60-85	30-60	0-30
	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
Type I Dozer 1, 2	Up	100-140	70-100	35-70	0-35
	Down	140-155	140-155	85-140	0-85
3, 5, 8	Up	75-110	50-75	20-50	0-20
	Down	110-130	110-130	55-110	0-55
4.00	Up	45-70	30-45	8-30	0-8
	Down	70-80	75-85	25-75	0-25
6, 7, 9	Up	65-95	40-65	15-40	0-15
	Down	95-110	90-110	50-90	0-50
11, 12	Up	35-55	20-35	3-20	0-3
	Down	55-65	55-65	6-55	0-6
10, 13	Up	20-35	9-20	0-9	0
	Down	35-40	30-40	0-30	0

Dozer Fireline Construction Rates (Single Pass) in Chains per Hour *(continued)*

Note: Production 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.

Dozer	Horse Power	Examples
Type I	**HEAVY** 200 Minimum Horse Power	D-8H, D-7H, JD-850
Type II	**MEDIUM** 100 Minimum Horse Power	D-5H, JD-650
Type III	**LIGHT** 50 Minimum Horse Power	D-46, JD-550, D-3

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.

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) JD450, 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 CREW STANDARDS FOR
NATIONAL MOBILIZATION

Minimum Standards	Type 1[1]	Type 2 with IA Capability	Type 2	Type 3
Fireline Capability	Initial attack/ can be broken up into squads, fireline construction, complex firing operations (backfire)	Initial attack/ can be broken up into squads, fireline construction, firing to include burnout	Initial attack, fireline construction, firing to include burnout	Fireline construction, fireline improvement, mop-up and rehab
Crew Size	18-20	18-20	18-20	18-20
Leadership Qualifications	Permanent Supervision Superintendent: TFLD, ICT4 Asst Supt: STCR, ICT4 3 Squad Bosses: CRWB(T), ICT5	CRWB and 3 ICT5	CRWB and 3 FFT1	CRWB & 3 FFT 1
Bilingual Requirement	CRWB and FFT1's must be bilingual (able to read and interpret) in language of crew.	CRWB and FFT1's must be bilingual (able to read and interpret) in language of crew.	CRWB and FFT1's must be bilingual (able to read and interpret) in language of crew.	CRWB and FFT1's must be bilingual (able to read and interpret) in language of crew.
Experience	80% 1 season or more	60% 1 season or more	40% 1 season or more	20% 1 season or more
Full Time Organized Crew	Yes	No	No	No
Communications	5 programmable radios	4 programmable radios	4 programmable radios	4 programmable radios
Sawyers	3 agency qualified	3 agency qualified	0	0

MINIMUM CREW STANDARDS FOR
NATIONAL MOBILIZATION
(*continued*)

Minimum Standards	Type 1[1]	Type 2 with IA Capability	Type 2	Type 3
Training	80 hours annual training	Basic firefighter training and/or annual firefighter safety refresher	Basic firefighter training and/or annual firefighter safety refresher	Basic firefighter training and/or annual firefighter safety refresher
Fitness	Arduous	Arduous	Arduous	Arduous
Logistics	Self-sufficient	Not self-sufficient	Not self-sufficient	Not self-sufficient
Maximum Weight	5100 lbs	5100 lbs	5100 lbs	5100 lbs
Dispatch Availability	1 hour	Variable	Variable	Variable
Production Factor	1.0	0.8	0.8	N/A
Transportation	Own transportation	Transportation needed	Transportation needed	Transportation needed
Tools & Equipment	Fully equipped	Not equipped	Not equipped	Not equipped
Personal Gear	Arrives with: crew first aid kit, personal first aid kit, headlamp, 1 qt canteen, web gear, sleeping bag	Arrives with: crew first aid kit, personal first aid kit, headlamp, 1 qt canteen, web gear, sleeping bag	Arrives with: crew first aid kit, personal first aid kit, headlamp, 1 qt canteen, web gear, sleeping bag	Arrives with: crew first aid kit, personal first aid kit, headlamp, 1 qt canteen, web gear, sleeping bag

MINIMUM CREW STANDARDS FOR
NATIONAL MOBILIZATION
(*continued*)

Minimum Standards	Type 1[1]	Type 2 with IA Capability	Type 2	Type 3
PPE	Arrives with: hard hat, fire resistant shirt/pants, 8″ leather boots, leather gloves, fire shelter, hearing/eye protection	Arrives with: hard hat, fire resistant shirt/pants, 8″ leather boots, leather gloves, fire shelter, hearing/eye protection	Arrives with: hard hat, fire resistant shirt/pants, 8″ leather boots, leather gloves, fire shelter, hearing/eye protection	Arrives with: hard hat, fire resistant shirt/pants, 8″ leather boots, leather gloves, fire shelter, hearing/eye protection

[1] Interagency Hotshot Crews (IHC) are a Type 1 crew that exceeds the Type 1 Standards as required by the National IHC Operations Guide (2001) in the following categories:

- Permanent Supervision with seven career appointments (Superintendent, Assistant Superintendent, 3 Squad Bosses)
- IHC's work and train as a unit 40 hours per week
- IHC's are a national resource

Engines (Minimum Requirements)

Components	Structure Engines		Wildland Engines				
	1	2	3	4	5	6	7
Pump Rating min. flow (GPM) at rated pressure (PSI)	1000+ 150	250+ 150	150 250	50 100	50 100	30 100	10 100
Tank Capacity Range (Gallons)	400+	400+	500+	750+	400-750	150-400	50-200
Hose, 2½" (feet)	1200	1000	--	--	--	--	--
Hose, 1½" (feet)	400	500	500	300	300	300	--
Hose, 1" (feet)	--	--	500	300	300	300	200
Ladders	48'	48'	--	--	--	--	--
Master Stream (GPM)	500	--	--	--	--	--	--
Personnel (Minimum)	4	3	3	2	2	2	2

Common Additional Needs - Request as Needed.

- All-Wheel Drive
- Pump & Roll
- High Pressure Pump
  (Minimum 40 gpm @ 250 psi)
- Class A Foam Proportioner
- Compressed Air Foam System (CAFS)
  with Minimum 40 cfm Compressor
- Additional Personnel

Water Tenders

Components	Water Tender Types		
	1	2	3
Tank Capacity (Gallons)	5000+	2500+	1000+
Pump Capacity (GPM)*	300+	200+	200+
Off Load Capacity (GPM)	300+	200+	200+
Max. Refill Time (Minutes)	30	20	15

*Portable pump acceptable.

Air Tankers

Resource	Components	Minimum Standards for Type			
		1	**2**	**3**	**4**
Air Tankers	Minimum Capacity (Gallons)	3000	1800	800	100
	Examples:	C-130 P-3 DC-7	DC-7 SP2H P2U	S-2 CL-215T CL-415	Thrush Air Tanker Dromader

Helicopters

Components	Type 1	Type 2	Type 3
Allowable Payload @ 59 F.° @ Sea Level	5000	2500	1200
Passenger Seats	15 or more	9-14	4-8
Retardant or Water Carrying Capability (Gallons)	700	300	100
Maximum Gross Takeoff/Landing Weight (lbs)	12501 +	6000-12,500	Up to 6000
Examples	Bell 214	Bell 204, 205, 212	Bell 206
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. EX: "Waverly 3 can handle with units now at scene."
• Copy, Copies	Used to acknowledge message received. EX: "Engine 3 copies."
• Disregard	Self-explanatory
• Proceed	Indicates another unit may transmit. EX: "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. En route is not substitute for responding.
• In-quarters (location)	Used to indicate that a resource is at station. EX: "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.

CLEAR TEXT GUIDE
(*continued*)

• 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 unconfirmed 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

SUGGESTED FOR PLACEMENT ON BASE MAP		SUGGESTED FOR PLACEMENT ON OVERLAYS	
MINIMUM RECOMMENDED			
BLACK	RIDGE / HIGHLIGHTED GEOGRAPHIC OR MANMADE FEATURES	RED	10 AUG 1730 UNCONTROLLED FIRE EDGE
			10 AUG 1730 SPOT FIRE
BLACK	COMPLETED DOZER LINE		10 AUG 1700 HOT SPOT
	COMPLETED LINE	ORANGE	10 AUG 2000 FIRE SPREAD PREDICTION
	LINE BREAK COMPLETED		PLANNED FIRE LINE
RED	10 AUG 1430 FIRE ORIGIN		PLANNED SECONDARY LINE
	HAZARD (IDENTIFY TYPE OF HAZARD, E.G., POWER LINES)		□ ▯ BRANCHES INITIALLY NUMBERED CLOCKWISE FROM FIRE ORIGIN
BLUE	INCIDENT COMMAND POST		(A) (B) DIVISIONS INITIALLY LETTERED CLOCKWISE FROM FIRE ORIGIN
	(B) INCIDENT BASE		A-2 SEGMENTS COMBINE DIVISION LETTER WITH CLOCKWISE NUMBERING WITHIN THE DIVISION
	(C) HOLT CAMP (IDENTIFY BY NAME)	BLACK	
BLUE	H-3 HELISPOT (LOCATION AND NUMBER)		W/10 1600 9/7 WIND SPEED DIRECTION
	(H) HELIBASE		PROPOSED DOZER LINE
	(R) REPEATER/MOBILE RELAY		FIRE BREAK (PLANNING OR INCOMPLETE)
OPTIONAL	(T) TELEPHONE	BLUE	(S) STAGING AREA (IDENTIFY BY NAME)
	(F) FIRE STATION		
	(W) WATER SOURCE (IDENTIFY, E.G., POND CISTERN, HYDRANT)		
BLUE	(X) MOBILE WEATHER UNIT		ALL OVERLAYS MUST CONTAIN REGISTRATION MARKS. THESE MAY CONSIST OF: IDENTIFIED ROAD INTERSECTIONS, TOWNSHIP/ RANGE COORDINATES, MAP CORNERS, ETC.
	▧ IR DOWN LINK		
	✚ FIRST AID STATION		

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 5/8 or	0.0328	2,000
1: 21,120	2.64	0.375	1,760
1: 15,840	3	0.05	1,320
1: 7,920	4	0.10	660
	8		

FORMULA FOR AREA
AND CIRCUMFERENCE OF A CIRCLE

Circle, Area

$$= 3.1416 \times \frac{\text{diameter squared}}{4}$$

or

$$= 3.1416 \times \text{radius squared}$$

Circle, Circumference $= 3.1416 \times \text{diameter}$

ACREAGE
DETERMINATION FACTORS

Perimeter Chart

Acres	Perimeter in Minimum	Chains Usual	Max.	Acres	Perimeter in Minimum	Chains Usual	Max
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

- Use this table as a guide to estimate areas and perimeters. Remember that results are approximate values only and have been rounded off.

- Fires that are roughly circular in shape will have perimeters that approach <u>Minimum</u> values.

- Fires that are very long and narrow or with many fingers will have perimeters that approach or possibly exceed <u>Maximum</u> values.

- Values in the <u>Usual</u> column will represent fires that are oval or wedge shaped.

Area in Acres

The following 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) that best fits the fire's shape and read the acreage for the paced perimeter shown in the left column.

Explanation of columns representing shapes of fires:

1. Fire in the general shape of a <u>circle</u>.

2. Fire in the shape of either a <u>square</u> or <u>rectangle</u> that is not more than twice as long as it is wide with a moderately irregular perimeter.

3. Fire in the shape of a <u>rectangle</u>, about three times longer than it is wide. This column also gives the area of a <u>triangle</u> with a moderately irregular perimeter.

4. Fire in the shape of a <u>rectangle</u> 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 <u>long fingers</u> or a <u>very irregular</u> perimeter.

Area in Acres

Perimeter in Chains
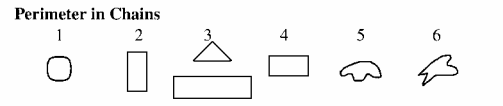
	1	2	3	4	5	6
1	.01	.01	.01	.01	.01	.01
2	.03	.02	.02	.02	.01	.01
3	.06	.05	.04	.04	.03	.02
4	.11	.10	.08	.06	.05	.03
5	.17	.15	.12	.10	.07	.05
6	.25	.22	.18	.14	.11	.07
7	.34	.29	.24	.20	.15	.10
8	.45	.38	.32	.26	.19	.13
9	.57	.49	.40	.32	.24	.16
10	.7	.6	.5	.4	.3	.2
12	1.0	.8	.7	.6	.4	.3
14	1.4	1.2	1.0	.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.

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
(*continued*)

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	=	10,000 square meters
	=	2.4 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 gallons
	=	1728 cubic inches
	=	28.316 liters
— Cubic yard	=	27 cubic feet
	=	200.3 gallons
	=	764.53 liters

Liquid Measure

— Cup	=	8 ounces
— Gallon	=	8.33717 pounds
	=	0.133680 cubic feet
	=	4 quarts
	=	128 ounces
	=	3.7853 liters
— Liter	=	0.264179 gallons
	=	1.567 quarts
	=	1.568 33.8144 ounces
— Pint	=	2 cups
	=	16 ounces
	=	0.47315 litters
— Quart	=	2 pints
	=	32 ounces
	=	0.9463 liters

INCIDENT COMMAND
SYSTEM FORMS

Forms that are routinely used in the incident
Command System are listed below. Those marked
with an (*) are commonly used in written Incident
Action Plans.

CS Form Number	Form Title
201	Incident Briefing
202 (*)	Incident Objectives
203 (*)	Organizational Assignment List
204 (*)	Division Assignment List
205 (*)	Incident Radio Comm. 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 Ops Summary Worksheet
221	Demobilization Checkout
224	Crew Performance Rating
225	Incident Personnel Rating

RESOURCE STATUS CARD
(Colors and Uses)

Card Color Number	Kind of Resource	Form
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

DISTANCES AND FORMULAS FOR ESTIMATING FIRE SIZE

Distances

1. 1 Pace = 2 Normal Steps

2. 11-13 Level Paces = 1 Chain

3. 66 Feet = 1 Chain

4. 80 Chains = 1 Mile

5. 10 Square Chains = 1 Acre

6. 1 Acre = Approx. 220 x 220 Feet

7. 1 Acre = 43,560 Square Feet

8. 640 Acres = 1 Square Mile

Formulas

1. Area of squares and rectangles = L x W

2. Area of triangles = ½ (L x W)

3. Area of circles = $\prod R^2$
   ($\prod$ = 3.14, R= Radius of circle)

4. Compute acres =

Average chains wide x average chains long
-- =
Acres
          10 Square Chains

AVERAGE INITIAL RATE OF SPREAD[1]
ACCORDING TO FUEL TYPE, SLOPE
STEEPNESS, AND SPREAD INDEX AT
SITE OF FIRE[2]

Fuel rate of Spread Type	Slope Steepness[3] (percent)	Spread Index									
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
		Perimeter increase in chains per hour									
Low	0-10	0	1	1	1	2	2	2	3	3	4
	11-25	1	1	1	2	2	3	3	4	5	6
	26-50	1	2	2	3	3	4	4	5	6	9
	51-75	2	3	3	4	5	6	6	8	10	14
	Over 75	3	4	5	6	7	8	9	12	16	21
Medium	0-10	1	1	1	2	2	2	3	3	4	5
	11-25	1	1	2	2	3	3	4	5	6	7
	26-50	2	2	3	3	4	5	6	7	8	11
	51-75	3	3	4	5	6	7	8	11	13	17
	Over 75	4	5	6	8	9	11	14	17	21	27
High	0-10	1	2	3	4	5	6	7	8	10	13
	11-25	1	3	4	6	7	8	10	12	14	18
	26-50	2	4	6	8	9	11	14	16	20	25
	51-75	3	6	9	12	15	18	22	26	30	40
	Over 75	6	10	15	19	24	28	35	42	49	63
Extreme	0-10	3	4	5	6	7	9	12	14	17	20
	11-25	4	6	7	9	10	13	17	20	23	28
	26-50	6	8	10	12	15	19	23	28	33	40
	51-75	9	11	16	19	23	30	36	44	53	62
	Over 75	16	20	25	30	37	46	58	71	84	97
Flash	0-10	6	12	15	18	23	28	33	40	50	61
	11-25	8	18	21	26	32	39	48	58	69	84
	26-50	11	25	30	37	45	55	67	81	97	119
	51-75	18	39	48	58	71	88	106	128	155	188
	Over 75	29	62	75	92	113	138	168	202	244	300

[1]Average initial rate of spread refers to perimeter increase between discovery of fire and first attack. This rate of spread may be anticipated during the first 4 to 5 hours.

[2]This table was based on table A-16, NRM Station paper No. 29, Fire Behavior, by J. S. Barrows. Changes were made using the relationship of the burning index vs. the national spread index (timber). The original data were used as presented in Station paper No. 29. Conversion work done in 1963 by NFFL, Barney & Stockstead.

[3]General descriptions used in slope descriptions are: level, 0 to 10 percent; gentle, 11 to 25 percent; moderate, 26 to 50 percent; steep, 51 to 75 percent; very steep, over 75 percent.

WHAT THE COLOR AND COLUMN OF SMOKE MAY MEAN	
What you see	**What it may mean**
The smoke column is thin, rising lazily, and the color is light blue to gray.	Probably a campfire.
The smoke column is narrow, thin, and dark gray to black.	Could be diesel-powered heavy logging or construction equipment.
The smoke column is small, thick, and white in color.	This may mean a small grass fire. If the smoke puffs up every so often, it may mean someone is burning leaves or grass and "feeding" it.
The smoke is widening at the base; it is predominantly white, but starting to turn brown or black on its downwind side.	This may indicate the fire is spreading in grass and moving unto heavier fuels. Dead brush will burn with a dark brown color, brush with a higher oil content will burn black.
The column of smoke is thick and black, with no spread to the base.	This could be a structure or vehicle fire. It may also be tires.
The smoke is black, but some white or light brown is showing away from the main column.	This may mean your vehicle or structure fire has moved into the grass.
The column is going straight up.	There is little or no wind on the fire.
The column is going up, but the top of the smoke is bent over.	There is little surface wind, but there is wind where the smoke bends. Beware; that wind may surface at any time.
The smoke is bent over at the ground and building in volume and intensity.	The fire is wind-driven with a good fuel supply.
The smoke has built to several thousand feet and a small white cloud has formed on the top.	Don't plan on days off. You are going to be quite busy.

FIRE SUPPRESSION INTERPRETATIONS FROM FLAME LENGTH	
Flame Length	**Interpretations**
Less than 4 feet	Fires can generally be attacked at the head or flanks by firefighters using hand tools. Handline should hold fire.
4 to 8 feet	Fires are too intense for direct attack on the head with hand tools. Handline cannot be relied on to hold the fire. Bulldozers, engines, and retardant drops can be effective.
8 to 11 feet	Fire may present serious control problems: torching, crowning, and spotting. Control efforts at the head will probably be ineffective.
over 11 feet	Crowning, spotting, and major fire runs are probable. Control efforts at the head of the fire are ineffective.

REPORT ON CONDITIONS/
SIZE UP REPORT

Incident Name – All incidents.

Incident Commander – All incidents.

Incident type – Wildland fire, vehicle accident, hazardous materials (HazMat), search and rescue, etc.

Incident Status – Fire – creeping, running, spotting, crowning; Vehicle – blocking road, over side, etc.

Location – Use landmarks, legal and lat/long.

Jurisdiction – Agency with jurisdiction.

Radio Frequencies – All incidents.

Incident Size – Fire and HazMat.

Fuel Type – Fire incident only.

Wind Speed and Direction – Fire, HazMat, All-risk, SAR.

Slope and Aspect – Fire and HazMat.

Best Access – All types.

Special Hazards or Concerns – For air and ground units.

Additional Resource Needs – Personnel, equipment.

OPERATIONAL LEADERSHIP GUIDE

The most essential element of successful wildland firefighting is competent and confident leadership. Leadership means providing purpose, direction and motivation for wildland firefighters working to accomplish difficult tasks under dangerous, stressful circumstances. In confusion and uncertain situations, a good operational leader will:

- TAKE CHARGE of assigned resources.

- MOTIVATE firefighters with a "can do safely" attitude.

- DEMONSTRATE INITIATIVE by taking action in the absence of orders.

- COMMUNICATE by giving specific instructions and asking for feedback.

- SUPERVISE at the scene of action.

DUTY

Be proficient in your job, both technically and as a leader
- Take charge when in charge.
- Adhere to professional standard operating procedures.
- Develop a plan to accomplish given objectives.

Make sound and timely decisions
- Maintain situation awareness in order to anticipate needed actions.
- Develop contingencies and consider consequences.
- Improvise within the commander's intent to handle a rapidly changing environment.

Ensure that tasks are understood, supervised and accomplished
- Issue clear instructions.
- Observe and assess actions in progress without micro-managing.
- Use positive feedback to modify duties, tasks, and assignments when appropriate.

Develop your subordinates for the future
- Clearly state expectations.
- Delegate those tasks that you are not required to do personally.
- Consider individual skill levels and developmental needs when assigning tasks.

R E S P E C T

Know your subordinates and look out for their well-being
- Put the safety of your subordinates above all other objectives.
- Take care of your subordinate's needs.
- Resolve conflicts between individuals on the team.

Keep your subordinates informed
- Provide accurate and timely Briefings.
- Give the reason (intent) for assignments and tasks.
- Make yourself available to answer questions at appropriate times.

Build the team
- Conduct frequent Debriefings with the team to identify lessons learned.
- Recognize individual and team accomplishments and reward them appropriately.
- Apply disciplinary measures equally.

Employ your subordinates in accordance with their capabilities
- Observe human behavior as well as fire behavior.
- Provide early warning to subordinates of tasks they will be responsible for.
- Consider team experience, fatigue, and physical limitations when accepting assignments.

INTEGRITY

Know yourself and seek improvement
- Know the strengths / weaknesses in your character and skill level.
- Ask questions of peers and superiors.
- Actively listen to feedback from subordinates.

Seek responsibility and accept responsibility for your actions
- Accept full responsibility for and correct poor team performance.
- Credit subordinates for good performance.
- Keep your superiors informed of your actions.

Set the example
- Share the hazards and hardships with your subordinates.
- Don't show discouragement when facing setbacks.
- Choose the difficult right over the easy wrong.

GUIDE TO COMPLETING THE INCIDENT COMPLEXITY ANALYSIS (TYPE 1, 2)

1) Analyze each element and check the response, Yes or No.

2) If positive responses exceed, or are equal to, negative responses within any primary factor (A through G), the primary factor should be considered as a positive response.

3) If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is or is predicted to be of Type 1 complexity.

4) Factor H should be considered after numbers 1–3 are completed. If more than two of the items in factor H are answered yes, and three or more of the other primary factors are positive responses, a Type 1 team should be considered. If the composites of H are negative, and there are fewer than three positive responses in the primary factors (A-G), a Type 2 team should be considered. If the answers to all questions in H are negative, it may be advisable to allow the existing overhead to continue action on the fire.

INCIDENT COMPLEXITY ANALYSIS (TYPE 1, 2)	Yes	No
A. Fire Behavior Observed or Predicted		
1. Burning index (from on-site measurement of weather conditions) predicted to be above the 90% level using the major fuel model in which the fire is burning.		
2. Potential exists for extreme fire behavior (fuel moisture, winds, etc.)		
3. Crowning, profuse or long-range spotting.		
4. Weather forecast indicating no significant relief or worsening conditions.		
Total		
B. Resources Committed		
1. 200 or more personnel assigned.		
2. Three or more divisions.		
3. Wide variety of special support personnel.		
4. Substantial air operation which is not properly staffed.		
5. Majority of initial attack resources committed.		
Total		
C. Resources Threatened		
1. Urban interface.		
2. Developments and facilities.		
3. Restricted, threatened, or endangered species habitat.		
4. Cultural sites.		
5. Unique natural resources, special-designation areas, wilderness.		
6. Other special resources.		
Total		

Incident Complexity Analysis (Type 1,2) *(Continued)*	Yes	No
D. Safety		
1. Unusually hazardous fireline construction.		
2. Serious accidents or fatalities.		
3. Threat to safety of visitors from fire and related operations.		
4. Restrictions and/or closures in effect or being considered.		
5. No night operations in place for safety reasons.		
Total		
E. Ownership		
1. Fire burning or threatening more than one jurisdiction.		
2. Potential for claims (damages).		
3. Different or conflicting management objectives.		
4. Disputes over suppression responsibility.		
5. Potential for unified command.		
Total		
F. External Influences		
1. Controversial fire policy.		
2. Pre-existing controversies/relationships.		
3. Sensitive media relationships.		
4. Smoke management problems.		
5. Sensitive political interests.		
6. Other external influences.		
Total		

Incident Complexity Analysis (Type 1,2) *(Continued)*		Yes	No
G. Change in Strategy			
1.	Change in strategy to control from confine or contain		
2.	Large amounts of unburned fuel within planned perimeter.		
3.	WFSA invalid or requires updating.		
	Total		
H. Existing Overhead			
1.	Worked two operational periods without achieving initial objectives.		
2.	Existing management organization ineffective.		
3.	Overhead overextended mentally and/or physically.		
4.	Incident action plans, briefings, etc. missing or poorly prepared.		
	Total		

INCIDENT COMPLEXITY ANALYSIS (TYPE 3,4,5)	Yes	No
Fire Behavior		
Fuels extremely dry and susceptible to long-range spotting or you are currently experiencing extreme fire behavior.		
Weather forecast indicating no significant relief or worsening conditions.		
Current or predicted fire behavior dictates indirect control strategy with large amounts of fuel within planned perimeter.		
Firefighter Safety		
Performance of firefighting resources affected by cumulative fatigue.		
Overhead overextended mentally and/or physically.		
Communication ineffective with tactical resources or dispatch.		

Incident Complexity Analysis (Type 3,4,5) (*Continued*)	Yes	No
Organization		
Operations are at the limit of span of control.		
Incident action plans, briefings, etc. missing or poorly prepared.		
Variety of specialized operations, support personnel or equipment.		
Unable to properly staff air operations.		
Limited local resources available for initial attack.		
Heavy commitment of local resources to logistical support.		
Existing forces worked 24 hours without success.		
Resources unfamiliar with local conditions and tactics.		
Values to be protected		
Urban interface; structures, developments, recreational facilities, or potential for evacuation.		
Fire burning or threatening more than one jurisdiction and potential for unified command with different or conflicting management objectives.		
Unique natural resources, special-designation areas, critical municipal watershed, T&E species habitat, cultural value sites.		
Sensitive political concerns, media involvement, or controversial fire policy.		

If you have checked "Yes" on 3 to 5 of the analysis boxes, consider requesting the next level of incident management support.

FIRELINE HANDBOOK

APPENDIX C – FIRE USE

CONTENTS

SAFETY FIRST—NO EXCEPTIONS

INTRODUCTION

Fire use is the use of wildland fire to achieve resource benefits irrespective of whether the ignition source is planned (prescribed fire) or unplanned (wildland fire use). The management decision to manage a planned or unplanned ignition for resource benefits is documented in an approved Fire Management Plan. The operational management of that fire is directed by a Prescribed Fire Plan (prescribed fire) or Wildland Fire Implementation Plan (wildland fire use). Successful implementation of either a Prescribed Fire or Wildland Fire Implementation Plan is dependent of the appropriate use and organization of fire use and other ICS skill positions.

FIRE USE SKILL POSITIONS

Fire use skill positions are needed for successful use of wildland fire to achieve land management objectives. They require a level of specific skill and knowledge. Personnel shall be assigned only to positions in which they are certified. The following is a listing of all National Interagency Incident Management System fire use skill positions:

Ignition Specialist

An Ignition Specialist is responsible for supervising and direction ground and/or aerial ignition operations according to establish standards in the prescribed fire plan.

- Review the burn plan and burn unit prior to implementation.

- Conduct pre-burn readiness assessment and briefing.

- Instruct crew on ignition operations.

- Conduct ignition operations in a safe manner.

- Complete test fire according to ignition plan.

- Ignite project area according to ignition plan.

- Identify impacts of ignition on control and desired fire effects.

Prescribed Fire Burn Boss

A Prescribed Fire Burn Boss is responsible to the agency administrator or Prescribed Fire Manager for implementing a prescribed fire plan.

- Review prescribed fire plan prior to implementation and ensures plan requirements are met.

- Act as liaison/coordinator between interdisciplinary managers and specialists.

- Recon the site.

- Obtain weather forecast, updates, and advisories from a meteorologist.

- Make go/no-go decision.

- Conduct the personnel/safety briefing to ensure a safe operation.

- Conduct the test burn.

- Supervise assigned personnel.

- Direct the ignition, holding, and monitoring operation.

- Declare the prescribed fire out.

- Determine when the prescribed fire exceeds prescription parameters or burn objectives.

- Evaluate and document objective accomplishment, operational procedures, assigned personnel, and costs.

- Ensure reports are completed.

Prescribed Fire Manager

A Prescribed Fire Manager is responsible for the implementation and coordination of assigned prescribed fire activities. A Prescribed Fire Manager may be assigned during periods when multiple simultaneous prescribed fires are being conducted, multiple prescribed fires will be conducted within a short time frame, or there is a complex interagency involvement.

- Obtain briefings from ordering official and/or prior Prescribed Fire Manager.

- Review prescribed fire plans prior to implementation and assess situation.

- Act as liaison/coordinator between the Prescribed Fire Burn Bosses, other offices, agencies, air quality authorities, news media, transportation agencies, and safety officials.

- Obtain and interpret long-term weather information.

- Conduct strategy meetings and/or briefings as needed.

- Set priorities for allocation of resources.

- Brief Prescribed Fire Burn Bosses and direct operational assignments according to agency specific policies and standards identified in prescribed fire plans.

- Monitor prescribed fire operations.

- Ensure all operations are conducted in a safe manner and in accordance with the prescribed fire plans.

- Ensure the completion of all required documentation including the evaluation and documentation of accomplishments, immediate fire behavior and fire effects, operational procedures and costs summaries.

Fire Effects Monitor

The Fire Effects Monitor is responsible for collecting the on site weather, fire behavior, and fire effects information needed to assess whether the fire is achieving established resource management objectives.

- Review the monitoring plan prior to implementation.

- Monitor, obtain, and record weather data.

- Monitor and record fire behavior data throughout the fire management operation.

- Recon the burn unit/area assigned.

- Plot the burn area and perimeter on a map.

- Monitor and record smoke management information.

- Monitor first order fire effects.

- Collect and record environmental data.

- Provide monitoring summary of the fire.

Long Term Fire Analyst

A Long Term Fire Analyst is responsible for acquisition and analysis of environmental and fire behavior information to develop recommendations and issue forecasts with short and long-range projections.

- Obtain briefing from supervisor.

- Coordinate weather data collection systems and resources, including Incident Meteorologist, Weather Observers, and Fire Effects Monitors.

- Acquire, manipulate, and interpret historical weather data.

- Collect, review, and compile fire history, fuel data and information about topography and fire barriers.

- Participate in planning meetings.

- Evaluates, display, and interpret the risks and uncertainty that a fire will reach a point of concern or cause critical events.

- Support fire use decision-making and fire use implementation actions for strategic planning and implementation plan development.

- Use the "Rare Event Risk Assessment Process" (RERAP) for long range fire planning and interpret the results.

- Input data into FARSITE (Fire Area Growth Simulator), run the fire growth model, and interpret and refine the results.

- Develop and prepare written tactical fire behavior forecasts.

- Attend operational briefings and provide site-specific fire behavior predictions, as requested.

- Establish weather security watch and monitor actual fire behavior to validate predictions, documents fire behavior, and anticipates potential safety problems.

- Inform personnel of changes in predicted conditions.

Fire Use Manager

A Fire Use Manager is responsible for incident
activities involving managing wildland fires use to
achieve resource management objectives including
developing and implementing strategic plans and
allocating resources.

- Prepare the initial Wildland Fire
  Implementation Plan (WFIP); evaluate an
  existing WFIP to determine if agency policy
  and identified resource objectives can be met
  through operations plan implementation,
  and/or make necessary revisions/amendments
  to a WFIP.

- Complete Initial Fire Assessment (WFIP Stage
  I).

- Obtain weather forecasts, updates and special
  advisories.

- Direct implementation of a Wildland Fire
  Implementation Plan (WFIP Stage II and III).

- Ensure that all required documentation
  including periodic fire assessment, is
  completed, maintained and properly filed.

- Evaluate the impacts of multiple fires
  (including wildland and prescribed) on natural
  resources, local economy, social
  demographics, political institutions and local
  unit management capability and advise agency
  administrator.

- Anticipate and evaluate impacts resulting from
  smoke.

- Provide information to agency administrator for periodic assessment of the WFIP decision.

- Monitor implementation costs and make the appropriate notifications.

- Identify appropriate measures to coordinate the termination of fire(s) if smoke, resource, and/or fire management objectives are not being met.

- Coordinate the declaration of the fire(s) out per agency policy unless dictated by season-ending event later in the year.

- Ensure rehabilitation actions are planned/accomplished in accordance with operations plans.

ORGANIZATION CHARTS

Prescribed Fire

┌─────────────────────────────┐
│ Prescribed Fire Manager   │
└─────────────────────────────┘

─ Prescribed Fire Burn Boss
    ─ Ignition Specialist
    ─ Fire Effects Monitor
    ─ Appropriate ICS Resources

Wildland Fire Use

┌─────────────────────────────┐
│ Fire Use Manager   │
└─────────────────────────────┘

─ Long Term Fire Analyst
─ Fire Effects Monitor
─ Appropriate ICS Resources

NWCG PRESCRIBED FIRE
GO/NO-GO CHECKLIST

Yes	No	Questions
		Are ALL fire prescription elements met?
		Are ALL smoke management specifications met?
		Has ALL required current and projected fire weather forecast been obtained and are they favorable?
		Are ALL planned operations personnel and equipment on-site, available, and operational?
		Has the availability of ALL contingency resources been checked, and are they available?
		Have ALL personnel been briefed on the project objectives, their assignment, safety hazards, escape routes, and safety zones?
		Have all the pre-burn considerations identified in the prescribed fire plan been completed or addressed?
		Have ALL the required notifications been made?
		Are ALL permits and clearances obtained?
		In your opinion, can the burn be carried out according to the prescribed fire plan and will it meet the planned objective?

If all the questions were answered "YES" proceed
with a test fire. Document the current conditions,
location, and results.

WATCH OUT 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. Uniformed on strategy, tactics, and hazards.
6. Instructions and assignments not clear.
7. No communication link with crew members or supervisor.
8. Constructing line without safe anchor point.
9. Building fireline downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and fire.
12. Cannot see main fire; not in contact with someone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather becoming 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 fireline.

Briefing Checklist

Situation
- ☐ Fire name, location, map orientation, other incidents in area
- ☐ Terrain influences
- ☐ Fuel type and conditions
- ☐ Fire weather (previous, current, and expected)
  Winds, RH, Temperature, etc.
- ☐ Fire behavior (previous, current, and expected)
  Time of day, Alignment of slope and wind, etc.

Mission/Execution
- ☐ Command
  Incident Commander/Immediate supervisor
- ☐ Leader's intent
  Overall strategy/objectives
- ☐ Specific tactical assignments
- ☐ Contingency plans

Communications
- ☐ Communication plan
  Tactical, Command, Air-to-ground frequencies
  Cell phone numbers
- ☐ Medevac plan

Service/Support
- ☐ Other resources
  Working adjacent and those available to order
  Aviation operations
- ☐ Logistics
  Transportation
  Supplies and equipment

Risk Management
- ☐ Identify known hazards and risks
- ☐ Identify control measures to mitigate hazards/reduce risk
- ☐ Identify trigger points for re-evaluating operations

Questions or Concerns?