Section 7013
(October 2002)

WATERSHED **7013**
(October 2002)

STRATEGY AND TACTICS **7013.1**
(October 2002)

STRATEGY **7013.1.1**
(October 2002)

Strategy is the overall plan used to determine and prioritize the major objectives needed to manage a wildland fire. The strategy(s) used to control a wildland fire depends on rate of spread, intensity, spotting potential, values at risk, size, resources available and other factors based upon initial size-up. During the **size-up,** the fire officer needs to evaluate facts, probabilities, own situation, available options, any plan of operation all ready implemented.

Attack of a wildland fire may involve one of the following strategies:

1. **Direct Attack (Offensive)**
   - Used when fire perimeter is burning at low intensity and fuels are light.
   - Crews can escape to safety in burned area; “one foot in green, one foot in black”.
   - An **anchor point** is required.
   - Control efforts, including line construction, are conducted at the fire perimeter, which becomes the control line.
   - The fire is stopped with least spread and acreage.
   - Burning out is not necessary.

2. **Indirect Attack (Defensive)**
   - Applications include fast moving ground fires too intense for crews, crown fires, steep terrain, or areas of pre-planned or natural barriers.
   - Uses pre-existing roads, natural barriers, or constructed firelines ahead of main fire.
   - Fire can catch firefighters working in unburned fuels.
   - The lines ahead of fire must be burned out or held by ground and air resources and become the final control line.
   - Requires lookouts to watch fireline and prevent entrapment.
   - Permits easier work for crews because of less smoke, heat, and flame contact.
   - Reduces length of fire edge and shortens control line.
   - Can cause increased acres burned.

3. **Combination of Direct and Indirect**
   - Be flexible, if the direct attack is not working, start thinking about going indirect.
   - If indirect attack is necessary, the fire may be moving rapidly to extended attack.

TACTICS **7013.1.2**
(October 2002)

Tactics are applied actions used to accomplish the overall objectives that were identified in the strategy. Fire tactics involve the actual number of resources and the individual designation of the units that are to accomplish the objectives.

The following are some examples of wildland firefighting tactics:

- **Pincer attack**: the direct attack around a fire in opposite directions by two (2) or more fire control resources.
- **Tandem attack**: the direct attack along a part of a fire perimeter by control resources following each other (can leap frog).
- **Envelopment**: control resources attack key or critical segments around the entire fire perimeter at approximately the same time.

Tactical considerations may include indirect attack such as hoselays, handline construction, dozer lines, retardant and foam support and firing out.

(Reference: CDF 4300 Training Manual, Incident Management II Instructor's Guide), and the "Firefighter's Handbook on Wildland Firefighting" - William Teie

WATERSHED EQUIPMENT **7013.2**
(October 2002)

The control of a wildland fire is dependent upon application of the appropriate strategy and tactics. When going through the planning process, consideration must be given to safety, efficiency and cost effectiveness. In order to be successful in meeting these goals and the objectives of the established strategies and tactics, it is imperative that one has a thorough knowledge of the resources available and their capabilities. To assist personnel in making sound decisions, "operating guides" have been established and presented in this section.

ENGINES **7013.2.1**
(October 2002)

In the fire service of today, an engine is the most versatile resource on the fire ground. It carries personnel, water, firefighting tools, and emergency medical equipment. Engine crews are the primary suppliers of water directly to the fire line. Often times an engine crew is the first resource to arrive at a fire and the officer must assume the roll of the first Incident Commander.

GENERAL CAPABILITIES OF ENGINES **7013.2.1.1**
(October 2002)

In wildland firefighting, engine crews can be used in the following ways:

- Suppression of fire by mobile attack or hoselays.
- Hotspotting critical areas.
- Handline construction.
- Supplying water to hoselays, portable tanks, backpumps, or other engines.
- Protecting structures, and other man-made improvements, historical and archeological sites, and valuable natural resources.
- Providing emergency medical care to firefighters and the public.

GENERAL ENGINE OPERATING GUIDELINES **7013.2.1.2**
(October 2002)

- Park engine off the road or in wide spots; do not block roads.
- Use headlights and warning lights when appropriate.
- Keep doors, windows and compartments closed.
- Park in a direction for quick escape; especially in structure protection mode.
- Maintain constant communication with crew.
- When pumping a hoselay, select the pumping engine based on tank capacity and pressure capability.
- Use water sparingly when in short supply.
- Plan for an adequate water supply; engine shuttle, water tenders, portable tanks, etc.

(Reference: Section 7096 “Capabilities,” CDF 4300 Training Manual, and Incident Management II Instructor’s Guide.)
NWCG Fireline Handbook
“Firefighter’s Handbook on Wildland Firefighting”- William Teie

DOZERS **7013.2.2**
(October 2002)

A bulldozer is a resource that can greatly enhance the timely construction of a fireline, especially in heavier fuels. Depending upon fire intensity, bulldozers can sometimes work directly on the fireline usually supported by aircraft, handcrews and engines. On larger fires, however, dozers are often assigned to building line parallel to or ahead of the main fire. This requires close supervision and constant communications. Dozers may be agency owned with experienced firefighting personnel assigned or they may be private contractors with a varied level of firefighting skills. The more experienced an operator is the more independent the dozer can work, however, it is always safer and more productive to have two or more dozers work together.

A skilled bulldozer operator can remove fuel and leave minimal impact to the soil. An inexperienced or careless operator can cause more damage trying to control a fire than the fire would cause. Inappropriate use of bulldozers can cause damage to environmentally sensitive areas, archeological sites, fences, road pavement and utility services above and below ground.

(Reference: 7096.2)

CAPABILITIES OF DOZERS **7013.2.2.1**
(October 2002)

Bulldozers have the following uses:

- Construction of fireline, direct or indirect.
- Construction of **safety zones.**
- Construction of **escape routes.**
- Scattering of heavy fuels near the fireline.
- Constructing helispots.
- Constructing or improving access roads to the fireline.
- Constructing water bars and other rehab tasks.

GENERAL DOZER OPERATING GUIDELINES **7013.2.2.2**
(October 2002)

- Be sure all bulldozers are in good mechanical condition.
- Be sure all bulldozers and operators have the required safety features and equipment.
- All operators must have appropriate communications with the incident.
- The dozer unit should have a dozer boss or swamper assigned to coordinate the dozer with other resources working in the vicinity.
- When building fireline with bulldozers, take advantage of favorable fuels and topography.
- The best place for bulldozer-constructed fireline is just off a ridge top on the slope away from the fire.
- Avoid sharp turns in the fireline**.**
- Unburned fuels should be pushed away from the fire, burned fuels toward the fire.
- If the plan calls for firing the completed dozer line, fire it as soon as possible.
- When locating line, avoid springs, bogs and other wet areas.
- Avoid working on steep side hills and creek bottoms.
- If crossing a streambed is necessary, make sure the appropriate environmental agencies are notified, e.g., Fish and Game.
- Identify ecological sensitive areas and use caution or avoid the area if restrictions dictate.

- During mop-up scatter large logs and hot piles within the burned area.
- Rehab dozer lines as soon as possible – water bar as necessary.
- Snags and hazardous trees can sometimes be pushed over with a bulldozer.

DOZER SAFETY **7013.2.2.3**
SAFETY WORKING AROUND DOZERS
(October 2002)

- Make bulldozer operator and swamper aware of other resources working in the area; especially at night or in dusty conditions.
- **"Danger Zone"** is within 50 feet of a working bulldozer.
- Be alert for rocks and other rolling materials when working below bulldozers; post a lookout.
- Watch material being moved by a bulldozer; trees, logs, stumps, etc.
- Do **not** walk directly in front of or in back of a working bulldozer.
- Do **not** approach a bulldozer until it has stopped and the operator has signaled you.
- **Never** get on a moving bulldozer to communicate with the operator.
- Do **not** permit anyone but the bulldozer operator to ride on the dozer.
- When mounting or dismounting with the engine running, always take equipment out of gear and lower the blade to the ground.
- When entering an area where bulldozers have completed work watch for:
  - Loosened rocks.
  - Weakened trees.
  - Disturbed rattlesnakes.
  - Irritated bees.
- Do **not** sleep on a dozer line.
- Stay clear of bulldozer loading and unloading operations.
- Advise bulldozer operator of hazards:
  - Power lines
  - Fence lines
  - Shafts
  - Pits
  - Underground utilities
  - Dangerous snags

SAFETY ITEMS NEEDED FOR BULLDOZER OPERATION

- Bulldozer must have a canopy with certified rollover protection and full side screens with fire curtains or an environmental cab.
- Proper seat belts.
- Adequate lights – front and rear.
- Fire extinguisher – pressure water is desired.

- A radio for fireline communications.
- Strobe light is desirable.
- A filtered air system for the operator is desirable.

SAFETY ITEMS FOR THE OPERATOR

- Personal protective clothing (nomex).
- Helmet with goggles.
- Gloves.
- Proper boots.
- Fire shelter.

(Reference: CDF 4300 TRAINING MANUAL)
"Firefighter's Handbook On Wildland Firefighting" –William Teie
NWCG Fireline Handbook
I.C.S. Field Operations Guide
"Wildland Firefighting" – Bill Clayton, David Day, Jim McFadden

ENGINE/DOZER AS PROTECTION **7013.2.3**
(October 2002)

Firefighters may find themselves in a fire entrapment situation while on or near CDF mobile equipment. The vehicle (engine or dozer) can provide an area of refuge.

PRE-FIRE ENTRAPMENT PREPARATION **7013.2.3.1**
(October 2002)

A. Train on refuge-taking procedures in different vehicles.
B. Cover any open areas in the vehicle cab area.

WHEN ENTRAPMENT IS IMMINENT **7013.2.3.2**
(October 2002)

A. Call for assistance via your supervisor, ECC, Incident Commander, etc.
B. Position the vehicle for maximum safety.
    1. Park in the safest area possible (low fuel loading, level terrain, no chimneys, saddles, or powerlines nearby).
    2. Use any available shelter. Park behind an embankment, structure, other vehicle, or large rocks.
C. Prepare the vehicle for exposure.
    1. Fire out around the vehicle.
    2. Minimize radiant heat exposure.
        a. Engine cab away from approaching fire if crew inside cab (safest).

b. Cab facing the fire if crew outside vehicle in crew compartment.
c. Dozer blade down facing the fire.

3. Leave engine running at high RPM (1000 minimum).
4. Leave auxiliary pump running with hose outside (150+ psi).
5. Leave dozer air conditioning running.
6. Set spring brake to avoid vehicle movement, if bumped into gear.
7. Keep cab sealed up.
   a. Don't lock the doors.
   b. Cover windows with Fire Shelters.
   c. Leave vehicle lights on.

D. Crew Preparation
   1. Get into the cab.
   2. Remain as low in cab as possible.
   3. If not alone, keep talking and offering encouragement.
   4. Cover up with turnout coats if available.
   5. Breathe shallowly.
   6. Stay in the cab until the fire passes.

AFTER THE FIRE PASSES **7013.2.3.3**
(October 2002)

A. Account for all personnel.
B. Administer and/or seek medical assistance.
C. Extinguish fires on the vehicle.
D. Give the IC, ECC or Fireline Supervisor a Report on Conditions.
E. Await help or continue with assignment based on injuries and/or damage.
   - Don't underestimate the need for Incident Stress Debriefing.

SUMMARY **7013.2.3.4**
(October 2002)

Many lives have been saved using these procedures. Be sure to practice with all models of CDF engines and dozers. Remember: "The life you save may be your own!"

FIRE CREWS **7013.2.4**
(October 2002)

CDF provides type-one fire crews in a cooperative relationship with the *California Department of Corrections (CDC)*, the *California Youth Authority (CYA)*, and the *California Conservation Corps (CCC)*. These fire crews provide labor for daily project work, and respond to emergency incidents. Fire crews are capable of hand line construction, assisting engine companies in hose lays, mop-up, and other labor-intensive work on emergency incidents.

CDF personnel assume the responsibility for wards, inmates and corp members while enroute to, working on, or returning from emergency incidents. While assigned to an incident, CDF will normally transfer custody of inmates and wards to the respective custodial agency for feeding, sleeping, and other off shift activities. In the absence of correctional officers, CDF personnel will continue to supervise the actions of wards and inmates.

Inmates and wards can only work into the State of Nevada within 25 miles of the California border. The use of CDC and CYA Conservation Camp Fire Crews in Oregon and Arizona is prohibited. Any travel through those states must be approved by the appropriate custodial agency prior to travel.

(Reference: 7096.3; 6400 and 6200 Handbooks, CCC Operating Plan and Interagency Agreement.)

CDF is responsible for the following for Fire Crew Members:

- Provide meals.
- Provide transportation.
- Provide qualified supervision.
- Provide training for assigned work.
- Provide Personal Protective Equipment.

While assigned to emergency incidents, the following standards will apply:

- Every effort should be made to provide 8 hours of uninterrupted rest for crews.
- Rest areas for inmates and wards, should be separate from rest areas for free persons.
- Shade should be provided in hot weather.
- Rest areas should be level.
- Rest areas should have adequate sanitary facilities.
- Separate rest area should be provided for inmates, wards, and female inmates.
- Crews should be provided a minimum of 3 meals in a 24-hour period.
- Crews should be provided the same meal as other incident staff.
- Shower facilities should be provided in close proximity to the rest area.
- Custodial crews cannot be coyote, but may be spiked only with the approval of custodial agency.
- A CDF Fire Captain will assess each assignment for safety and security. They have the right to refuse assignments for either reason.

- Each crew will be dispatched with appropriate custodial staff. They will provide custody during off shift time, provide transportation for medical or disciplinary purposes, and provide for inmate health and welfare issues while off shift.
- The appropriate custodial Agency representative is responsible for all issues related to custodial staff.

SUPERVISION OF INMATE FIRE CREWS **7013.2.4.1**
(October 2002)

- Do not split Fire Crews
- Do not leave inmates unsupervised for any length of time.
- Do not allow untrained personnel to supervise inmates or wards.
- Do not attempt to punish inmates for poor work performance.
- Do not swear, or lay hands on an inmate.
- Do not allow inmates to operate non-CDF equipment without approval from the direct supervisor.
- Do not allow inmates to operate motor vehicles.

ESCAPES OR WALK AWAYS **7013.2.4.2**
(October 2002)

Occasionally, inmates or wards will escape or walk away from work projects or emergency incidents. CDF personnel should use the following to guide their actions in the event of an escape:

- Ensure that the inmate has not become unintentionally separated from the crew.
- Notify the custodial agency.
- Notify the Incident Commander on an emergency.
- Notify ECC and ensure that the local law enforcement authorities have been notified.
- Provide assistance to custodial agencies.

INMATE/ WARD RELATIONS **7013.2.4.3**
(October 2002)

Relations between CDF staff and inmates and wards are governed by policy found in Handbook 6400 for adult inmates and 6200 for wards. Both of these handbooks refer to Title 15, which provides the guidance for the CDC and the CYA. There are general guidelines that can assist staff in their dealings with both groups.

- Do not aid or assist any inmate or ward to escape. PC 4533 and PC 4538
- Do not allow or assist any inmate to communicate with outsiders unless prior approval or arrangements have been made by CDC or CYA. PC 4570 CCR Title 15 3401

- Do not permit former inmates or persons not associated with the conservation camp program to loiter, associate with inmates or wards, or interfere with inmate activity. All visitors must conform with rules and regulations stipulated by the agency in charge of custody. PC 2790
- Do not allow inmates to use a telephone, mail a letter, or communicate in any manner that will permit unmonitored contact with persons not connected with the camp program. PC 4570 CCR Title 15 3282 (b) and 3401
- Do not accept gratuities or presents from inmates or their families or friends. PC 2541, CCR Title 15, 3399
- Do not accept from nor deliver to an inmate or ward, their associates, or their families any message, package, letter, gratuity, or gift. PC 4570
- Do not in any way contact or communicate with families or know associates of inmates or wards. CCR Title 15, 3401
- No employee will threaten, strike, or lay hands on an inmate unless in self- defense of him/ herself or to prevent injury to persons or property. PC 2652, CCR Title 15, 3279
- No personally- owned weapons or firearms are permitted in vehicles, buildings, or storage within camp limits at any time. PC 4574, CCR Title 15, 3284
- Guns, explosives, or any type of weapon will not be brought within the camp limits. Persons bearing firearms will be advised of this regulation and instructed to leave the area or unload and secure the firearms in a locked compartment or turn in weapons to the Corrections Duty Officer while in a camp. PC 4574; CCR Title 15, 3284
- Narcotics, drugs, or alcohol will not be brought within the camp limits or to and area where inmates or wards may be present. Prescription drugs for an employee may be brought into camp or work areas, but must be kept in the personal possession of the employee for whom they were prescribed or must be placed in a securely locked cabinet. PC 4573; CCR Title 15, 3284 and 3410
- There will be no drinking of alcoholic beverages while on duty or in the presence of inmates. CCR Title 15, 3410
- Under no circumstances will custody of inmates or wards be given to an employee who shows any evidence of drinking. CCR Title 15, 3410
- Gambling in the presence of, or with inmates is prohibited in any form. CCR Title 15, 3400
- Only cooperating or sponsoring agencies' employees who have had proper training will directly supervise inmates. PC 2706
- No inmate will be permitted to drive a vehicle of any type on a public road except in the case of extreme emergency; for example, a crew vehicle threatened by a wildland fire that would otherwise be destroyed. CCR Title 15, 3408

- Purchase of hobby craft from inmates must be in strict compliance with institutional hobby craft regulations. PC 2541; CCR Title 15, 3399
- Inmates may not perform personal services for employees or employees of contractors except as specifically authorized by institutional and camp procedures. PC 2541; CCR Title 15, 3399
- Any camp employee must notify the Camp Commander upon becoming aware that a relative or close personal friend has been committed to CDC or CYA. CCR Title 15, 3406
- Employees should never indicate to an inmate he/ she will or can help in securing employment after release. Do not allow an inmate to be in possession of, gain access to, or bring into camp, any contraband, or anything not indicated as approved property without expressed approval of the Camp Commander and / or Division Chief.
- During emergency assignments, adult inmates and wards should be assigned to separate Divisions while working, kept separate in incident base, and provided separate sleeping areas. Male and female inmates and wards also should be kept separate while assigned to emergency incidents.

CHAIN SAW OPERATIONS **7013.3**
(Limbing, Brushing, Bucking, & Felling)
(October 2002)

CDF personnel may be called upon to limb, buck, or brush and fell trees while assigned to emergency incidents. As this is hazardous work, the following items shall be considered before felling trees. Remember; don't be afraid to say "No!" if you are uncomfortable with the cutting assignment.

- No CDF personnel (including inmates and wards) shall operate a chain saw unless they have completed or are enrolled in the CDF approved chain saw course (NWCG S-212) except in case of emergency where life is immediately threatened.
- Chain saw operators in training may operate chain saws under direction of a certified chain saw operator

All safety PPE shall be worn while operating a chain saw, i.e. chaps, hardhat, goggles, gloves, hearing protection, etc.

Prior to felling a tree, an assessment of the situation will be conducted. This assessment will include the following:

- Direction of lean
- Observe for top hazards, i.e. widow makers, loose limbs or tops, etc.
- Check for snags
- Direction of fall

- Clear work area at base of tree
- Determine primary and alternate escape routes
- Walk out intended lay of tree
- Ensure area is clear of personnel

Once the assessment has been made the supervisor will assure the following is addressed and briefed on:

- A safety briefing shall be conducted once the assessment has been made.
- A lookout will be posted when work begins.
- Wedges will be used as needed.
- A warning will be called out when the tree begins to fall.
- After the tree has fallen, the area will be assessed for hazards caused by the falling tree.
- **REMEMBER!** No person should fell any tree that is larger or more complicated than they are comfortable with, or their training has prepared and certified them for.

FIRING OPERATIONS **7013.4**
(October 2002)

The utilization of the appropriate strategy and tactics is extremely important in determining the outcome of suppressing a wildland fire. On larger, hotter fires the strategy of choice is often an indirect attack. In addition to hoselays, hand lines, dozer lines, and retardant lines, the use of backfire and burning out are tactical considerations frequently used. The use of fighting fire with fire is very common in wildland firefighting; however, it requires a great deal more coordination and fire ground experience than the other tactical choices. Knowing when and how to properly execute a burning out or backfire operation can result in the rapid control of a major fire with the use of limited resources. Indecision and poor timing by Incident Commanders can compromise safety; produce escapes that rapidly increase the advancement of the fire and create other incident related problems.

DEFINITION:

BURNING OUT - (FIRING OUT, BLACK LINING) – Setting fire inside a control line to consume fuel between the edge of the fire and the control line, when the main fire is not an immediate threat. Control lines can be constructed fire line, roads, driveways, stream or dry creek bottoms, wet lines or foam lines.

Burning out has the following uses:

- Improve completed fireline.
- Eliminate fingers of fire by cutting directly across each tip of fire.
- Create safety zones.

- Combine spot fires.
- Reduce mop-up.

BACKFIRE – A fire set to spread against the influence of wind and slope in order to widen the burn zone ahead of the main fire. The desired effect is to slow or stop a fast moving, high-intensity fire from overrunning an established fireline.

Conditions that warrant backfire are:

- Rapid rate of spread of the main fire.
- Fire intensity is too severe for direct attack.
- There is an immediate threat to life or property.
- Direct attack not possible because of inaccessible terrain.

LEGAL AUTHORITY **7013.4.1**
(October 2002)

Public Resources Code 4426 – A person shall not set a backfire, or cause a backfire to be set, except under the direct supervision or permission of a state or federal forest officer, unless it can be established that the setting of such backfire was necessary for the purpose of saving life or valuable property.

Health and Safety Code 41801 – Nothing in this article shall be construed as limiting the authority granted under the provisions of law to any public officer to set or permit a fire when such a fire is, in his/her opinion, necessary for any of the following purposes:

- The prevention of a fire hazard that cannot be abated by any other means.
- The instruction of public employees in the methods of firefighting.
- The instruction of employees in methods of firefighting, when such fire is set, pursuant to permit, on property used for industrial purposes.
- The setting of backfires necessary to save life or valuable property pursuant to Section 4426 of the Public Resources Code.
- The abatement of fire hazards pursuant to Section 13055.
- Disease or pest prevention, where there is an immediate need for and no reasonable alternative to burning.

Health and Safety Code 13055 – Any public agency authorized to engage in fire protection activities, including but not limited to a fire protection district, city, county fire department, the Department of Forestry and Fire Protection, and the United States Forest Service, may use fire to abate a fire hazard.

INCIDENT AUTHORITY **7013.4.2**
(No. 1 November 2005)

The Incident Commander has the overall authority and responsibility to set a backfire or burn should the need exist. As the incident organization expands, the responsibility and authority to backfire or burnout may be delegated. A normal progression of delegation, depending on the complexity of the incident, would be from the Incident Commander to the Operations Section Chief and could extend down to the Branch Director, Division Supervisor, Strike Team Leader, Task Force Leader or Single Resource.

Communications When Firing:

Except where immediate firing is necessary to prevent the loss of life or major property damage, all firing operations shall be communicated to the appropriate ICS supervisor prior to the commencement of the firing operation. The officer supervising the firing operation shall remain in communication with his/her ICS supervisor and adjoining forces to the extent possible.

The level of backfire and/or burnout authority should be identified as early as possible. Radio net announcement at the incident will be made prior to backfiring and/or burnout. This will be communicated on tactical and command nets and will identify general location of geographic area to be burned.

FIRING TEAM ORGANIZATION **7013.4.3**
(October 2002)

Firing Observers: Personnel used primarily for reconnaissance, intelligence gathering, and on-going evaluation of the firing operation.

Ignition Team: Personnel assigned to physically light the fire and should not have any other incident responsibilities.

Holding Team: Personnel assigned to follow closely behind the ignition team and prevent the escape of the firing operation.

Mop-up Team: Resources specifically designated to remain behind for mop-up and patrol.

Reserves: When available, any resources may be staged to assist with any aspect of the firing operation.

IGNITION PATTERNS **7013.4.4**
(October 2002)

Edge firing: Fire set along the edge of the control line.

Strip firing: Fire set parallel to but away from the control line.
- 1-2-3 Concept most commonly used where three lighters are assigned and their pace and space is adjusted as necessary. ***(You are not limited to three lighters, adjust the number up or down as necessary).**

Spike firing: Spikes of fire are driven directly into the influence (wind / slope) in from and perpendicular to the control line.

Dot firing: Variation of strip firing where separate ignition points are set.

Ring firing: Used during an extremely fast moving fire through light flashy fuels where structures and other improvements are threatened and there may not be sufficient time to establish a permanent control line. A hastily constructed line (may be a wet or foam line) is placed around the site and fire is carried around the outside perimeter of the ring. This tactic is utilized only to protect an identified resource of value and has little if any effect on control of the main fire.
***Ring firing may be the most logical tactic utilized in a potential entrapment situation!**

CRITICAL POINTS OF FIRING OPERATION **7013.4.5**
(October 2002)

To provide for maximum personnel safety, any firing operation must have an identified starting and ending point.

Anchor point: Represents a safe and secure place to begin any firing activity.

Termination point: Represents a safe place to secure or end a firing operation.

COMMON PROBLEMS DURING FIRING OPERATION **7013.4.6**
(October 2002)

- Bunching up of firing group along the line.
- Resources stringing out along the control line.
- Hasty mop-up operations.
- Lack of attention to assigned task; all groups must pay close attention to both sides of the control line.

WATCH OUT SITUATIONS ON FIRING OPERATIONS **7013.4.7**
(October 2002)

A. ADVERSE LINE LOCATION
- Midslope lines.
- Undercut line.
- Switchbacks or sharp bends in the line.

B. TOPOGRAPHY
- Firing in narrow canyons.
- Firing through saddles.
- Firing across long slopes.

Fuels:
- Concentration of heavy fuels (jackpots) close to the edge of the line.
- Snags along the edge of the line.

C. WEATHER
- Wind speed is changing.
- Wind direction is changing.
- Thunderstorms are developing in the area.
- Humidity is changing.
- Temperature is changing.
- Shading of fuels is developing.

D. PERSONNEL AND RESOURCES
- Loss of contact with your crew, supervisor, and/or adjacent resources.
- Lack of sufficient resources.
- Wrong type of resources.
- Vital piece of equipment breaks down.

E. HIGH-VALUE AREAS CLOSE TO OR WITHIN THE BURN AREA
- Structures.
- Recreational areas.
- Communications sites.
- Improvements.
- Historical sites.
- Archeological sites.
- Natural resource values.

F. COMMON FIRING EQUIPMENT

- Fusees.
- Drip torch.
- Pneumatic torch.
- Blivits.
- Terra torch.
- Propane torch.
- Very Pistol (12 gauge or 25mm).
- Fire quick flare launcher.
- Fusee launcher.
- Helitorch.
- Aerial Ignition device (ping – pong balls).

AS A CONTROL TACTIC **7013.4.8**
(October 2002)

To be written

AS A SAFETY TACTIC **7013.4.9**
(October 2002)

To be written

EMERGENCY AREA ABANDONMENT PROCEDURES AND SIGNALS **7013.5**
(October 2002)

To be written

FIRE GROUND ACCOUNTABILITY **7013.6**
(October 2002)

The ability of the IC to account for all incident personnel at all times is imperative. On vegetation fires, floods, or other emergencies, all personnel that are assigned to the line must be accounted for, as they enter the work area, and as they exit the line.

- Accountability will be the responsibility of the Division /Group Supervisor.
- Prior to the end of a work shift, the Division/ Group Supervisor will account for each person assigned and verify that all are enroute to Incident Base.
- Miscellaneous personnel that move between areas at the incident (i.e. Field Observers, Line EMT's, etc.) must check in with the respective Division Supervisor as they enter and exit that work area.
- The incident Safety Officer will monitor accountability to ensure compliance.
- Each individual supervisor is responsible for subordinate accountability.

Each year homes are being built in areas prone to high fire danger, and this poses an increasing problem for the modern firefighter. The following guidelines should help you to do an effective job of structure protection, in addition to keeping your crew safe.

A. WHAT IS THE FIRE SITUATION?

- Rate of Spread – Will you have the time necessary to do your job?
- Flame Lengths – Are the flames longer than the clearance?
- Fuel Types – Can I be effective with the equipment at hand?
- Fire Weather – What is the current and expected weather?
- Topography – Will the slope allow an attack? Is the structure at the top of a chimney?

B. PHYSICAL FEATURES AND IMPROVEMENTS

- Roads- does the access road allow me safe access and egress? Are there locked gates?
- Fuel Breaks- Has the landowner cleared a defensible space at the property? Are there natural barriers?
- Structures – How many? Type and construction
- Water Sources – Hydrant, Pool, pond, etc.

C. COMMUNICATIONS

- Do you have good communications with supervisor and adjoining forces?
- Does your supervisor know where you are?
- Can you contact Air Attack if needed?

D. STRATEGY

- Before the fire reaches the structure ask three questions:
  1. Is there a place to attack?
  2. Are there enough resources to be effective?
  3. Is there enough time to do pre-work necessary to protect structure?
- Always look for a way to extinguish the fire first.
- In all situations be sure of your egress.
- Don't over commit. If you spend two hours at one structure, you might loose 3 or 4 structures in that time.
- Be careful about firing out. The problem you solve for yourself may create a larger problem for someone else.
- After the fire passes:
  1. Do a complete check for any extension.
  2. Provide mop-up/overhaul where necessary to prevent further extension.
  3. Set up a patrol pattern to revisit all structures.
  4. In the event of reassignment, assure backup plans for patrol are made.

E. SAFETY

- Can I protect this structure without compromising the safety of my crew or apparatus?
- Have I provided for the following:
  LCES
  Lookouts
  Communications
  Escape Routes
  Safety Zones
- Have I briefed all involved on all safety issues?
- Am I prepared for changes in Fire Behavior?

F. DEALING WITH OCCUPANTS

- Evacuate occupants. Remember, it is their right to stay, you should advise if you cannot guarantee their safety.
- Advise occupant that they may compromise your ability to protect their structure.
- If the occupant stays, teach them how to help defend and patrol their property.
- Include occupants in safety briefings.
- If rapid pullout of your apparatus is necessary, notify occupants (if they are present.) Advise them to leave and potential consequences should they choose not to evacuate. Notify supervisor if occupants elect to stay. Document circumstances that prompted you to leave on ICS-214.

STRUCTURE TRIAGE AND PROTECTION 7013.7.1
(October 2002)

Structure Triage

When committed to structure protection and if time allows, the Company Officer should do a comprehensive assessment of the geographical area and the task at hand. You should be able to determine the defensible structures when assessing a home in the I–Zone.

Defensible - features which may allow a structure to survive:

- **Fire Resistant construction**
  Composition, tile, metal, roofing.
  Stucco, brick, metal siding.
  Enclosed Decks, no decks, or overhangs.
  Screened vents on roofs, attic, and a sub-floor with few openings.
  Minimal glass on side of fire approach.

- **Geography**
  Flat terrain.
  Backside of ridge.
  No Chimneys.
  Water Source nearby.
  Clustered with other winners.
  Visible from street.

- **Good Access**
  Short, wide driveway with room to turn around.
  Light fuel on access road.
  Fire not funneled across access, no chimneys.
  No snags that would fall across access.
  More than one route of ingress or egress.
  Egress safe even when fire is burning adjacent area.

- **Good Clearance**
  All flammable vegetation at least 30 feet away.
  On slopes, brush and trees at least 100 feet away.
  Woodpiles and other flammable materials away from structure.
  No ladder fuels present. Break in continuity of ground, surface, and aerial fuels.
  Fire resistant vegetation.

Less defendable - what makes a structure difficult, unsafe, or impossible to defend?

- **Poor Construction**
  Shake or shingle roof.
  Wood siding.
  Exposed decks and overhangs.
  Large area of windows, particularly if on fire approach side.
  Many vents and openings in roof, attic, and sub floor, especially if unscreened.

- **Poor location**
  Mid- slope
  Top of slope
  Top of chimney, intense fire funneled at structure.
  Isolated from other structures; resources unable to protect more than one at a time.
  Long distance from water.
  Hidden from view.

- **Poor access**
  Narrow, long drive; slow travel, difficult in smoke.
  Heavy fuels along access; heat generated precludes access or egress while burning.
  Access crosses chimney.
  Access has snags that may fall across road.
  Unsafe escape route.

- **Poor Clearance**
  Fuels right up to structure.
  Brush within 30 feet of structure, 100 feet on steep slope.
  Trees overhanging or near structure; especially when fire has been spreading vertically or is crowning.
  Vertical continuity of fuels is sufficient to expect fire spread into the crowns.
  Woodpile, hay or other concentrated flammables near structure with no time to move or adequately cover them.
  Structure has already caught fire and has substantial involvement.

Fighting the Fire

- Remember that you eliminate the need to protect structures if you extinguish the fire.
- Burn or fire out around structures only if you have coordinated your activities with adjoining forces, supervisor, and have a clear starting point, and stopping point. This does not apply to life safety situations; however, you should notify all listed if you have had to fire out for life safety reasons.
- Conserve water if possible.
- Fight fire in lightest fuels possible.
- Pre treat with aircraft if possible.
- Watch for re-burns.

Remember the following:

The worst thing that can happen is to become trapped at an unsafe structure. Expect one or more additional vehicles to suddenly appear at your structure, potentially causing gridlock. Always imagine the worst-case scenario; look for a second way out! Nothing is worth your or your crew's life, or the destruction of your apparatus.

When to protect the "Less Defendable" Structures

- Never protect a structure if it is unsafe to do so. A structure with no escape route and/or no safety area should not be protected, even if extra resources are available
- When all threatened "Defendable Structures" are protected, resources are still available, and there is time.

- Enough resources and time are available to safely overcome deficits such as shuttling water, clearing brush, etc.
- Fire behavior and or weather changes reduce control problems.
- Direction of fire approach changes; backing fire rather than head on.
- Contents or structure dictate attempt to protect. (i.e. a historical building, any structure that would pose a greater problem to the incident if destroyed).

When not to protect a "Defendable" structure.

- Does not need protection to survive.
- Change in fire behavior or direction causes a "defendable" to become a "less defendable"
- Not enough resources to protect all the "defendable" at the same time.

Preparing the Structure

Use time wisely to prepare for the fire approach. You can improve your chance of success.

Exterior

- Ladder the roof. Use the owners if available; try not to tie up your own equipment.
- Clean roof. Remove leaves, twigs, pine needles, any flammable material
- Cover swamp coolers and other vents if possible
- Pre- treat with foam if available and water supply allows
- Cut limbs overhanging roof, or fall trees too close to structure
- Close windows and doors but leave them unlocked
- Remove vehicle or place in garage.
- Move boats away from structure
- Place flammable items such as lawn chairs inside structure
- Remove flammable vegetation. Consider utilizing Fire Crew or dozer if available. Scatter brush away from structure, DO NOT PILE
- Remove flammable fencing if too close to structure
- Consider removing decks (as a last resort).
- Shut off gas supply to structure
- Leave electricity on unless structure becomes involved
- Pre-connect garden hoses

Interior:

- Become familiar with floor plan.
- Know where access to attic is, you may want to ladder.
- Remove light curtains from windows, close insulated drapes.
- Put pets and valuables in least exposed room or in vehicle.

Placement of Apparatus, Hose Deployment, and Personnel Placement

- The First Rule of Structure Protection is to **Stay Mobile**.
- Establish Safety Zones and identify the Escape Routes to reach them. Appoint or identify a lookout and establish "trigger points" when it is necessary to abandon the structure. Establish a "Cut and Run" signal and brief all personnel on each of these points. Make sure you have communications with all forces, and they are tested and work.
- Always back in; be ready to leave.
- Mark driveways to show structure is already protected. Use ribbon across access driveway, sign, and any other predetermined signal.
- Park in cleared area, driveway, or other non- flammable area.
- Use structure to protect apparatus from heat.
- Keep exit clear, do not allow other vehicles to block exits.
- Use 100-200 ft. pre-connect 1-1/2 or 1- ¾ lines. Minimize hose deployment, **Stay Mobile!**
- Connect to hydrant for engine refill only.
- Use Portable Pump in Pond or Pool. Avoid drafting. Keep tank topped off.
- Have a 50 ft. pre-connect coiled on top of apparatus for engine protection.
- Be able to reach all exterior portions of structure with a hoseline.
- Keep hose bed covered, compartments closed, windows rolled up.
- Charge and bleed hose lines as fire gets near.
- Place homeowner's garden hose in tank.
- Maintain communications and control of all personnel at all times.
- Rest personnel if possible.

Fighting the Structure Fire

- A general rule is not to spend significant effort saving a structure that has substantial involvement.
- If you can control the structure fire, fight it aggressively, but avoid over commitment.
- Use large diameter hose lines for fast knock down.
- Avoid water curtains- uses too much water.
- Save the last 100 gallons of water in your tank.
- Avoid spraying water on windows, they will break.

- Request assistance if needed.
- Use homeowner's garden hose for mop up.

If you are Over-Run By Fire

- Be decisive, take control of crew.
- Retreat to pre- established Safety Zones
- Use interior of structure as a refuge
- Take hose into structure with you
- Wear Turn outs
- Don SCBA
- Notify Supervisor
- Request Air Support

Use Engine as Refuge

- Keep pump running
- Use pre-connect 1 ½ line to deploy a fog over engine.
- Wear Turnouts and all other safety PPE.
- Don SCBA
- Use fire shelters or salvage covers to reflect radiant heat. Close windows and get low in cab.
- Use radio to declare an emergency. Advise of your location (latitude and longitude), street address; advise of your situation, and resource needs.
- Stay in cab until safe to exit.
- Check condition of apparatus on exit.
- Notify supervisor of status.
- Suppress fires, determine whether to stay or move on.

Pull out – if rapid pull out is required, consider the following:

- Consider cutting hose lines
- Bleed pressure and fold hose loosely on top of engine, keep vehicle protection line charged.
- Notify occupants if present. Advise them to leave and potential consequences if they don't evacuate. Notify supervisor if occupants elect to stay.
- Document circumstances that prompted you to leave on ICS-214.
- Notify Supervisor of your decision, and seek new assignment.
- Notify adjoining forces of your decision, and what fire conditions prompted your actions.

If Rapid pull out is <u>not</u> needed:

- Do a complete check for extension. Wait awhile, many seemingly saved structures have burned to the ground after forces have left.
- Limit your mop up to genuine threats to the structure.
- Top off tank

- If homeowner is present, teach them to patrol their property.
- Establish a patrol for the area, and continue checking already saved structures.

General Safety for Structure Protection

- Use and wear all PPE.
- Establish Lookouts, Safety Zones, Communications, and Escape Routes. Brief all personnel on these items, be sure they are understood.
- **Keep Mobile**.
- Avoid driving in heavy smoke if possible. Use headlights to be seen.
- Try to have more than one escape route.
- **Back your engine in**. Be ready to leave.
- Park in safety zones.
- Maintain control of your crew at all times.

WILDLAND URBAN INTERFACE (WUI) PLACARD (ICS 231) **7013.7.2**
(No. 4 September 2012)

The WUI Placard (ICS 231) was developed to provide a consistent system for conducting structure triage and evaluation of structures in a WUI environment. It provides firefighters with information regarding the safety and defensibility of a structure. It has been adopted by FIRESCOPE for use by multiple agencies within California.

When to Use **7013.7.2.1**

During initial and extended attack, there may be insufficient time and/or resources available to conduct structure triage. When time and resources exist and triage operations are conducted, the WUI Placard (ICS 231) should be used. The WUI Placard is to be used by firefighting personnel to provide information related to firefighter and public safety. Typically, this will be used in a planned need event, but is ultimately up to the resources on scene and the Incident Commander when it is to be utilized. The ICS 231 is to be filled out per the instructions printed on the back of the card. Also, see Exhibit (attached) for further information.

The WUI Placard is used as a tool to assist firefighters in determining which triage category (threatened defensible, threatened non-defensible, or not threatened) a structure may be classified based on current and expected fire behavior. The decision to defend or not defend a structure must be based on fire behavior conditions at the time and made by the Officer in charge. Fire behavior conditions may change at any moment and may potentially change the category and defensibility of the structure. Tactical actions can then be determined and implemented based on the appropriate triage category.

At the conclusion of an incident or when the threat to a structure passes and the placard is no longer operationally necessary, the Incident Commander is responsible to ensure that all applied placards have been removed. If evacuation orders have been issued, it would be beneficial if the WUI placard can be removed prior to residents returning home.

How to Use **7013.7.2.2**

The WUI Placard (ICS 231) is available on the CAL FIRE intranet under ICS Forms. This file is designed to be printed out on bright yellow card stock (60lb) paper double sided and placed in fire apparatus and vehicles. Copies should be made in black typography so as to reproduce well on the yellow paper.

When filling out the placard, use a black permanent marker (Sharpie style) to ensure durability. Fill out the placard entirely when using. The ICS 231 is to be filled out per the instructions printed on the back of the card. Also, see Exhibit (attached) for further information.

The placard should be placed securely, using duct tape, string or parachute cord or equivalent, to a mailbox post or address designator. In the event that multiple address designators or mailboxes exist at an intersection, then a separate placard should be placed for each specific address that is triaged.

CLOSURES AND EVACUATIONS **7013.8**
(October 2002)

EVACUATIONS **7013.8.1**
(October 2002)

The California Department of Forestry and Fire Protection plays an important role in the evacuation and closure process in the event of a wildland fire or other emergency. Each year in California and throughout the West, homes are being built in areas prone to high fire danger. This always poses a problem for firefighters to get residents out of harms way. This will provide the responsibility and tasks to perform an effective evacuation or closure.

A decision to declare an evacuation can have serious impacts on a community and it's residents, CDF peace officers have statutory authority to declare an evacuation or set up a closure under Penal Code 409.5.

PENAL CODE 409.5 AUTHORIZES THE EVACUATION OF AN AREA THAT IS AT RISK TO THE PUBLIC.

409.5. (a) Whenever a menace to the public health or safety is created by a calamity including a flood, storm, fire, earthquake, explosion, accident, or other disaster, officers of the Department of the California Highway Patrol, police departments, marshal's office or sheriff's office, any officer or employee of the Department of Forestry and Fire Protection designated a peace officer by subdivision (g) of Section 830.2, (b) Officers of the Department of the California Highway Patrol, police departments, marshal's office or sheriff's office, officers of the Department of Fish and Game designated as peace officers by subdivision (e) of Section 830.2, or officers of the Department of Forestry and Fire Protection designated as peace officers by subdivision (g) of Section 830.2 may close the immediate area surrounding any emergency field command post or any other command post activated for the purpose of abating any calamity enumerated in this section or any riot or other civil disturbance to any and all unauthorized persons pursuant to the conditions set forth in this section whether or not the field command post or other command post is located near to the actual calamity or riot or other civil disturbance. (c) Any unauthorized person who willfully and knowingly enters an area closed pursuant to subdivision (a) or (b) and who willfully remains within the area after receiving notice to evacuate or leave shall be guilty of a misdemeanor. (d) Nothing in this section shall prevent a duly authorized representative of any news service, newspaper, or radio or television station or network from entering the areas closed pursuant to this section.

The decision to evacuate is made by the fire agency (IC, OSC, DIVS, Single resource).

Two Types Of Evacuations

- **ADVISORY**-A recommendation that the residents leave the area for their own safety.

- **MANDATORY-**Strongly recommended that residents leave, but cannot be forced to do so. The evacuation area is closed to all entry. This will eliminate unauthorized people from entering the closure.

Evacuations are a function of law enforcement. Local P.D. or Sheriff will usually handle the evacuation.

Evacuation Levels

<u>Shelter in Place</u>
- Keep people in homes or businesses
- Determine if it is safe
- Determine that there is adequate clearance around structure

Designated Safe Areas

- Keep this near the fire area (shopping centers, large parking areas, etc.)
- Used for short durations
- Use when you anticipate limited logistical needs
- Consider the use of an Information Officer at the location to brief public and address concerns.
- Let residents back in when it is safe

Full Evacuation

- Used for intense fires having a broad front
- Evacuees will be displaced for long periods of time

Handling Difficult Residents

If a resident refuses to leave, be polite, courteous, and;

- Explain the situation and give recommendation
- Do not spend a lot of time
- Give resident something to do
- Advise IC, OPS, DIVS of situation if possible

RESIDENTS CANNOT LEGALLY INTERFERE WITH FIREFIGHTING OPERATION.

Items To Consider In Preparation Of An Evacuation:

Number Of People to Evacuate

- Area of Evacuation
- Fire and Law Enforcement available resources
- Safe Locations/Safety Zones
- Travel Routes

Type Of Evacuation

- Evacuation Notification
- Precautionary
- Immediate Threat
- Area Closures

Evacuation Plan (Incident Specific Plan)

- Fire responsibilities are to designate the area of the evacuation
- Law Enforcement responsibilities are to implement the evacuation
- Fire and law enforcement responsibilities
- Travel Routes
- Safety Zones
- Shelter in Place
- Alternative Location
- List of Non-Evacuated Residents

Designated Safe Areas

- Keep this near the fire area (shopping center, large parking area, etc.)
- Used for short duration.
- Use when you anticipate limited logistical needs.
- Consider the use of an Information Officer at the location to brief public and address concerns.

Lifting Of Evacuation Advisories

- Level of threat may change
- Duration of effective evacuation
- Who may return to area
- Residents
- Property Owners
- Business Owners

Additional Items To Be Addressed During The Evacuation:

- Contact local disaster representatives to support shelters.
- Informational number for public to call
- Assign Information Officer with phone number
- Location of Shelters
- Area of Evacuation
- Emergency Alert System (EAS)
- Evacuation Plan should be located under the Law Enforcement Branch in the Incident Action Plan (IAP)

ROAD CLOSURES **7013.8.2**
Three Levels Of Traffic Flow Control
(October 2002)

TRAFFIC CONTROL **7013.8.2.1**
(October 2002)

- Emergency personnel are working in the area
- Roadside fire when visibility is not a factor
- Roadside vehicle accident or in one lane only
- Safety concerns for victims or emergency personnel
- Traffic is slowed or one lane is closed

LIMITED ACCESS ROAD CLOSURE **7013.8.2.2**
(October 2002)

- A limited threat by the emergency.
- Access is limited to:
- Emergency personnel

- Local residents and those assisting local residents in preparing for the emergency.
- Red Cross, etc.
- Request should include the number of closure points required.

COMPLETE ROAD CLOSURE **7013.8.2.3**
(October 2002)

- Suggested for cases of mandatory evacuations.
- Residents or those assisting residents would be exposed to grave danger if allowed into the emergency operating area.
- Request should include the number of closure points required.

It is important to note that on large incidents the level of closure required may vary depending upon changing levels of risk to public safety. It is imperative that the IC stays in constant communication with the Law Enforcement Agency Rep and modifies the level of closure depending upon the specific circumstances of the incident.

MARKING WATER SOURCES **7013.9**
(October 2002)

The technology of firefighting has advanced tremendously over the years; however, the use of water is still the most effective agent available in the suppression of wild fires. It is usually readily available and is cost effective compared to other types of suppression agents. Because of its importance to a wildland fire, it is imperative that the most readily available water source be identified and marked for use.

POTENTIAL WATER SOURCES **7013.9.1**
(October 2002)

- Community hydrant and distribution systems.
- Public and private storage tanks.
- Lakes.
- Ponds.
- Rivers.
- Streams.
- Canals.
- Aqueducts.
- Flumes.
- Fire engines.
- Water tenders.

PRE-INCIDENT WATER SOURCE IDENTIFICATION **7013.9.2**
(October 2002)

- Wildland pre-plans.
- Hydrant system maps.
- Maps identifying lakes, ponds and streams.

- Street markers designed for water source identification (blue in color).
- Readily visible signs for water storage tanks.

INCIDENT WATER SOURCE IDENTIFICATION **7013.9.3**
(October 2002)

- Incident Action Plan – Division assignment page and incident map.
- Drop points – Identified on map and signed at the water source.
- GIS overlays if available.
- Establish a system that is common for your incident.

MOP-UP **7013.10**
(October 2002)

Mop-up is defined as the act of making a fire safe after it has been contained. Mop-up should start as soon as line construction and burnout are complete and should start with the most threatening situations first. Mop-up procedures are just as critical to the incident as the suppression of the unwanted fire was initially and all **safety** concerns must be addressed with equal importance.

PRINCIPLES OF MOP-UP **7013.10.1**
(October 2002)

- Immediately search out spot fires adjacent to and outside the controlled portion of the fireline and take immediate action on anything found.
- Burn out intervening fuels between the fire and the control line when practical and safe.
- Extinguish all materials along or near the edge of the control line.
- Mop-up the entire fire on small, easily accessible fires.
- On large fires mop-up far enough inside the control line (e.g. 200 feet) to be sure that no fire can blow out, spot or roll across the line under any possible conditions.
- Allow fuel to burn up if it will do so promptly and safely.
- Fell all snags or burning trees that could spot, fall, roll across the line or present a falling hazard to firefighters and general public.
- Fell all snags adjacent to the line that may be a receptive fuel bed for firebrands.
- Remove or re-position fuels within the fireline if they have the potential to roll across or close to the edge of the control line.
- Trench, block or undercut line to keep logs, stumps or other burning material from rolling across the control line.
- Scatter or break up large concentrations of fuels (brush piles, slash piles, *jackpots*, etc.) located close to the line to eliminate hotspots that could result in fire across the line.
- Search for flames, glowing embers, and wisps of smoke.
- Dig out white ash areas, burned logs, stumps and roots.

- Use hand tools in conjunction with water to rake, scrape, chop, and stir until heat is dissipated.
- Water conservation is important; use it sparingly but use enough to do the job.
- Wetting agents and foam will greatly increase the effectiveness of water, especially in deep-seated fuels.
- To determine when fire is extinguished feel out the hotspot by passing the back of the ungloved hand 12" above the smoldering fuel and then lower the hand until near the fuel surface.
- Improve control lines by eliminating sharp bends and widening as necessary.
- Clear canopy near the line to eliminate possibility of fire extending across to an unburned area.
- Ensure control lines are cleared to mineral soil and burning roots are grubbed out.
- **Remember SAFETY! SAFETY! SAFETY!**

PATROL **7013.10.2**
(October 2002)

Patrolling is when resources are assigned to move about the fireline looking for any hotspots or hazards inside and outside the control line and abating them immediately when found.

Patrol guidelines are as follows:

- The number of resources assigned depends on:
  1. Size of fire
  2. Type of fire behavior observed during control operations
     a. Significant spotting
     b. Clean burn vs. partially burned fuels or large islands
     c. Type of fuels – light, flashy vs. heavy

- There may be a vantage point from which the entire fire or large segments of it can be seen thus reducing the number of resources needed to be assigned patrol duty.
- Resources assigned to patrol can be minimized if the control line is accessible to vehicles.
- Patrol the fire as long as necessary to ensure there will be no additional fire occurrences.

References: CDF 4300 training Manual
NWCG Fireline Handbook,
"Firefighter's Handbook on Wildland Firefighting" William Teie

WILDFIRE CAUSED DAMAGE **7013.11**
EMERGENCY WATERSHED PROTECTION (EWP)
(October 2002)

Damage to a watershed caused by wildfire processes will be evaluated concurrently with suppression-caused damage. In contrast

to suppression damage, damage by the fire itself may not be mitigated. This difference in treatment occurs because:

- Fire is a natural process on wildlands. Natural seeding and re-growth processes often quickly restore an area to pre-fire condition.
- Few wildfires burn with an intensity that completely destroys the organic soil layers, seed bank or root crowns of sprouting plants.
- The wildfire, as a result of size or location may not pose a significant threat to downstream watersheds.

*Emergency Watershed Protection (*EWP) refers to treatment of significant wildfire impacts such as areas burned with high intensity fire causing destruction of most organic ground cover (white ash over an area of significant size) or those areas along watercourses and major canyons where flooding can be anticipated. Generally, the vast majority of burned areas will recover with no treatment. Typically after severe large fires, an interdisciplinary team with expertise in soil stability, erosion and wildlife identifies problem areas. EWP can include aerial or ground seeding of native grasses, planting tree seedlings, use of specialized equipment (backhoe, graders, excavator) to clean out creeks, or road resurfacing (rocking, magnesium chloride). In many cases, EWP will require a different funding code than allowing use of the Emergency 00900 account. Most projects of this nature receive a new PCA or are funded by other agencies or programs on a cost-share basis.

CDF also has a formal agreement with the Department of Fish and Game to assist with rehab issues on private land. The IC should order a Fish & Game specialist if wildlife issues are present. [Ref. CDF/DFG Joint Policy on Pre, During, and Post Fire Activities and Wildlife Habitat.

The federal equivalent of the EWP is a *Burned Area Emergency Rehab (*BAER) team. On federal incidents and on joint SRA/federal fires, the federal agency may appoint a BAER team to plan and supervise the rehab efforts. A BAER Team can include soil and erosion specialists, wildlife biologists, archeologists and specialized equipment managers.

FIRE REHABILITATION **7013.11.1**
(October 2002)

All wildland fires on CDF DPA shall be evaluated to determine the extent to which suppression-related rehabilitation and when EWP efforts are needed. Rehab work is authorized by the Director of CDF when suppression-caused damage can be readily repaired and when further damage to private property is likely. In cases where soil loss and floods from areas denuded by fire poses a significant threat to watershed values, or public health, safety or welfare, EWP in the form of post-fire treatment is allowable. The costs of rehab can be included

as part of emergency operations. [Ref. Public Resources Code Section 4675-4676]

The goals of the Department are two-fold: (1) to keep damage to a minimum during suppression and to (2) initiate rehabilitation work while the active suppression work is still occurring so that repairs will be completed shortly thereafter.

TREAT SUPPRESSION CAUSED DAMAGE, ESPECIALLY IF MORE DAMAGE WILL OCCUR IF YOU DON'T.

SUPPRESSION REHABILITATION **7013.11.2**
(October 2002)

Suppression Rehab on SRA deals primarily with mitigating or repairing damages caused to either environmental or structural disturbances related to suppression which may have been caused by: construction of firelines; safety zones and helispots; handlines; debris deposited into watercourses; reopened roads; trash; fences, gates and culverts. Rehab work should focus on problem areas that can be realistically mitigated. It is not practical to unmake roads, eradicate firelines or replace tree stems back on their stumps. It is feasible to reduce damage, particularly where further damage is likely if we do not act. We try to remove dirt in draws because it can wash downstream, plug culverts and thus cause future washouts and erosion. We repair road surfaces and install waterbars on firelines so winter erosion does not occur. We repair fences so that livestock does not get out onto roadways, thus leading to vehicle accidents and potential loss of human life.

As a fire approaches the control stage, the IC is responsible to deal with rehabilitation issues. A simple fire may require only that the dozer be used to install a few waterbars before loading up. On extensive incidents and particularly on major incidents, a formal, written Rehab Plan is necessary. Rehab issues are particularly relevant when the fire is large, damaging, politically sensitive, or where known environmental issues are present. If necessary, a Rehab Unit Leader can be requested through normal ordering channels. Otherwise, the Plans Section will handle this planning duty. [See Incident Command Team Transition Briefing Form, Item 26][See Suppression Checklist 7097.4]

On FRA lands suppression rehab is the responsibility of the appropriate federal wildland agency. In most cases BEAR teams will outline measures to be taken by the federal agencies.

STANDARD MITIGATION MEASURES **7013.11.3**
(October 2002)

Mitigation of watershed damages will minimize long-term impact caused by suppression personnel and equipment. The pattern for mitigation measures rests in large part on standards in the Forest Practice Regulations. These are the same standards that CDF

foresters enforce on private logging operations. They constitute the minimum level of protection.

ROADS **7013.11.4**
(October 2002)

Roads constructed or reconstructed during fire suppression activities will be treated as follows: Access roads will be returned as close to the pre-incident condition as is practical. This can be accomplished by blading the road with dozer or grader. Previous waterbars or rolling dips should be reinstalled. Plugged culverts should be reopened. Road rehab efforts shall be coordinated with the interests of the road/land owner. Rehab planning should consider ongoing access needs when developing the road draining effort. [CCR 923.2-4/943.2-4/963.2-4]

FIRELINES **7013.11.5**
(October 2002)

Outslope the disturbed surface to allow for drainage or build waterbars to divert water. Waterbars will be cut a minimum six (6) inches into the firm bed of the fireline and have a berm with a compacted height of six (6) inches making a total height of no less than twelve (12) inches. Waterbars to be constructed diagonally across the fireline at an angle of thirty-five degrees (see sketch). The outside end of the waterbar must be open. Waterbar spacing should be constructed at all watercourse crossing and be otherwise guided by the spacing criteria below.

Fireline gradient	0-25 %	26-50 %	over 50 %
Spacing	100 feet	75	50

Where extreme slopes or extreme environmental sensitivity prevent the use of dozers for building waterbars, fire crews can be assigned to perform the necessary erosion control work.

Fire lines constructed by hand generally present fewer environmental problems. For fire crew constructed lines, the waterbars do not have to be cut deeper than the width of a standard shovel. Waterbar spacing is as shown above.

WATERCOURSES **7013.11.6**
(October 2002)

Vegetative material and soil shall not be left in watercourses. As mop-up work is being completed, inadvertently deposited material shall be removed [1]. Development of recommendations for debris removal must consider the steam channel and proximity to downstream culverts that could become blocked. Additional rehab action may be necessary when equipment was used near a significant watercourse. A significant watercourse is defined as one where fish are present or

where riparian (water-loving) vegetation (such as willows, alders, ferns, moss, etc.) is present. Erosion control treatments are needed where there is more than 800 square feet of ground disturbance within fifty (50) feet of the stream channel and where natural processes are not likely to stabilize the soil. Erosion control treatments can consist of spreading slash, mulch, bark or straw on the disturbed surface to break up the impact from rain and surface flow [2].

(Reference: Removal of watercourse crossings is described in CCR 923.3d/943.3d/963.3d; 800 sq.ft. rule in CCR 916.7/936.7/956.7 applies generally to Class 1 and Class 2 watercourses.)

SLASH ALONG ROADS **7013.11.7**
(October 2002)

Agency created slash along roads in unburned areas can provide hazardous conditions that continue for many years. Lopping or crushing can be effective in reducing this hazard. Along public roads used as secondary firelines, knocked-over trees and brush knocked down from fireline construction should be lopped to 30-inches in height to reduce future fire hazard. Prepared suppression rehabilitation plans may dictate other methods of slash removal.

(Reference: CCR 917.2b-d/937.2b-d/957.2b-d)

FENCES AND GATES **7013.11.8**
(October 2002)

Fences that were cut during fireline construction should be closed-up to prevent loss of livestock. In most cases, a few pieces of wire can provide temporary closure. Gates should be closed and relocked if possible to prevent trespassing. If gates have been damaged by heavy equipment, they can probably not be repaired with field-available materials. In this case, a report of damage should be prepared.

HELISPOTS, SAFETY ISLAND AND STAGING AREAS **7013.11.9**
(October 2002)

Helispots, safety islands and staging areas built to support suppression activities should be returned as closely to pre-incident conditions as is practical. All trash, cardboard, hose, fittings and signs will be removed from the site.

SUPPRESSION DAMAGE CLAIMS **7013.11.10**
(October 2002)

If private property is damaged as a result of the fire fighting effort, the first consideration is to determine whether or not the damage has actually occurred during the suppression effort. If immediate repairs

can be accomplished and they are attributed to the suppression effort, do so. If cause of damage is in doubt, or if the damages are beyond your ability to repair the issue should be referred through the organization to the IC or rehab specialist (RESP). Do not make admissions of responsibility or promise to pay for damages. In many cases, immediate low-tech repairs to a fence or culvert can prevent expensive future claims. During mop-up, landowners are often willing to accept minor repairs from fire crews. When uncorrected, the damage becomes more sever and expensive.

(Reference: Handbook 3800; 3857 Board of Control Claim)

(see next section)

(see HB Table of Contents)

(see Forms or Forms Samples)