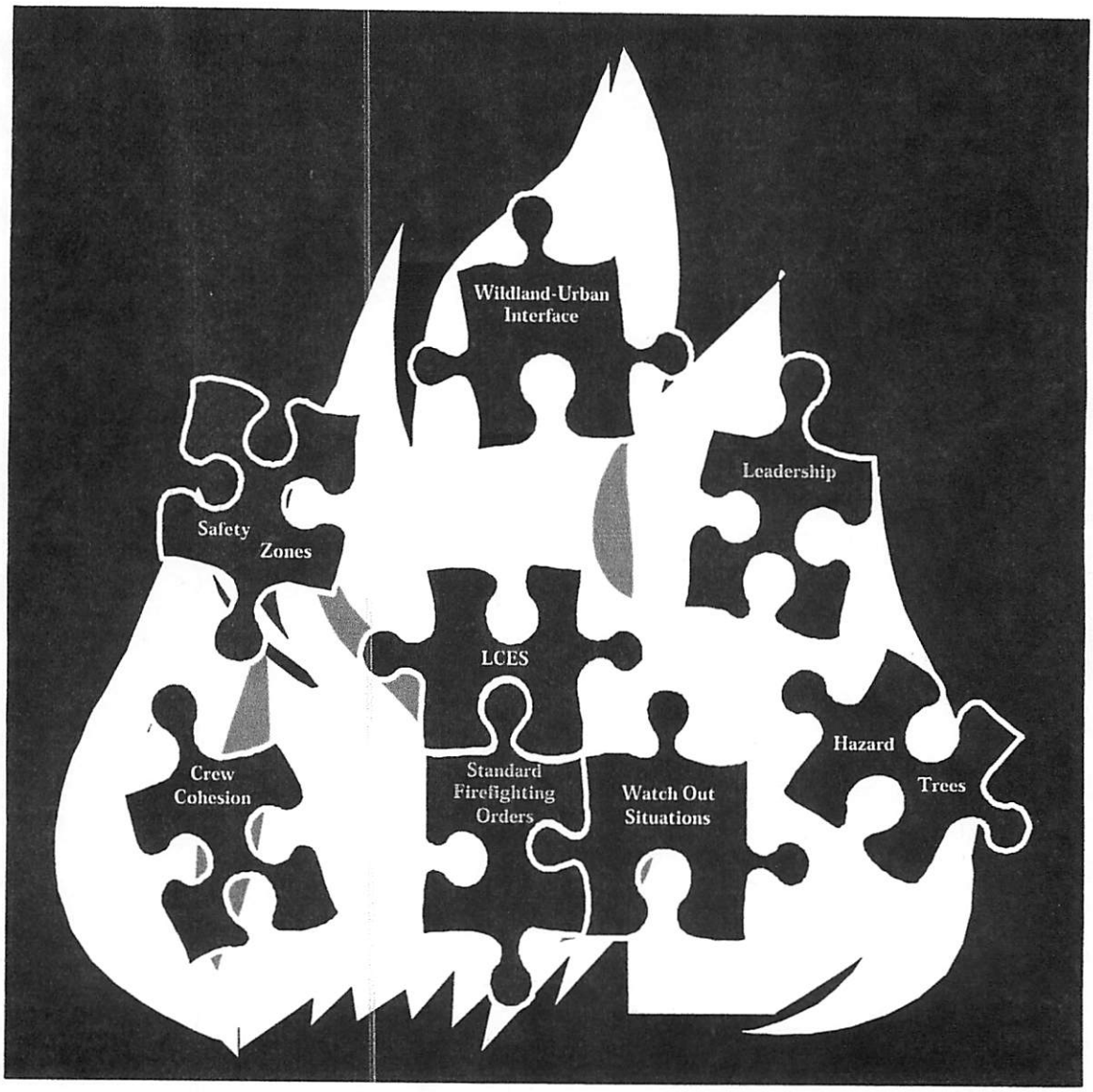
Making Sense of It All

2005 Fireline Safety Refresher Training

Student Workbook



This presentation will provide an overview of basic safety principles for wildland firefighting.

Through group exercises, students will be asked to apply these safety principles to real-life fire scenarios from previous fire seasons.

INTRODUCTION

This year's fireline safety refresher training, MAKING SENSE OF IT ALL, is intended as an alternative delivery system for annual refresher training required for all personnel participating in fire suppression or prescribed fire activities who may be subject to assignments on the fireline. Check specific agency policy to determine if this training package meets all refresher training requirements.

PREREQUITIES

Students should have successfully completed S-130 and S-190 and have at least one season as a firefighter.

COURSE OBJECTIVES

Upon completion of this training, the student will be able to understand and apply general wildland firefighting principles to simulated fire scenarios using the Incident Response Pocket Guide.

MODULE 1—Introduction
Nuttall Fire Complex - Gibson Fire

Current Situation:

Date/Time: July 7, 2004

Location: SW of Safford, AZ; 10,000 feet elevation

Tactical Assignment: Protect observatory and burn out if necessary

Fuel Type: Model 10; 75-80% tree mortality due to bark beetle and drought

Weather Forecast: Temperature, 75-80°F; RH, 16-21%; winds, variable S at 5-10 mph, gusts to 20 mph

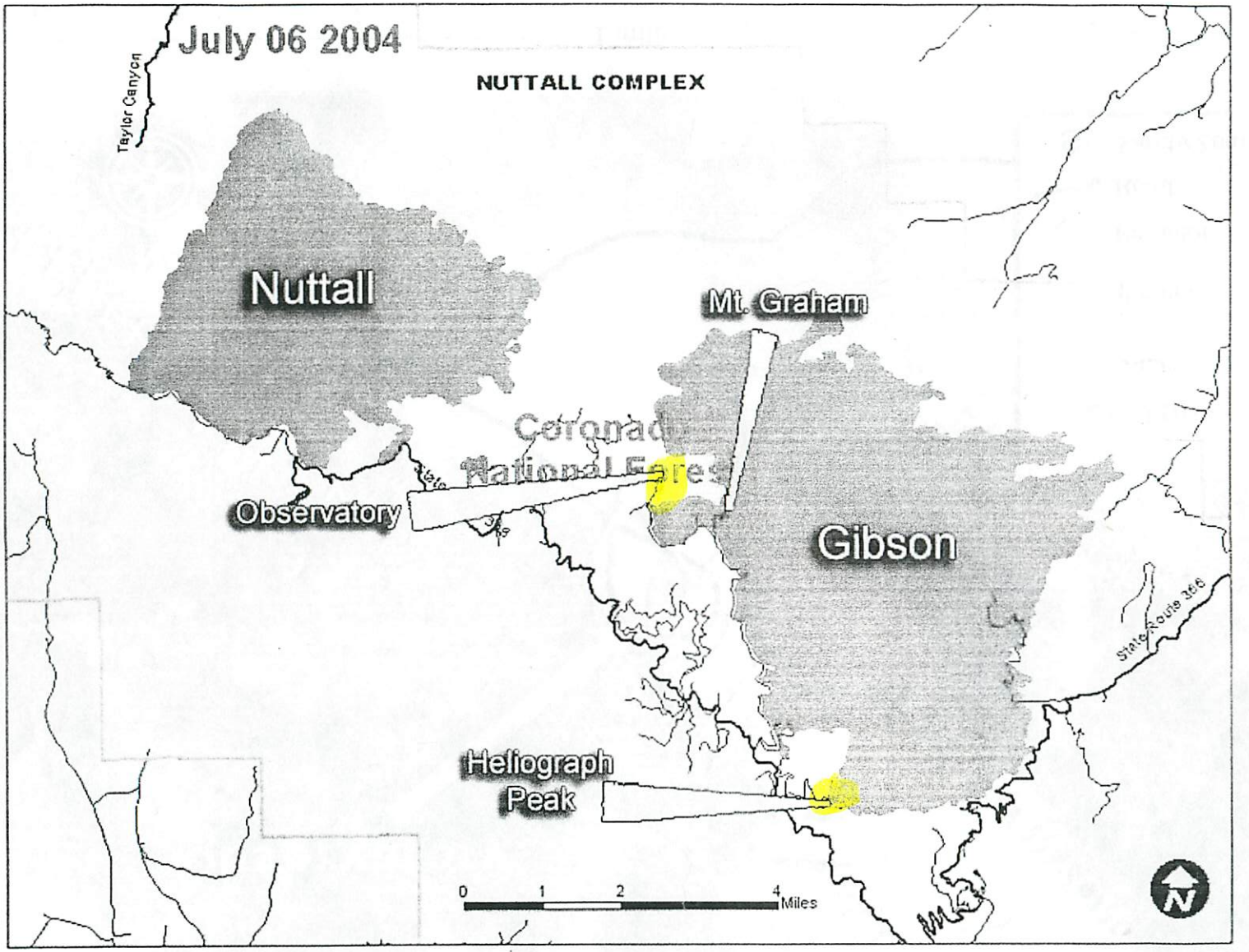
Resources Available: 2 Type 1 crews, 2 dozers, 1 Strike Team-Engines, 1 water tender, existing sprinkler system, and secondary hose lay with two 6,000 gal tanks (pumpkins)

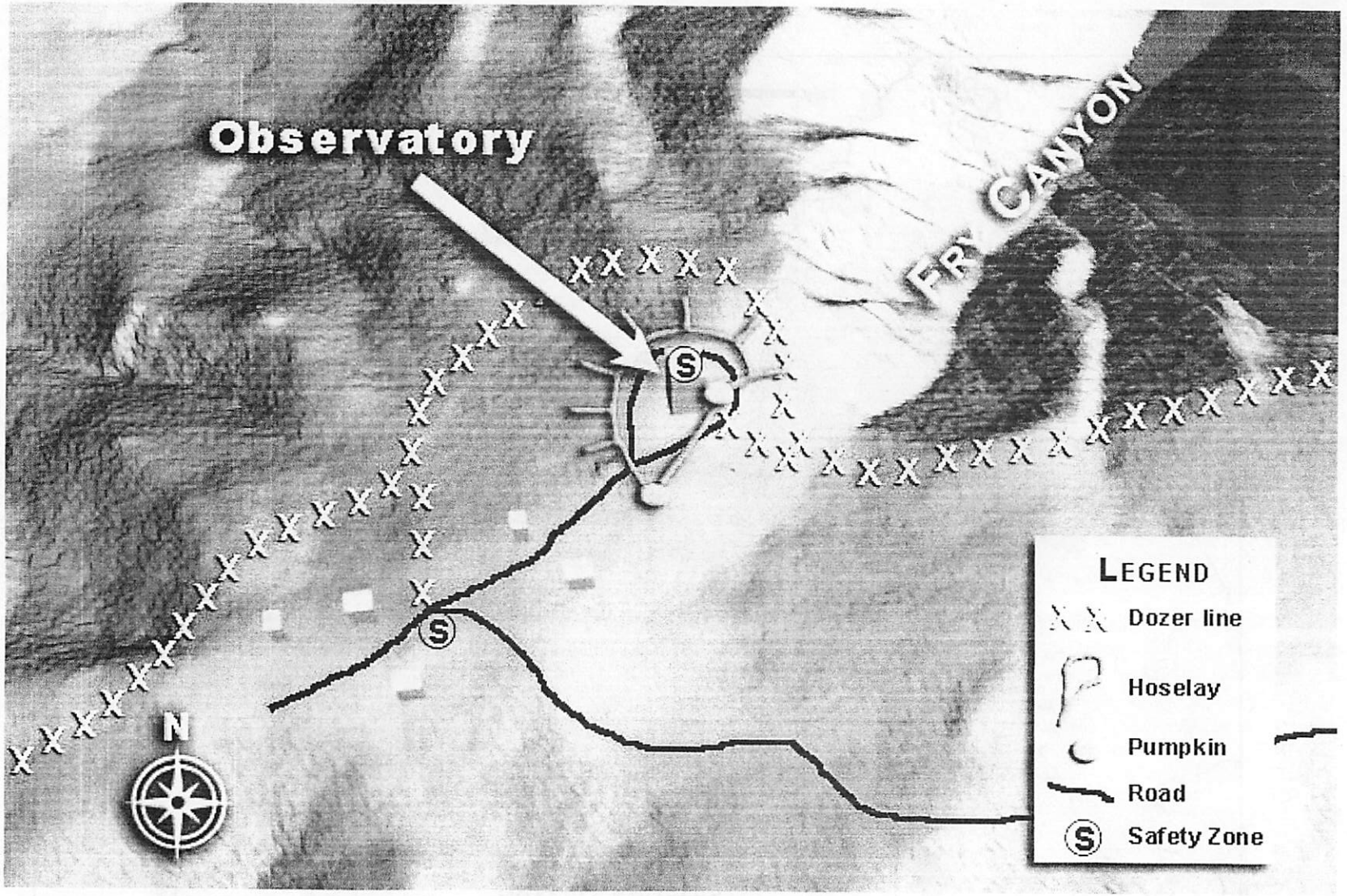
See maps on pages 5 and 6 of your student workbook.

Group Exercise:

After reviewing the Gibson fire, discuss the following questions in your group:

- Given the available resources, what safety concerns do you have about a possible burnout operation?
- Assuming you are going to burnout, what important points would you mention in your operational briefing?


July 06 2004
NUTTALL COMPLEX
Taylor Canyon
Nuttall
Mt. Graham
Observatory
Gibson
Heliograph Peak
0 1 2 4 Miles
N


Observatory
FRY CANYON
S
S
N
LEGEND
Dozer line
Hoselay
Pumpkin
Road
Safety Zone
1 mile

MODULE 2—Standard Firefighting Orders, Watch Out Situations & LCES

STANDARD FIREFIGHTING ORDERS

FIRE BEHAVIOR

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.

FIRELINE SAFETY

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.

ORGANIZATIONAL CONTROL

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.

IF YOU CONSIDER 1-9, THEN

10. Fight fire aggressively, having provided for safety first.

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. Uninformed 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 the 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.

MODULE 2—Standard Firefighting Orders, Watch Out Situations & LCES

Exercise A – Standard Firefighting Orders

Group Exercise:
Review Krebs' article and discuss the following questions in your group:

- What is the difference between Situational Awareness and Situational Analysis?
- Do you use the Standard Firefighting Orders as an analytical process or as a checklist?

RE-THINKING THE USE OF THE 10 STANDARD FIRE ORDERS
by John Krebs

For several years some on-the-ground fire people have been attempting to reinstate the original 10 Standard Fire Orders. Some had never converted to the FIRE ORDERS because they had found the old arrangement to be orderly and easy to remember. In June of 2002 the NWCG officially returned to the 10 Standard Fire Orders. The news was slow getting to the field with some units not hearing about it until early 2003.

Conversion to the 'new' arrangement of the orders will have little or no affect on firefighter safety unless there is a change in how they are taught and used. Even prior to the South Canyon fire tragedy, many fire crews had made a practice of memorizing the FIRE ORDERS and it's safe to say that became a requirement for all first line firefighters following that incident. Then came the 30-Mile fire, followed by numerous (and ongoing) investigations and a renewed awareness of basic fire fighting fundamentals.

In the fall of 2001, there was a large international fire symposium held in Missoula, MT. The basic theme of this gathering was fireline safety. Many notable fire individuals voiced their concerns, advocating different approaches which could be used to reduce firefighter injuries and fatalities. One of the "buzz words" which developed from that symposium was "situational awareness." That phrase really piqued my interest in regards to fireline safety and the relationships of the 10 Standard Fire Orders, the 18 Situations, and LCES.

"Awareness" is defined as having or showing a realization, perception, or knowledge. Without venturing off into the realm of fireline psychology, I began to think of the "situational awareness" of various individuals involved in the Storm King incident as revealed in John Maclean's book. (If you own a copy of "Fire on the Mountain" take time to reread it and highlight the comments of the on-the-ground firefighters in regards to their "situational awareness" related to the fire environment. If you don't own a copy of this book, get it; read it; reread it.) These examples are not meant to address individuals but rather to explore the "collective" awareness of the participants.

Pg 43	crew member awareness of reburn potential in Gambel oak
Pg 47	cutting line downhill
Pg 58	glowing logs cartwheeled down the slope
Pg 58	cold front on the way (NOAA radio)
Pg 60-61	fire continued to grow at night and was considered very active for nighttime conditions.
Pg 70	unusual amount of fire activity...for the cool of the morning; active all night
Pg 71-72	knowledge of red flag warning
Pg 72	"NOAA" – winds 15-25 mph with stronger gusts toward evening
Pg 74	fire had doubled in size since early AM

Pg 76 continuous fuels, unbroken masses of oak
Pg 77 flames under oak only 3-4" high

These are just a few of the items related to the situational awareness collectively expressed or known by the on-the-ground crew members prior to jumping off Hells Gate ridge. Additionally, there were many firefighters present who had memorized the FIRE ORDERS and could quote them verbatim.
So why, with all the situational awareness (having realization, perception, knowledge) were decisions made which led to the tragic ending. I've come to the belief that over the years we have never taught our firefighters how to practice the situational analysis inherent in the 10 Standard Fire Orders. Analysis is defined as "an examination of a complex, its elements, and their relationships." For use in the fire environment, we must teach firefighters to apply the analysis process habitually, routinely, and in a predetermined order (the design of the 10 Standard Fire Orders).

I'd perceive this analysis to begin with the initial attack forces—be that a 2-person crew or a larger resource. The analysis is not a one-person responsibility, although its initiation would be the duty of the person in charge. If this situational analysis were the universally accepted (and expected) approach, it would have a tendency to reduce the crew's acquiescence to a plan of action in which the participants had no ownership. Personalities would be removed from the process, thus promoting the expressions of "awareness" by those who might feel intimidated by the more experienced person or by established traditions.

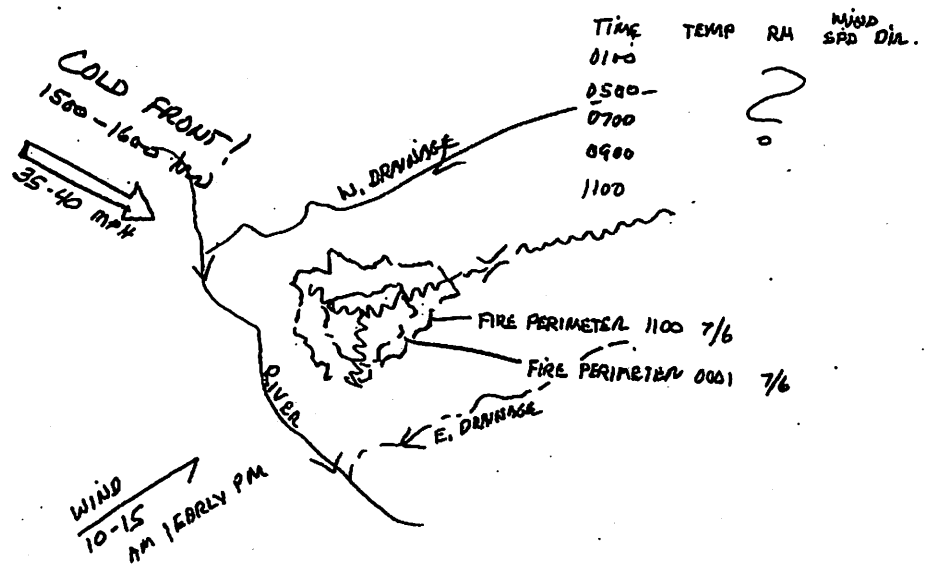
Perhaps the process in the field would precede something like this. At the beginning of a shift the leader calls the crew together. Using a map (this could be as simple as a hand-drawn sketch on paper) to help delineate ridges, drainages, aspects, etc., the IC solicits the environmental and fire related observations of each individual. These are briefly recorded in the notebook. The next step is to initiate the analysis process using the 10 Standard Fire Orders in their specific sequence. Each order is prefaced by the imperative YOU meaning your crew.

The first three Orders address fire behavior. No. 1: Keep informed on fire weather conditions and forecasts. This prompts answers to two questions. The first being, what is the latest fire weather forecast? With all the forecasts available to the firefighter—commercial radio, NOAA, satellite imagery, etc.—the fire meteorologist's forecast is the most specific to the fire situation. Do not shortcut this valuable resource! If possible (and conditions warrant it) seek a spot weather forecast.

The second question is to be answered by YOU. What are the weather conditions specific to your fire? A belt weather kit is a must. No crew should be without one. Don't forget the importance of other weather related observations—cloud formations, topographic influences on wind, aspects, elevational changes, etc.

No. 2: Know what the fire is doing at all times. Observe personally; use scouts. Obviously, on very large fires, Order No. 2 cannot be accomplished nor is it relevant. What this relates to is your area of responsibility and adjacent areas which may affect your operations. These observations cannot be made without considering the conditions under which the fire is burning. The affects of relative humidities, wind and topography on the current observed flame lengths are important indicators for anticipated future activity. How is the fire propagating and under what conditions is this occurring? What is likely to change this behavior?

No. 3: Base all actions on current and expected behavior of the fire. Your analysis related to this order is paramount to your safety! It is the place where you take what you have been taught in the classroom in S-190, S-290, and S-390 and put it to practice. In essence, regardless of the size of your organizations, this step becomes your IAP (Incident Action Plan). If we had made the 10 Standard Orders as an integral part of our fire training instead of a little separate memory exercise for the purpose of passing a course, the situation analysis initiated on Storm King Ridge may have looked something like this:



The crew meets to evaluate and collectively discuss situational awareness. All persons are encouraged to participate. (Reference possible inputs recorded earlier from Maclean's book. In addition assume that fire weather conditions had actually been monitored on a periodic basis by the crew.) The discussion then turns into a brief situational analysis beginning with Orders 1, 2 and 3—fire behavior (basic weather-fuel-topography).

Incomplete Team

Why, on a large fire in the IAP, is this a team effort while on small incidents we've essentially taught it to be the responsibility of the IC? That approach ignores all the experiences, education and observations of the other participants!

Only after completion of the fire behavior analysis can the next three orders on safety be addressed with any validity.

No. 4: Have escape routes (for everyone) and make them known. Are these clearly marked and checked out? Is the black truly black? Don't get into the game of how quickly you can cover the ground. Leave plenty of room for a margin of error. Consider the rates of the slowest person in the crew. Allow for injury—unpredicted wind, fatigue, etc. Remember this take off on the old Kenny Roger's tune, The Gambler, "Know when to hold 'em. Know when to fold 'em. Know when to walk away and you won't have to run."

No. 5: Post lookouts when there is possible danger. This really relates back to Fire Order No. 2. The lookouts must know what to look for and have the experience, equipment, and communications necessary to accomplish their given assignments.

No. 6: Be alert! Keep calm! Think clearly! Act decisively! In January, at the invitation of Rich Dolphin, Superintendent of Smoke Bear Hotshots, I was privileged to attend the "2003 Rocky-Basin Southeast/West Hotshot Workshop in Scottsdale, AZ. Dr. Kevin Gilmartin presented a very informative lecture entitled "Behavioral Science Aspects of High Intensity Firefighters." (He is also the author of "Emotional Survival for Law Enforcement" which is an excellent book for wildland firefighters, as well.) Dr. Gilmartin relayed the findings of a study related to sleep deprivation and its affect on one's ability to think in the abstract. Going without sleep for 24 hours had the same affect on the thought process as having a blood alcohol level of .10! So, after being awake sometimes more than 30 hours, how can a

firefighter possibly conform to Fire Order No. 6? I'd suggest it can be done by addressing, as a team, items related to situational awareness (18 Situations that Shout Watchout) and then conduct the analysis through the 10 Standard Fire Orders. The most important word in this order is THINK!

The next three orders concern Operational Control.

No. 7: Maintain prompt communications with your crew, your supervisor, and adjoining forces.

The IAP, no matter how simple, must identify a chain of command in order to fulfill the requirements of this order. Knowing what to communicate, when to communicate (and the means by which it will be done), and to whom the information must be sent is again a team effort easily identified during the development of the IAP.

No. 8: Give clear instructions and be sure they are understood.

Involving the "team" in the development of the IAP and displaying the plan on paper provides the basis for both instruction and understanding. I was taught early in my career to put instructions given to me in writing and then repeat those to ensure understanding. The analysis process promotes questions and prompts answers. Giving clear instructions is always a two-way endeavor.

No. 9: Maintain control of your forces at all times.

When the "fire behavior" (Orders 1, 2, 3) has been (and is repeatedly being) analyzed, when "safety" (Orders 4, 5, 6) is being practiced, when lines of communications are established (7) and instructions are clear and understood (8) maintaining control of your forces has been assured.

No. 10: Fight fire aggressively having provided for safety first.

This order is the most frequently remembered and the first to be initiated. Almost all of our firefighter training is measurable and to some extent could be considered competitive or aggressive. For example: How fast did you do your pack test? How quickly can you set up a pump and layout 500' of hose? How many pull-ups, push-ups, sit-ups can you do? How many miles a day do you run? What are your saw qualifications? These highly developed skills are all essential to achieving excellence in fire suppression. So why would I want to change this last order when it is the very thing we do best? It also is the order which seems to me to have caused us to take unnecessary risks. We engage the physical effort prior to exercising the mental aspects of firefighting. Therefore, I'd reword this last order to read—Fight fire intelligently having provided for safety first.

In conclusion, returning to the 10 Standard Fire Orders will have little or no affect on firefighter safety unless we teach them to be used as a situational analysis process. All of the 18 situations that shout watch out may not be present on every incident. Firefighters will observe and become aware of those that are applicable. The 10 Standard Fire Orders, however, must be applied on EVERY incident if one is to develop and implement a safe and efficient incident action plan.

Prepared for discussion at Smoke Jumper SOS Refresher

DVD/ VHS Module	DVD/ VHS Action	Content	Facilitator Tasks	Refer To
		Note to students to refer to green section Understand human Factors	Facilitator Note/Additional Discussion Points: • This is a warm-up exercise. Don't focus too much on tactics. • Use the green pages in the IRPG to identify the safety concerns. • Probability of success. • Available resources. • Incident commander intent. • Fire behavior.	IRPG pp. 1-22
	Play	– Gibson fire exercise recap – 2004 fire season and statistics recap		

Module 2		– Module 2 (Standard Firefighting Orders, Watch Out Situations, and LCES) introduction – John Krebs – Module 2, Exercise A (Standard Firefighting Orders) introduction	Understanding you have a word these are the tools. Understanding method.	SWB p. 7 IRPG (Back cover) SWB p. 8
	Stop	Read 1ST Before I think would Be good	Have students get into groups of 5-6 and read John Krebs' article, *Re-Thinking the Use of the 10 Standard Fire Orders.* (Suggested time for group exercise and classroom discussion: 15-20 minutes) Group Exercise: Review Krebs' article and discuss the following questions in your group: • What is the difference between Situational Awareness and Situational Analysis? • Do you use the Standard Firefighting Orders as an analytical process or a checklist?	SWB pp. 8-11

MODULE 2—Standard Firefighting Orders, Watch Out Situations & LCES

Exercise B - LCES

Group Exercise:

Review Gleason's article and discuss the following question in your group:

- Does LCES replace the Standard Firefighting Orders or complement them? Why or why not?

LOOKOUTS, COMMUNICATION, ESCAPE ROUTES, SAFETY ZONES
"LCES"
Original Document by Paul Gleason
Former Zig Zag Hotshot Superintendent
June, 1991

"LCES and Other Thoughts"

I have been asked to give input on wildland firefighter safety to the Fire and Aviation Staff - Safety and Training, Washington Office. First, let me say I am honored to be able to contribute at this level. The afternoon of June 26, 1990, as I knelt beside a dead Perryville firefighter, I made a promise to the best of my ability to help end the needless fatalities, and alleviate the near misses, by focusing on training and operations pertinent to these goals.

Throughout my career I have dealt with wildland fire suppression, as a Hotshot Crew Supervisor, with only minor injuries occurring to those I have directly supervised. This is primarily because of two reasons, luck (which cannot be ignored) and basic lessons which I learned from the exceptional firefighters I have had the opportunity to work with. Many of the really valuable suppression lessons I learned were prior to fire shelter requirements.

Subject vs. Objective Hazards

A popular mountaineering test divides the alpinists' hazards into two distinct types: subjective, which one has direct control over (e.g., condition of the equipment, the decision to turn back) and objective hazards which are inherent to the alpine environment (e.g., avalanches, rock fall). Objective hazards are a natural part of the environment. They cannot be eliminated and either one must not go into the environment where they exist or adhere to a procedure where safety from the hazard is assured.

Similarly, the wildland firefighter's hazards are either subjective or objective. Examples of subjective hazards would be working below a dozer constructing fireline or the use of improper techniques while felling a tree. The fireline supervisor has direct control over these types of hazards.

The wildland fire environment has four basic objectives hazards; lightning, fire-weakened timber (standing and lying), rolling rocks and entrapment by running fires. When these hazards exist the options are to not enter the environment or to adhere to a safe procedure. I feel the key to

this safe procedure is LCES. Although, the following discussion applies to all objective hazards, we will directly address fire entrapments.

LCES

LCES stands for lookout(s), communication(s), escape routes and safety zone(s). These are the same items stressed in the FIRE ORDERS and "Watchout" Situations. I prefer to look at them from a "systems" point of view, that is, as being interconnected and dependent on each other. It is not only important to evaluate each one of these items individually but also together they must be evaluated as a system. For example, the best safety zone is of no value if your escape route does not offer you timely access when needed.

A key concept – the LCES system is identified to *each firefighter prior* to when it must be used. The nature of wildland fire suppression dictates continuously evaluating and, when necessary, re-establishing LCES as time and fire growth progress. I want to take a minute and briefly review each component and its interconnection with the others.

Lookout(s) or scouts (roving lookouts) need to be in a position where *both* the objective hazard and the firefighter (s) can be seen. Lookouts must be trained to observe the wildland fire environment and to recognize and anticipate wildland fire behavior changes. Each situation determines the number of lookouts that are needed. Because of terrain, cover and fire size one lookout is normally not sufficient. The whole idea is when the objective hazard becomes a danger the lookout relays the information to the firefighter so they can reposition to the safety zone. Actually, each firefighter has the authority to warn others when they notice an objective hazard which becomes a threat to safety.

Communications(s) is the vehicle which delivers the message to the firefighters, alerting of the approaching hazard. As is stated in current training, communications must be prompt and clear. Radios are limited and at some point the warning is delivered by word of mouth. Although more difficult, it is important to maintain promptness and clearness when communication is by word of mouth.

Incident intelligence (regarding wildland fire environment, fire behavior and suppression operations) both to and from Incident Management (i.e., Command & General Staff) is of utmost importance. But I don't view this type of communication a normal component of the LCES system. Entrapment occurs on a fairly site-specific level. Incident intelligence is really used to alert of hazards (e.g., "Watchout" situations) or to select strategical operations. LCES is primarily a Division function: responsibility should be here.

Escape Routes are the path the firefighter takes from their current locations, exposed to the danger, to an area free from danger. Notice that escape routes is used instead of escape route(s). Unlike the other components, there always must be more than one escape route available to the firefighter. Battlement Creek 1976 is a good example of why another route is needed between the firefighter's location and a safety zone.

Escape routes are probably the most elusive component of LCES. Their effectiveness changes continuously. As the firefighter works along the fire perimeter, fatigue and spatial separation increases the time required to reach the safety zone. The most common escape route (or part of an escape route) is the fireline. On indirect or parallel fireline, situations become compounded.

Unless safety zones have been identified ahead, as well as behind, firefighter retreat may not be possible.

Safety Zone(s) are locations where the threatened firefighter may find refuge from the danger. Unfortunately shelter deployment sites have been incorrectly called safety zones. Safety zones should be conceptualized and planned as a location where no shelter is needed. This does not intend for the firefighter to hesitate to deploy their shelter if needed, just if a shelter is deployed the location is not a tree safety zone. Fireline intensity and safety zone topographic location determine safety zone effectiveness.

Again, a key concept – the LCES system is identified prior to when it must be used. That is lookouts must be posted with communications to each firefighter, and a minimum of two escape routes form the firefighter's work location to a safety zone (not a shelter deployment site) every time the firefighter is working around an objective hazard.

Safety and tactics should not be considered as separate entities. As with any task safety and technique necessarily should be integrated. The LCES system should be automatic in any tactical operation where an objective hazard is or could be present.

LCES is just a re-focusing on the essential elements of the FIRE ORDERS. The systems view stresses the importance of the components working together. The LCES system is a result of analyzing fatalities and near misses for over 20 years of active fireline suppression duties. I believe that all firefighters should be given an interconnecting view of *L*ookout(s), *C*ommunications(s), *E*scape routes and *S*afety zone(s).

Division Operations

Establishing a Lookout position in the Operations function has its merits. The Lookout(s) would be assigned directly to the Division Supervisor. They would have only one responsibility, albeit an important one. Lookouts keep one eye on the fire and the other on the Division's firefighters.

Commonly, Weather Watchers, and Field Observers are incorrectly assigned lookout duties. Division Supervisors should solicit input from these sources for their decisions, but these positions are in the Planning sections, not Operations. Lookouts need to be identified prior to tactical deployment of suppression resources and they need to give their undivided attention to the Division's objective hazards and firefighter locations.

Ideally each crew would establish lookouts in potentially hazardous situations. But, this requires the ability to identify these situations and to establish adequate (in amount and location) lookouts for the situation. Additionally, all too often crew supervisors hesitate to remove a crewmember from fireline production and assign them the position of lookout. They do not realize that the assignment of lookouts is not only their authority but also their responsibility.

Incident Management, through Operations and Planning, would identify the operation's "Watchout" Situations, divisions on which they are (or could) occur and assign qualified lookouts to the Division Supervisor.

Span of Control

Span of control depends directly on the quality of resources and their capabilities. Three-to-five subordinates to each supervisor may be sufficient for a static environment where there is direct access to each subordinate; but in the active wildland fire environment experienced leadership is necessary on a tighter ratio. Jerry Monosmith presented solutions via the geographical breakdown of a division into "segments."

Crucial to any solution is the definition of "experienced." How would you define experienced? Many reasons have been given for the lack of experience including an organization's inability for employee retention and insufficient BASIC supervision skill development.

Downhill/Indirect Firelines

The two situations that firefighters traditionally have found themselves getting into trouble are downhill and indirect fireline operations. The lessons learned on the Loop Fire ('66) developed awareness, and consequential guidelines, for downhill fireline construction. Since then downhill operations have been safer; everyone agrees the only one who works in a chimney is Santa Claus, and he does it in the dead of winter. Unfortunately, we still have a ways to go (i.e., Battlement Creek '76).

Indirect firelines are a different story. In the last half of the 1980s all the entrapments have occurred during indirect operations. Extreme fire behavior with active spotting has put more reliance on indirect strategies. With indirect fireline the firefighter finds themselves removed from the best safety zone, the burn, as well as unable to see the objective hazard.

"Floating Division"

A floating division is the planned division during an indirect operation that exists initially only on paper (a map). It is not anchored. Wildland fire suppression tactics stress the importance of beginning construction at an anchor point (point where there is the least chance of being outflanked). To safely deploy resources on a "floating" division it is extremely important that the division is initially anchored and that the anchor point is also a safety zone. Only then can resources begin work developing the LCES system as they progress.

The success of the operation depends on the safety of personnel and the ability to hold the fireline. It is crucial that indirect fireline location is determined after careful analysis of wildland fire behavior possibilities including that behavior which will result if the fire enters the third-dimension (crowning/spotting from both wind-driven and plume-dominated fires). All too often the full possibilities are not incorporated in location decisions.

Wildland/Urban Interface

Suppression in the wildland/urban interface presents its own unique set of problems. The choice of fireline location is often influenced by the homes which stand between the fire front and a "better" option. Often the standard tactics of anchoring at the rear (or heel) and flanking will leave improvements in the path of the wind-driven fire.

The lack of an ideal fireline location does not in itself constitute unsafe indirect strategy. The "urgency" of the operation causes a break down in solid tactics. During interface suppression operations, maybe more than any operation, the LCES system must be in place.

With the rapid spread rates reached by wind-driven fires only two options are available—the traditional "anchor and flank" strategy or the unorthodox protection of improvements and resources as the wildfire spreads past. The last dictates the necessity for a "defensible space" around each improvement sufficient to serve also as a safety zone, a true safety zone. Unless this precaution has been made, the risk to defending the improvement may not be worth the operation.

Judgment Errors

John Dill, head rock climbing rescue ranger in Yosemite NP, recently made an analysis of errors in judgment made preceding an accident. He found three reasons which contribute to the accidents; ignorance, casualness and distraction. After thinking about the firefighter's environment and accidents these same reasons were found to correspond. Allow me to take a moment and help draw the correlations.

Ignorance: Unfortunately, we still have firefighters and fireline supervisors who still end up in wildland fire situations that call for skills and knowledge beyond their level of training. I know it is stressed over and over, but the BASICS, basic wildland fire behavior, basic suppression skills, need to be learned and reviewed. Yet many of the entrapments are the result of no lookouts or an insufficient safety zone, a lack of basics.

Casualness: The rock climber standing at the base of a couple thousand-foot granite walls in Yosemite is reassured in their decision to undertake a challenging ascent because of the helicopter which is poised less than a mile from the proposed ascent. We are doing the same. The situation is viewed more casually because we have an option if the tactic fails – our fire shelter.

Another way casualness enters our environment is through the reinforcement of improper tactics since the fire does not "blowup" while we are working the fireline the first few, or several, times. But then we find ourselves entrapped because the familiar situation changes and our reliance on improper tactics just doesn't work this time.

Distraction: Often I have been told that was it not for the on-the-job training that was given by a Division Supervisor the hazard would not have been noticed and tactics would not have been adjusted. Distraction is a very, very real problem for firefighters. Fatigue and carbon monoxide do not help with the decision making process either. Fireline personnel should be continually monitoring each other and remain open to communication and others evaluation of the situation at hand.

MODULE 3—Withen's Ten Essential Firefighting Factors
The TEFF Card

Side One of the TEFF Card:

Ten Essential Factors in Firefighting (TEFF)		Use Risk Mgt Process: Trends Lead to Trigger Points								
		Good				Medium				Extreme
		1	2	3	4	5	6	7	8	9
L	Lookouts									
C	Communication									
E	Escape Routes									
S	Safety Zones									
W	Weather									
T	Terrain									
Fb	Fire Behavior									
Fr	Firefighting Resources									
Fs	Fire Status									
Ft	Fuel Type									

The Trends examine broad indicators of conditions leading to Trigger Points which signal modification or disengagement of **Fire Suppression Tactics.**

Side Two of the TEFF Card

Fire Suppression Tactics

Engage

Anchor & Flank
Direct Attack
Frontal Assault on Head
Indirect
Backfire/Burnout

Modify

Change Engagement Tactics
Pull Back to better line location (indirect)
Consolidate Forces
Hold, Improve, Reinforce
Patrol, Hold what you have

Disengage

Pull back closer to safety zone & break
Retreat
Evacuate

Send Comments on TEFF to:
Patrick Withen at pwithen@virginia.edu
or McCall Smokejumpers
P.O. Box 1065, McCall, ID 83638
276-275-1927 (cell)

Side Two states concisely all the firefighting action options, from Engagement to Modification to Disengagement, that are available to wildland firefighters when they follow the TEFF in light of the Trends Toward Trigger Points. Viewing a concise set of firefighting rules (the TEFF), combined with Trends & Trigger Points, combined with a three part system of Fireline Tactics combines previous firefighting knowledge in such a manner that the firefighter has a new, to-the-point guide to fireline tactics.

Group Exercise:

Review the TEFF card material and discuss the following questions in your group:

- What system do you use for keeping track of all the operational guidelines available to you?
- Do you find the TEFF card to be a useful tool?

WHAT ARE THE TEN ESSENTIAL FACTORS IN (WILDLAND) FIREFIGHTING?

The purpose of this section is to briefly explain each of the TEFFs and to give an overview of the criteria the typical firefighter would use in judging whether the situation is good, medium or extreme risk.

A SUMMARY OF TEFF

TEFF 1: Sufficient lookouts are in place given the hazard assessment.

TEFF 2: Communications: Sufficient communications are in place; generally communications are needed with lookout(s), crews, supervisors, & adjoining forces, but there may be other critical links.

TEFF 3: Escape Routes: A suitable escape route is known to all.

TEFF 4: Safety Zones: A suitable safety zone is known to all. The safety zone may be to exit the fire area.

TEFF 5: Weather: The weather is doing what is expected; no RH or wind trigger points have been crossed.

TEFF 6: Terrain: The terrain is not causing unexpected fire behavior, creating a hazard for firefighting resources, or compromising the escape route.

TEFF 7: Fire behavior is understood in light of weather, terrain, & fuel type. Fire behavior is not doing anything unexpected, thus Firefighting resources' tactics are succeeding as expected.

TEFF 8: While more resources may be on order, firefighting resources are sufficient for firefighters to remain safe & to successfully implement current tactics.

TEFF 9: Firefighters are aware of the scope of the fire, & current tactics are successful in light of amount of firefighting resources & to keep current firefighters safe.

TEFF 10: Fuel type is understood, and is exhibiting expected fire behavior.

Tracking Trends in the Ten Essential Factors in (Wildland) Firefighting

The following chart gives an overview of the criteria the typical firefighter would use in judging whether the situation is good, medium or extreme risk.

LCES WT FFFF	Good		Medium		Bad
L Lookouts	Good LO in place	Moving farther away from LO	LO becomes less effective because fire &/or crew moves out of sight		No or ineffective LO
C Communications	Good Commo	Commo becomes so heavy it is difficult to speak to necessary forces	People move into holes where it is difficult to reach them	Weak Commo	Lost Commo
E Escape Routes	Good Escape Route in place	Many factors enter into determining whether an Escape Route is "Short" or "Long: Terrain & Fuel dependent	Escape routes become longer, steeper, etc. as crew &/or fire change locations	"Long" Escape Route	Escape Route becomes so long as to make it ineffective
S Safety Zones	Good Safety Zone	With Improvement, Marginal Safety Zone	Deployment Zone	The only safety zone may be a long Escape Route out of the area; very wind dependent	No Deployment Zone & Long Escape Route out of area
W Weather	"Good" Wx usually in morning, degrades as day goes on	Fire Wx in mid to late afternoon, & often into early evening	Wx also storm & front dependent		Extreme Wx
T Terrain	Fire in consistent terrain	Fire approaching critical terrain	Fire just into critical terrain	Fire well into critical terrain	Fire into new critical terrain
Fb Fire Behavior	smoldering	creeping	running / torching	passive crowning	active crowning / major runs
Fr Firefighting Resources	Fire feels over-manned	More people split off to do other jobs	Obviously not enough people	Undermanned to the extent that fire is lost	Critical functions failing: LO, Commo, etc.
Fs Fire Status	Fire tactics going well: good anchor, progressing on line; more line progress than fire growth	Weak anchor: roll out, spotting, bad position on fire, etc.	Tactics not working well: must chase spots, roll out, or fire is growing faster than you can line it	Fire making major advances & you are loosing a lot of line	Fire is forcing w/drawl from the line/area
Fx Fuel Type	Consistent Fuel	Fire approaches more volatile fuel (moisture, type, consistency)	Fire into significant pocket of more volatile fuel	Transition to volatile fuel is causing increased fie behavior	Critical Fuel: flashy, ladder fuel, preheated, pre-burned, etc., capable of initiating blow-up

The necessity for judgment and expertise by the line firefighter is the reason for the development of the 1 – 9 Matrix called the Trends Leading to Trigger Points. The Matrix cannot be filled out in a lock-step manner. No two firefighters will fill it out in the same manner. However, the ability to view all the criteria in one place, and to be able to see trends is an improvement over earlier training and simple checklists.

A SUMMARY OF THE TEFF & THE 59 FIREFIGHTING GUIDELINES

10	**FO**	**The 10 Standard Firefighting Orders (based on FIRE ORDERS adaptation)**
18	**WO**	**The 18 Watch Out Situations**
7	**DL**	**The Downhill Line Construction Checklist**
4	**CD**	**Common Denominators of Fire Behavior on Tragedy Fires**
7	**LU**	**Look Up, Down & Around Factors**
4	**LC**	**LCES**
9	**UW**	**The Wildland Urban Watch Outs**
59		**Total**

I. Lookouts

FO	8	Establish lookouts in potentially hazardous situations
WO	12	Cannot see main fire; not in contact w/ someone who can
DL	3	LCES will be coordinated for all personnel involved
DL	3a	Crew supervisors is in direct contact w/ lookout who can see the fire
LC	1	Lookouts must be established & known to all firefighters before needed

II. Communications

FO	4	Ensure instructions are given & understood
FO	6	Remain in communication w/ crew members, your supervisor, & adjoining forces
WO	5	Uninformed on strategy, tactics, & hazards
WO	6	Instructions & assignments not clear
WO	7	No communication link w/ crew members or supervisor
WO	12	Cannot see main fire; not in contact w/ someone who can
DL	3A	Crew supervisors is in direct contact w/ lookout who can see the fire
Dl	3B	Communication is established between all crews
LC	2	Communications must be established & known to all firefighters before needed

III. Escape Routes

DL	3b	Rapid access to safety zones in case fire crosses below crew
LC	3	Escape routes must be established & known to all firefighters before needed
UW	1	Poor access & narrow one-way roads
UW	2	Bridge load limits

IV. Safety Zones

FO	7	Determine safety zones & escape routes
WO	3	Safety zones & escape routes not identified
WO	17	Terrain & fuels make escape to safety zones difficult
LC	4	Safety zones must be established & known to all firefighters before needed

V. Weather: Wind, Temperature, & Humidity

FO	3	Recognize current weather conditions & obtain forecasts
WO	4	Unfamiliar w/ weather
WO	14	Weather becoming hotter & drier
WO	15	Wind increases and/or changes direction
CD	3	When there is an unexpected shift in wind direction or in wind speed
LU	5	Observe wind
LU	6	Observe stability
UW	8	Strong winds

VI. Terrain

WO	2	In country not seen in daylight
WO	9	Building fireline downhill w/ fire below
WO	13	On hillside where rolling material can ignite fuel below
WO	17	Terrain & fuels make escape to safety zones difficult
DL	5	Fireline will not lie in or adjacent to a chute or chimney
CE	4	When fire responds to topographic conditions & runs uphill
LU	3	Scout terrain
UW	1	Poor access & narrow one-way roads
UW	2	Bridge load limits
UW	6	Structures in chimneys, box canyons, narrow canyons, or on steep slopes

VII. Fire Behavior

FO	2	Initiate all action based on current & expected fire behavior
WO	4	Unfamiliar w/ local factors influencing fire behavior
WO	16	Getting frequent spot fires across line
DL	7	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
LU	7	Watch fire behavior
UW	7	Extreme fire behavior

VIII. Firefighting Resources

FO	1	Fight fire aggressively, but provide for safety first
FO	9	Retain control at all times
FO	10	Stay alert, keep calm, think clearly, act decisively
WO	18	Taking a nap near the fireline
DL	1	Crew supervisors & overhead will discuss assignment prior to committing crews
UW	4	Inadequate water supply
UW	9	Evacuation of public (panic)

IX. Fire Status

FO	5	Obtain current information on the fire status
WO	1	Fire not scouted & sized up
WO	8	Constructing line w/o safe anchor point
WO	19	Attempting frontal assault on fire
WO	11	Unburned fuel between you & fire
WO	12	Cannot see main fire; not in contact w/ someone who can
DL	2	Decision will be made after proposed fireline has been scouted
DL	4	Direct attack will be used whenever possible; if not possible, the fireline should be completed between anchor points before being fired out
DL	6	Starting point will be anchored for crew building fire down from the top
CD	1	On relatively small fires or deceptively quiet areas of large fires

X. Fuel Type

WO	4	Unfamiliar w/ local factors influencing fire behavior
WO	17	Terrain & fuels make escape to safety zones difficult
CD	2	In relatively light fuels, such as grass, herbs, & light brush
LU	1	Assess fuel characteristics
LU	2	Feel & measure fuel moisture
UW	3	Wooden construction & wood shake roofs
UW	5	Natural fuels 30 ft. or closer to structures

INSTRUCTIONS: The Ten Essential Factors in (Wildland) Firefighting (TEFF)

"Are You TEFF Enough?"

The TEFF Card consolidates 59 standard firefighting guidelines, including the 10 Standard Firefighting Orders, the 18 Situations That Shout Watch-Out, the Downhill Line Construction List, the Common Denominators on Tragedy Fires, etc. TEFF assumes the firefighter has a strong background in the 59 firefighting guidelines.

NOTE: The TEFF Card is on a trial run. If successful it may be used to reduce paperwork, cards, etc.

On side one of the TEFF Card are the Ten Essential Factors in Firefighting (TEFF) and a trends scale. On the other side of the TEFF Card are the three levels of Fire Suppression Tactics including Engagement, Modify, and Disengagement.

To use the TEFF Card, at the beginning of shift, mark or mentally note two boxes for each of the Ten Essential Factors. First, mark current conditions at the beginning of the shift. Second, mark the conditions you expect at the peak of burning period.

Then, throughout the day, as you use the Risk Management Process and as conditions change, update your TEFF Card to represent current conditions. You may specify specific trigger points (e.g., lost the Lookout, fire roles out on underslung line, etc.) which cause you to Modify your Fire Suppression Tactics. Second, you may watch for trends, or degradation of several of the TEFFs that might cause you to modify your Fire Suppression Tactics.

Feedback: We need your input! Mark your most appropriate response, and make comments!!

1. I found the TEFF Card to be useful.

A	B	C	D	E
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

2. How many shifts did you use the TEFF? _____

3. I think we are better off using the 10 & 18, and not the TEFF Card

A	B	C	D	E
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

4. Rank your top three preferences for fire guidelines by indicating 1, 2 & 3

_____ 10 Standard Firefighting Orders

_____ 18 Situations that Shout Watch-Out

_____ 7 Downhill Line Construction Checklist

_____ 10 TEFF

_____ 4 Common Denominators of Fire Behavior on Tragedy Fires

_____ 7 Look Up, Down & Around

_____ 4 LCES

_____ 9 Wildland Urban Watch Outs

_____ Some combination of the above, such as _____

5. What is your highest Redcard Qual? _____

The TEFF Card could be improved by: _____

_____

_____

MAKE COMMENTS ON OTHER SIDE!!

WRITE COMMENTS HERE:

SUBMIT COMMENTS TO:

Patrick Withen
McCall Smokejumpers
P.O. Box 1065
McCall, ID 83638
208-634-0385 (Fax)
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276-275-1927 (Cell)

NOTE: This information is based on FIREORDERS not the original Standard Firefighting Orders. Refer to http://people.uvawise.edu/pww8y/ **for updates to the TEFF card.**

MODULE 4—Safety Zones

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 four 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.**

CALCULATIONS 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.	½ 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 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.

Appendix B—Fire Crew Cohesion: Previous Recommendations

Recommendations From the Human Factors Workshop—A 5-day human factors workshop was held in Missoula, MT, during June 1995. Experts in psychology, sociology, formal organizations, fire safety, and wildland firefighting were brought together. On the last day of the workshop, 21 recommendations were formulated. Two recommendations focused on improving cohesion in fire crews:

- Develop methods to speed up crew cohesion and work practices before fireline assignments.
- Organize more national, regional, and local rendezvous where there is more mixing of type I, type II, engine, and helitack crews, fire management officers, incident management teams, and dispatchers so they can share knowledge and discuss problems.

Recommendations From the TriData Study—In 1998 the TriData Corp. completed a major study on the fire safety culture. A report from the study, *Phase III—Implementing Cultural Changes for Safety*, made two specific recommendations about improving fire crew cohesion:

- Unit cohesion should be fostered and attention given to developing good crew dynamics.
- Foster better crew cohesion, especially among type II crews.

Management Evaluation Report of the Thirtymile Fire—The incident review board wrote about the problem of people who were unfamiliar with each other working together:

- There were a number of issues that limited the development of crew cohesion for the Northwest Regular No. 6 crew. These included: collateral duties of command, fatigue, incident complexity, lack of opportunity to work together, and management effectiveness.

These reports from workshops, studies, and fire fatality investigations all recommended working to increase the cohesion of wildland fire crews.

Excerpt from *Crew Cohesion, Wildland Fire Transition, and Fatalities*, Jon Driessen, Ph.D., February 2002.

Complete publication available at http://www.myfirecommunity.net/documents/Cohes.pdf

Module 5—Crew Cohesion

Rock Creek Fire

Current Situation:

Date/Time: July 28, 1939; 1500 hours

Location: North of Winnemucca, NV, east of Orovada

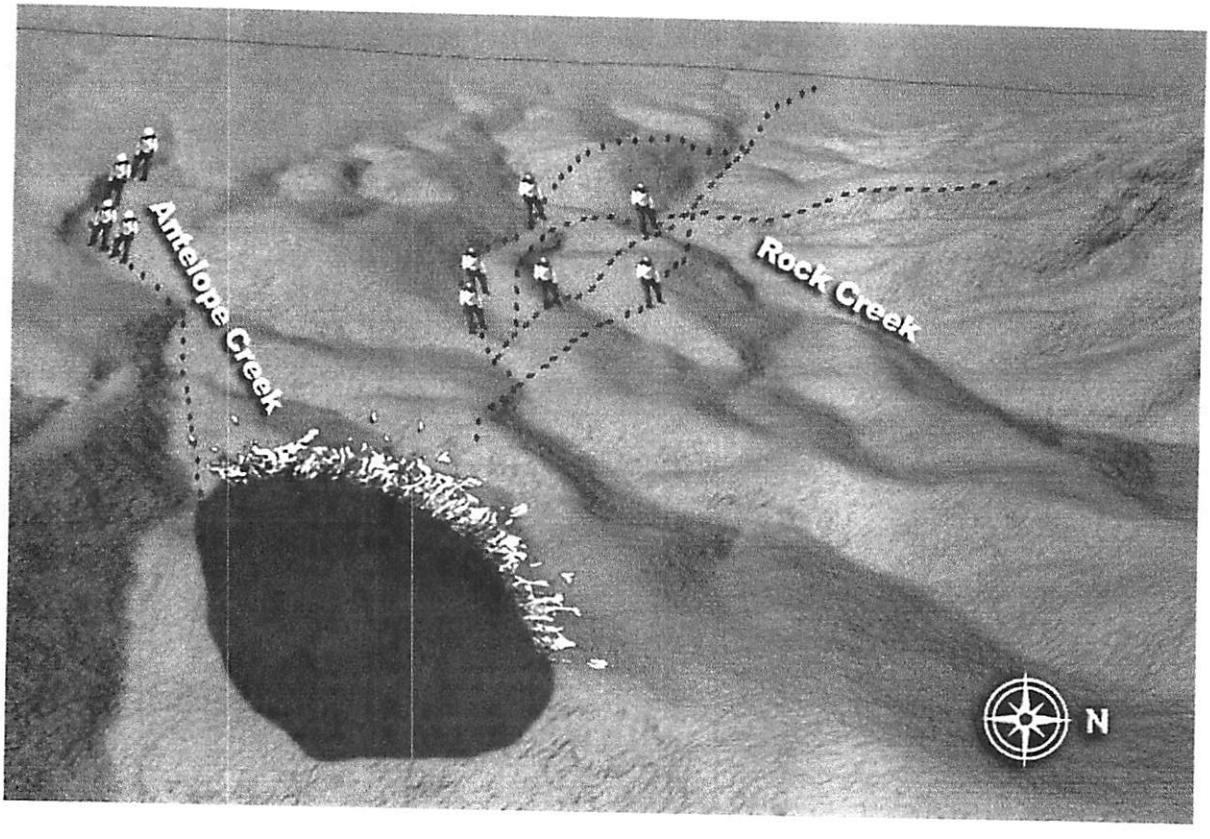
Tactical Assignment: Initial attack

Fuels & Topography: 3-5' sagebrush on the slopes and 6-7' in drainages; the ground was rocky and deceptively steep

Weather Forecast: Temperature, 100°F; RH, 15-18%; winds, SW at 5-10 mph; probability of thunderstorm development throughout the day

Present Weather: Mature thunderstorm directly over the fire; down drafts causing an abrupt E wind shift with gusts to 50 mph

Resources Available: Local ranchers and a CCC crew



Group Exercise:

After reviewing the Rock Creek fire, discuss the following questions in your group:

- As the Squad Boss, what would you do in this situation?
- Given the current situation, what are your responsibilities as a Squad Boss in regards to span of control, maintaining order, and crew cohesion?
- As a Crew Member, what are your responsibilities toward your Squad Boss and your fellow Crew Members?

Module 5—Crew Cohesion

Excerpt from *The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster*, Karl E. Weick.

> I want to argue that the tragedy at Mann Gulch alerts us to an unsuspected source of vulnerability in organizations. Minimal organizations, such as we find in the crew at Mann Gulch, are susceptible to sudden losses of meaning, which have been variously described as fundamental surprises (Reason, 1990) or events that are inconceivable (Lanir, 1989), hidden (Westrum, 1982), or incomprehensible (Perrow, 1984). Each of these labels points to the low probability that the event could occur, which is why it is meaningless. But these explanations say less about the astonishment of the perceiver, and even less about the perceiver's inability to rebuild some sense of what is happening.
>
> . . . I have borrowed the term "cosmology" from philosophy and stretched it . . . People, including those who are smokejumpers, act as if events cohere in time and space and that change unfolds in an orderly manner. These everyday cosmologies are subject to disruption. And when they are severely disrupted, I call this a cosmology episode (Weick, 1985: 51-52). A cosmology episode occurs when people suddenly and deeply feel that the universe is no longer a rational, orderly system. What makes such an episode so shattering is that both the sense of what is occurring and the means to rebuild that sense collapse together.
>
> **Stated more informally,** a cosmology episode feels like vu jádé—the opposite of dèjá vu: I've never been here before, I have no idea where I am, and I have no idea who can help me. This is what the smokejumpers may have felt increasingly as the afternoon wore on and they lost what little organization structure they had to start with. As they lost structure they became more anxious and found it harder to make sense of what was happening, until they finally were unable to make any sense whatsoever of the one thing that would have saved their lives, an escape fire. The disaster at Mann Gulch was produced by the interrelated collapse of sensemaking and structure. If we can understand this collapse, we may be able to forestall similar disasters in other organizations.

The entire article is linked in the Fireline Leadership's Professional Reading Program at http://www.fireleadership.gov/toolbox/documents/pro_reading_room.htm

MODULE 5—Crew Cohesion
Crew Cohesion Assessment Tool

Purpose: In terms of crew cohesion, each crew is different, and even the same crew with the same people will vary in the level of cohesion from time to time. The Crew Cohesion Assessment is designed to provide a tool to measure crew or team behaviors as they relate to cohesion.

Crew cohesion is no mystery. The factors that make crews and teams cohesive are well known, documented through the centuries in both literature and research. This tool describes behaviors that are grouped into seven general categories representing characteristics of cohesive groups. Although not all-inclusive, the list can provide a place to start in determining the strengths and weakness of your crew or team in relation to team cohesion.

The interpersonal dynamic of teams or crews changes constantly. What was true last year may not be true today. A leader's responsibility is to continually monitor and assess the health and well-being of the crew and its members. This tool can be used independently by a single crew leader, by a leadership team, or with the crewmembers.

Instructions: Following are the recommended steps for using the survey tool:

Step 1: Determine the time frame to which you will confine your assessment. Although you can use the tool to assess past or present behavior, for the most useful results you should limit your assessment time to a short window of recent time (i.e. the past 4 weeks). Do not mix the distant past and the present because it may blur the focus of the results.

Step 2: Rate the *behavior* of the crewmembers and leaders during the assessment period, using a scale of 1 to 5 as follows:

Score	Description
1 = never observed	Behavior is not seen except in very rare cases or only with a single person – indicates potential serious weakness that should be addressed immediately.
2 = rarely observed	Behavior is seldom seen or exhibited by only a few crewmembers or leaders – indicates a weakness the improvement plan should address.
3 = sometimes observed	Behavior is seen unpredictably or by only some of the crewmembers – indicating average performance. Improvement plan dependent upon scope and criticality of issue.
4 = often observed	Behavior is evident with most crewmembers most of the time – indicates a definite strength to be preserved. Further improvement is likely limited to working with a few people or specific operations.
5 = always observed	Behavior is seen in all crewmembers and leaders nearly all the time - indicates exceptional strength. Improvement plan should include actions to maintain this strength for the future.

Try to be as honest and pragmatic as possible. Sometimes your initial reaction is the best response you can provide.

Step 3: If you are assessing the crew with others, compare your assessment, discussing areas where you have differing perceptions. Discuss which items are the most important to your crew and its mission. Note of items that rate unusually high or low for later discussion.

Step 4: Build a plan of action to improve upon the identified weaknesses, and plan ways to sustain the strengths. If crewmembers were not involved with the assessment process, consider sharing your perceptions with the crew and including them in the planning.

Step 5: File your assessment and set a date for your next assessment to determine your progress against your planned goals.

LEADERSHIP TOOLBOX REFERENCE
Crew Cohesion Assessment
Courtesy of Mission-Centered Solutions

Communication

Crew leaders communicate intent clearly and crewmembers understand the intent of orders that are given.	1 2 3 4 5
Crewmembers are willing to bring up problems, successes, or issues with the leadership team.	1 2 3 4 5
Crewmembers communicate well with the other crewmembers.	1 2 3 4 5

Conflict

Crewmembers are willing to address conflicts with others when they occur.	1 2 3 4 5
Crewmembers focus on what is right, not who is right, when resolving conflict or other problems.	1 2 3 4 5
Conflicts between individuals on the crew are short-lived and do not persist over extended periods of time.	1 2 3 4 5

Trust

The crew environment allows and encourages all crewmembers to be heard.	1 2 3 4 5
Crewmembers complete assignments without excessive supervision.	1 2 3 4 5
Crewmembers implement decisions of the leadership team without delay.	1 2 3 4 5
Crewmembers are willing to experiment on new ideas without risking embarrassment.	1 2 3 4 5

Teamwork

Crewmembers show ownership in the crew's accomplishments or failures.	1 2 3 4 5
Crewmembers show a strong consciousness of the history, tradition, and lore of the crew.	1 2 3 4 5
Crewmembers anticipate the needs of others and act in anticipation of those needs, especially during high tempo operations.	1 2 3 4 5
The intensity of the work is determined more by the crewmembers than by direction from leaders.	1 2 3 4 5

Effectiveness

Crew remains focused on the quality of the service they provide, even when others do not hold them directly accountable for that service.	1 2 3 4 5
Crew works well with other resources to accomplish the mission.	1 2 3 4 5
Crew actively discusses situation awareness when planning and conducting operations.	1 2 3 4 5
Crewmembers can pause an action to clarify their situation awareness or voice concerns.	1 2 3 4 5
Crew recognizes and successfully transitions between high-stress and low-stress conditions.	1 2 3 4 5

Leadership

Crew has a complete set of standard operating procedures or crew handbook that is well understood and used.	1 2 3 4 5
Leaders demonstrate and adhere to a consistent set of values and standards.	1 2 3 4 5
Leaders conduct themselves in an ethical manner.	1 2 3 4 5
The leadership team speaks and acts with one voice and mind.	1 2 3 4 5

Learning

Crew debriefs daily as part of the standard operating routine.	1 2 3 4 5
Crew conducts impromptu on-the-job training events to build crew skill sets.	1 2 3 4 5
Crew conducts training to discuss lessons from other fires or other operations.	1 2 3 4 5
Training is conducted by more than just one or two crew leaders.	1 2 3 4 5
Crew leaders understand their responsibility to mentor crewmembers.	1 2 3 4 5

LEADERSHIP TOOLBOX REFERENCE
Crew Cohesion Assessment
Courtesy of Mission-Centered Solutions

Module 5—Crew Cohesion

Group Discussion

- What role does crew cohesion play in your work environment? Relate to your specific role in firefighting?

- What can you do this fire season to improve crew cohesion?

- What are your thoughts on the role of the crew boss versus the role of the crew member in regards to crew cohesion (leadership versus followership)?

MODULE 6—Leadership

LEADERSHIP

Developing Leaders in Wildland Fire

Home | The Program | What's New | Frequently Asked Questions | Links | Comments

Paul Gleason Lead by Example Award

Values and Principles

Leadership Toolbox

Training Courses

Leadership Committee

Wildland Fire Leadership Development Program

The most essential element of successful wildland firefighting is competent and confident leadership. The wildland fire leadership development program has been established to provide an avenue for you to improve essential leadership skills during all stages of your career.

Updates and New Features

updated 12/13/04

- TDGS Library
- Leaders We Would Like to Meet: Jack Wilson
- Evaluating the Leadership Program
- Revised TDGS/STEX workbook (pdf version)
- 2003 Gleason Award Recipients

This website is designed to provide information regarding the implementation of the NWCG wildland fire leadership development program. In addition it provides a resource to allow individuals to strive for a higher performance level as a leader through self-directed learning opportunities.

The Leadership Committee is chartered by the NWCG Training Working Team

Text Links:

Home | The Program | What's New | FAQs | Links | Comments
Values and Principles | Leadership Toolbox | Training Courses | Leadership Committee

Accessibility

Website support provided by National Interagency Fire Center
3833 S Development Avenue
Boise, Idaho 83705

SAFENET

SAFENET is a form, and process, that provides a method for reporting unsafe situations on, or off, the fireline. The information provided on the form will help collect important, safety-related data to determine long-term trends and problem areas. A SAFENET may be filled out at any time to report a valid concern about unsafe situations in fire operations, as well as document corrective action.

Discuss the methods for filing a SAFENET.

- Electronically (access site through the NIFC Web site)
- By hardcopy (self-addressed, stamped forms available through the cache system).
- By phone (1-800-670-3938)

Discuss advantages of filing a SAFENET through your supervisor versus sending it yourself.

- Increase the chances of finding an immediate solution.
- Keeps supervisor "in the loop."

Discuss using SAFENET in situations other than fire.

- Prescribed fire
- All-risk
- Training

Where does a SAFENET go, and what response can you expect?

- SAFENETs are received and stored in a database in Boise. After a SAFENET is received, the names are removed. It is then given a document number and posted to the Web.
- Every new SAFENET is then forwarded to the affected agencies designated list of contacts, which usually includes the National or Regional Safety Officer.
- It is each agency's responsibility to ensure that corrective actions are taken.

Corrective actions can be filed by anyone at any time. They are automatically attached to the individual SAFENET on the database.

Discuss using SAFENET to monitor safety issues other firefighters may be having.

MODULE 6—Leadership
Group Discussion

Exercise A - AAR/Investigation

1. What is the difference between an After Action Review and an investigation?

2. Recall any near misses you were involved with and discuss how the lessons learned from that event were disseminated.

Exercise B - Stress

1. Identify and discuss the behavioral traits that you personally exhibit when you find yourself in stressful situations?

2. Given your current position in the fire organization, how can you help to minimize the effect of stress on your co-workers and supervisors?

Module 7—Wildland-Urban Interface
High Crow Fire

Current Situation:

Date/Time: July 6, 2003; 1550 hours

Location: Warm Springs Avenue, Boise, ID

Size/Behavior: 100 acres; 100% of the perimeter was active and exhibiting rapid rates of spread

Tactical Assignment: Protect multiple homes and power line

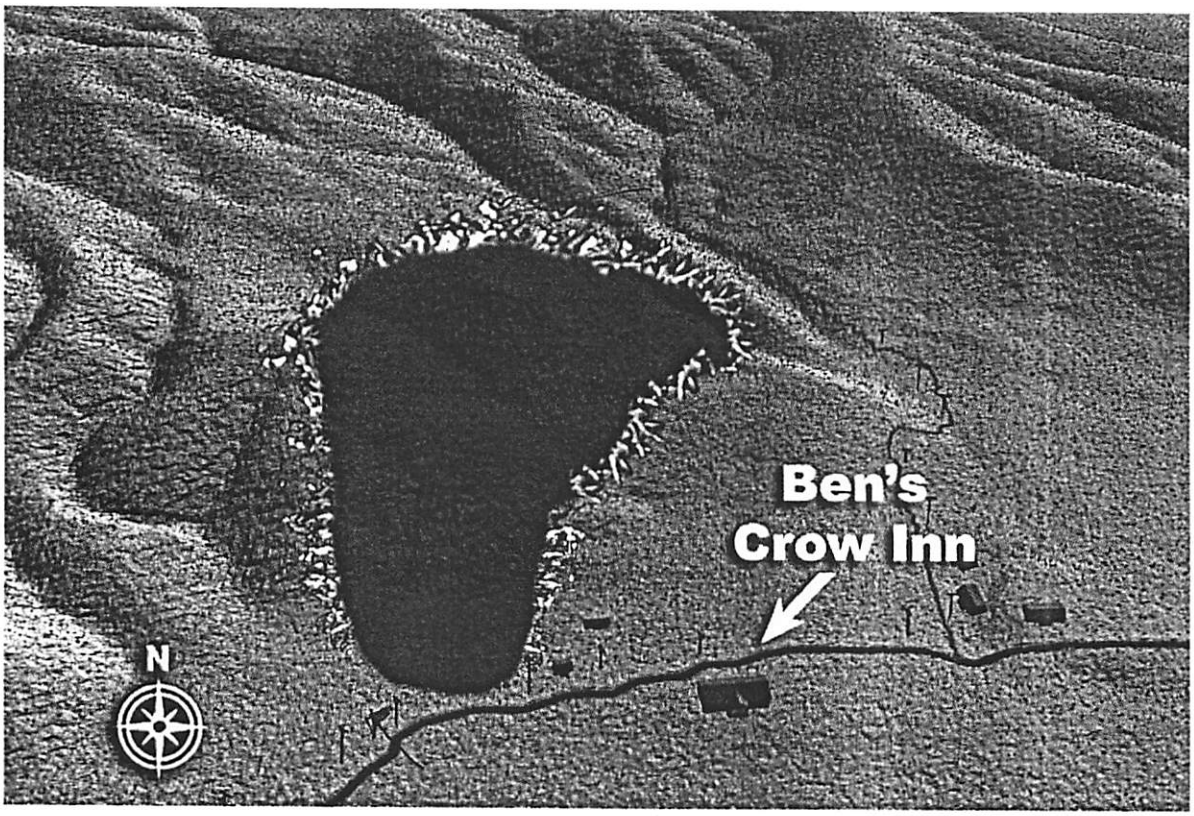
Fuels & Topography: Flashy fuels with high brush component in drainages; numerous natural chimneys

Hazards: Power lines, slow moving traffic and potential congestion

Weather Forecast: Sunny skies; Temperature, 95°F; RH, 16%; winds, SW at 10-15 mph

Resources On Scene: IC—Boise City Battalion Chief, 6 Type 4 wildland fire engines, 1 BLM Type III helicopter, 1 USFS Type II helicopter, 1 BLM Air Attack, and 1 BLM ICT3

Resources En route: 1 BLM Type III helicopter, 1 Type 1 crew, 2 SEATs, 2 heavy airtankers, 4 Type 4 engines, several structural engines, several dozers with transports, and multiple law enforcement agencies



Group Exercise:

After reviewing the High Crow fire, discuss the following in your group:

- As the incoming IC, analyze this situation and list the concerns (communication, span of control, etc.) you will need to monitor/address in priority order.

Module 7—Wildland-Urban Interface

Group Discussion

- How would you rate your area's preplanning efforts?

- What else needs to be done to improve cooperation before this fire season?

- How many local cooperators have you met or made contact with?

Taken from the Board of Review for the Waterfall Wildland Entrapment, August 13, 2004

Executive Summary

Prior to Initial Attack (IA) of Waterfall Fire

Carson City is located in Western Nevada at the eastern front of the Sierra Nevada Mountain Range. This area is commonly referred to as the Sierra Front. The portion of the Sierra Front that is on the western edge of Carson City is made up of steep canyons and slopes with urban developments immediately adjoining the wildland forest boundary. The road systems are a combination of paved, gravel, and unmarked single lane roads. Narrow roads on the sides of the slopes are common. Fuels on the west side of Carson City are comprised of open stands of Jeffery Pine, mountain brush, mixed grasses including cheat grass, and structures. Fuels could be described as continuous and fuel loading could be described as moderate to heavy.

Typically steep slopes and down canyon winds are key factors in fire spread and intensity in the Sierra Front. The National Fire Danger Ratings System (NFDRS) indices for the area during the time of the fire were above normal. Fire danger indices were above the 97th percentile for the area and potential for large fire growth was high.

Multi-jurisdictional fires with rapidly escalating complexity are common for the Sierra Front. The evolution of initial attack into a larger more complex extended attack organization is common under the conditions that existed on July 14, 2004. The HTF, NDF, and local fire departments have experienced several large, extended attack fires so far this season. These fires were contained with initial attack and extended attack organizations. Two fires required the activation of Type-2 Incident Management Teams (IMT).

Initial Attack through Burnover

Detection of the Waterfall Fire was at approximately 0257 on July 14, 2004 and an initial attack response was initiated by the CCFD and NDF. Upon arrival on scene, NDF and CCFD established Unified Command for the incident. At 0600 the HTF joined unified command and a Type-3 organization had been established with the IC's from NDF, HTF, and CCFD. The organization was made up of an Operations Section Chief (OSC), a Public Information Officer (PIO), Safety Officer (SOF), an Air Operations Branch Director (AOBD), an Air Tactical Group Supervisor (ATGS), three Division Group Supervisors (DIVS), a Structure Group Supervisor (DIVS), and a Staging Area Manager (STAM).

The fire was at least 20 acres, and was not yet accessible by vehicle. The mix of tactical resources included hand crews, engines, dozers, helicopters, and air tankers. A variety of homes were located within ¼ mile immediately east of the fire's location.

At approximately 0800, based on a complexity analysis, a Type-2 IMT was ordered. Primary considerations for these decisions were high potential for large fire growth and concerns for public safety within the wildland urban interface. The in-briefing for this IMT was scheduled for 1200.

Two staging areas were established. Staging Area 1 was at the Carson Middle School, with a Staging Area Manager (STAM) assigned. Staging Area 2 was established at the trailhead on Kings Canyon Road, without a STAM assigned.

Between 0900 and 1100 the fire activity continued to increase. The fire was at 50+ acres. Additional tactical resources arrived. Direct attack was still only effective with air support at this time.

At 1105, a handcrew reported two potentially serious injuries from rolling rocks. These injuries required first aid and a technical rescue, resulting in the diversion of tactical suppression resources from the structure protection group and Division B. In addition, emergency medical (EMS) personnel and equipment were dispatched from CCFD to provide technical rescue assistance. The response to these injuries increased radio traffic, drew tactical and strategic attention away from fire suppression, and increased vehicle traffic into Staging Area 2.

As the fire increased in size and complexity, uncontrolled access on the Kings Canyon Road allowed unauthorized personnel and vehicles to enter the area. Unauthorized personnel included private parties, unassigned fire and non fire personnel, members of the media and incoming Type-2 IMT members. Many of these people were without required escorts and/or Personal Protective Equipment. This situation resulted in a tremendous amount of congestion on the Kings Canyon Road and at Staging Area 2 prior to and during the burnover and entrapment.

Prior to 1200 the agency administrators, with support from the unified command, completed the Wildland Fire Situation Analysis (WFSA), Delegation of Authority, and their briefing materials for the Type- 2 IMT. In-briefing for the Type-2 IMT began at approx 1200. At this time, the unified commanders separated, one staying at the ICP, one participating in the Type-2 IMT inbriefing, and the other IC departed for the fire to begin the role of OSC2 (T) with the Type-2 IMT. Following the briefing the Type -2 IMT started the transition with the Type-3 IMT and officially assumed command of the fire at 1600 July 14, 2004.

At about 1230, the Type-3 OSC and DIVS B directed a burnout operation on the south end of the fire to keep the fire north and west of the Kings Canyon Road. As the crew and engine initiated the burnout, the main fire spotted over the road in several locations. (See appendix C Exhibit 6.) The spots grew beyond control immediately. DIVS B directed burnout operations to cease and his personnel to egress back down the road toward Staging Area 2. At this time congestion at Staging Area 2 prevented most vehicles from leaving the area, resulting in the entrapment and burnover of twenty one personnel and eighteen vehicles at approximately 1315. Two persons received first and second degree burns; one fire department employee and a news reporter. Vehicle damage included three vehicles destroyed and an unknown number of vehicles with lesser damage.

Development of Findings

Based upon site visits, interviews and a review of written and photographic documentation, the investigation team identified numerous findings in the following areas:

1. Environmental and Fire Behavior
2. Multi-Jurisdictional Incident Management
3. Communications
4. Firefighter and Public Safety
5. Transitions
6. Roles and Responsibilities
7. Operations and Tactical Decision Making
8. Entrapment
9. Management
10. Policy

The complete Waterfall Investigation Report can be found at http://www.forestry.nv.gov/main/waterfall_fire04.htm

Module 8—Hazard Trees

Hazard Tree Safety

Environmental conditions that increase snag hazards:

- Strong winds
- Night operations
- Steep slopes
- Diseased or bug-kill areas

Hazard tree indicators:

- Trees have been burning for an extended period
- High risk tree species (rot and shallow root system)
- Numerous down trees
- Dead or broken tops and limbs overhead
- Accumulation of down limbs
- Absence of needles, bark or limbs
- Leaning or hung-up trees

Group Discussion:

Assignment: 100% mop up
Weather forecast: Winds, variable SW, 3-5 mph with occasional gusts up to 10 mph

After reviewing the hazard tree safety video clip, discuss the following in your group:

- Do you think this assignment should be accepted? If not, how should you go about refusing the assignment?
- If you think the assignment should be accepted, how should you mitigate the hazards present?

HOW TO PROPERLY REFUSE RISK

Incident Response Pocket Guide

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:

1. There is a violation of safe work practices.
2. Environmental conditions make the work unsafe.
3. They lack the necessary qualifications or experience.
4. 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, 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 why it was turned down.

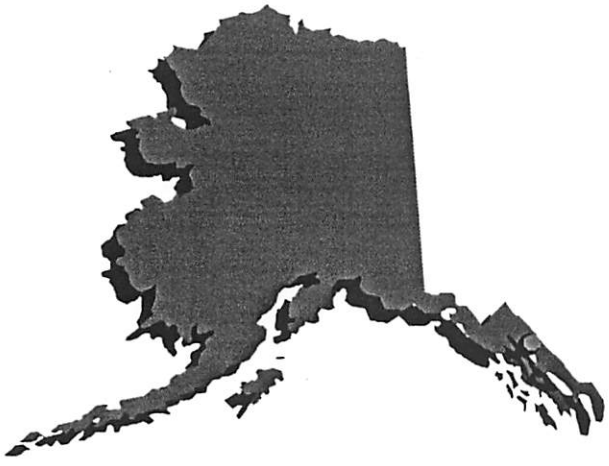
- If an unresolved safety hazard exists or an unsafe act was committed, the individual should also document the turn down by submitting a SAFENET (ground hazard) or SAFECOM (aviation hazard) form in a timely manner.

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.

Module 9
Alaska Firefighting

Group/Class Discussion:
Discuss the following in your group:

- How should you prepare for an out-of-region fire assignment?



Module 10
Conclusion & New Generation Fire Shelter

Fire Shelter Update

Introduction

A new fire shelter has been under development for several years and is now available to wildland firefighters (Figure 1). The adoption of this new system, which includes the fire shelter, training shelter, video and booklet, began in June 2003. About 50,000 of the new shelters have already been delivered to the GSA. A complete transition to the new shelter is expected to take another 2 to 4 years. All wildland firefighters need to know the impacts of this change.

A Tech Tip entitled "New Generation Fire Shelter Developed for Wildland Firefighters (0351-2313-MTDC)" provides information on the new fire shelter system. This Tech Tip also includes instructions on modifying existing fireline packs to fit the new shelter, and can be accessed electronically on the MTDC website or can be ordered in hard copy through MTDC. *You will be prompted for a user name and password when accessing the MTDC website. Use the following user name: t-d / password: t-d.*

Fire Shelter References

- **Fire Shelter Information from the USDA Forest Service, Fire and Aviation Management web site.**
- **More information on the New Generation Fire Shelter Developed for Wildland Firefighters (0351-2313-MTDC)** ***You will be prompted for a user name and password when accessing the MTDC website. Use the following user name: t-d / password: t-d.***

Figure 1 - New fire shelter

Size Comparison of New and Current Fire Shelters:

	New Fire Shelter	Current Fire Shelter
Weight - w/o case	4.2 lbs	3.4 lbs
Folded size - w/o case	8.5" x 5" x 4"	8.5" x 5.5" x 3"
Folded Size - w/case	9" x 5.75" x 4.5"	9" x 5.75" x 3 1/8"
Deployed Dimensions	86" long	71" long
	15.5" high	24" high
	31" wide	48" wide
Cost	$256	$65 (approximate)

How will adoption of the new shelter affect wildland firefighters?
From the perspective of how we train firefighters to use fire shelters, very little has changed. Though the new shelter offers better protection from direct flames than the original shelter, survival of the occupant is more likely if direct flame contact with the shelter is avoided. Even though the new shelter provides increased protection compared with the original shelter, firefighters will still need to know how to recognize potential entrapment situations and how to avoid them. The same evaluation process that firefighters have been using to identify survivable sites still applies. Teaching firefighters to avoid deploying shelters in or near fuel concentrations, chimneys, and other potentially hazardous areas will continue to remain an important part of fire shelter training.

Use of Original Fire Shelter
The original fire shelter still provides good protection if used as described by existing guidelines. The original shelter can be used until the transition to new shelters is complete and as long as they meet the refurbishing criteria listed in the "Fire Equipment Storage and Refurbishing Standards" prepared by the National Fire Equipment System Refurbishment Standards Task Group, Sept.1998. (See related website links above).

Current Fire Shelter Training Aids (Original or New Shelter)
The present standard for fire shelter training materials for either shelter system includes the Entrapment Avoidance-Its Your Call! training program (2002),) and the Lessons From the Thirtymile Fire html/PowerPoint training program. There are two videos currently approved for fire shelter training; instructors will have to choose which video to use based on the type of fire shelter that trainees will be using.

Original Fire Shelter Training Aids

Instructors providing training for persons using the original fire shelter will need to utilize the Using Your Fire Shelter video (NFES# 1568, 2001 edition to demonstrate the most current original fire shelter information available today. A previous fire shelter training video, Your Fire Shelter (NFES# 1568, 1986 edition) shows techniques that are no longer recommended. Since both videos have the same NFES number and similar titles, it is suggested that the 1986 version be eliminated from training libraries to prevent confusion.

The Your Fire Shelter booklet (NFES #1570) 2001 edition, and the Avoid the Flames pamphlet (MTDC) 1999 edition can also be used as training materials for original shelter users.

Training Revisions for New Shelter
The new fire shelter and training fire shelter have significant differences from the original system (Figures 1, 2). Wildland firefighters will need to attend a training session to learn how to use the new shelter and training shelter before they are allowed to carry the new shelter on the fireline.


Figure 2 - Cutaway view of new fire shelter

The new training shelter, The New Generation Fire Shelter training video (NFES #2711, 2003 edition), and the New Generation Fire Shelter pamphlet (NFES #2710) became available in May 2003. A Spanish language version of the New Generation Fire Shelter training video and the Your Fire Shelter booklet will be available by mid 2004.

National Interagency Fire Center
3833 S. Development Avenue
Boise, Idaho 83705
208-387-5512

NOTE: **Contents of this site will be reviewed and updated annually.**

INTERNET WEB SITE LINKS

www.fire.blm.gov/training/blmtrng/blmtrng.html
Web site for 2001, 2002, 2003, 2004, and 2005 Fireline Safety Refresher (Student Workbook and Facilitator Guide)

www.fire.blm.gov/
- Six Minutes for Safety
- Operational Documents and Reports
  View a variety of interagency guides, handbooks, and publications.
  - Fire Preparedness Review Guide
  - Interagency Standards for Fire and Fire Aviation Operations, 2005
  - Position Task Books for ICS positions

  View investigation reports and reviews from high-profile fires.
  - Sawtooth Fire
  - Cramer Fire
  - Thirtymile Fire

www.forestry.nv.gov/main/waterfall_fire04.htm
- Waterfall Fire Accident Investigation Report

www.refresher.nifc.gov
(Also accessed through the Safety link on the NIFC home page)
- Wildland Fire Safety Training Annual Refresher (WFSTAR)
  Hot Topics for 2005:
  - AARs
  - Fire Danger Pocket Cards
  - Driving Safety
  - New Fire Shelter
- SAFENET
- Historical Wildland Firefighter Fatality Reports

www.nwcg.gov/pms/pubs/pubs.htm
Select National Fire Equipment System Catalog – Part 2 Publications 2005 Edition
- Using Your Fire Shelter Video (2001), NFES 1568
- Your Fire Shelter Booklet, 2001 Edition, PMS 409-2, NFES 1570
- Incident Response Pocket Guide, PMS 461, NFES 1077
- Fireline Handbook, PMS 410-1, NFES 0065
- Interagency Standards for Fire and Fire Aviation Operations, 2004
- New Generation Fire Shelter Video (2003), NFES 2711
- New Generation Fire Shelter Booklet (2003), NFES 2710, PMS 411
- New Generation Fire Shelter DVD (2003), NFES 2712

www.wildfirelessons.net
NARTC Lessons Learned Web site

www.fireleadership.gov
Interagency Fireline Leadership Web site
- Information concerning staff rides

http://people.uvawise.edu/pww8y/
Dr. Patrick Withen's Web site

ANNUAL FIRELINE SAFETY REFRESHER COMMENTS

How many seasons have you worked as a firefighter? _____

What agency do you represent? _____

What is your primary function in fire suppression?

- ☐ Line Firefighter
- ☐ Fireline Supervisor
- ☐ Other IMT Section
- ☐ In Support of Fires
- ☐ Management

What will you do differently after viewing this refresher?

_____

_____

_____

_____

_____

_____

How can the refresher be improved?

_____

_____

_____

_____

_____

_____

Facilitator, please return this form to the address below. Comments by e-mail are welcome.

BY MAIL: NIFC Fire Training
BLM Training Unit
Attn. Eva Brown
3833 S. Development Ave.
Boise, ID 83705

BY FAX: (208) 387-5378

E-MAIL: Eva_Brown@nifc.blm.gov