

# Firefighter Type 1 S-131



NFES 002791

**Student Workbook**  
**SEPTEMBER 2016**





## CERTIFICATION STATEMENT

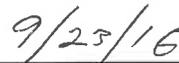
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Firefighter Type 1, S-131

  
Operations and Training Committee Chair

  
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# Firefighter Type 1

## S-131

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## **PREFACE**

Firefighter Type 1, S-131, is a required training course in the National Interagency Incident Management System: Wildland Fire Qualification System Guide (PMS 310-1).

This course was developed by an interagency group of subject matter experts with direction and guidance from the National Wildfire Coordinating Group (NWCG) Training Branch. The primary participants in this development effort were:

### **USDI BUREAU OF LAND MANAGEMENT**

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### **USDA FOREST SERVICE**

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### **NWCG TRAINING BRANCH**

The NWCG appreciates the efforts of these personnel and all those who have contributed to the development of this training product.



# CONTENTS

PREFACE .....i

## INSTRUCTIONAL UNITS

Unit 0 – Introduction .....0.1  
Unit 1 – Position Responsibilities and Operational Leadership .....1.1  
Unit 2 – Communication .....2.1  
Unit 3 – Lookouts, Communications, Escape Routes, and Safety Zones.....3.1  
Unit 4 – Look Up, Down and Around.....4.1  
Unit 5 – Decision Making .....5.1



# Firefighter Type 1, S-131

## Unit 0 – Introduction

### OBJECTIVES:

Throughout this unit, the lead instructor will:

1. Introduce the course coordinator, instructors, and students.
2. Discuss course logistics.
3. Provide a course overview.
4. Discuss course expectations.
5. Identify course reference materials.
6. Discuss position responsibilities.



## I. WELCOME AND INTRODUCTIONS

- Name and job title
- Agency and home unit
- Incident Command System (ICS) qualifications
- Experience relative to the position as either a trainee or a trainer/coach, both positive and negative.

## II. COURSE LOGISTICS

- Course agenda
- Sign-in sheet
- Breaks
- Facility locations (restrooms, vending machines, drinking fountains, smoking areas, evacuation policy, etc.)
- Message location
- Cell phone policy
- Local information (restaurants, local map, transportation)

### III. COURSE OVERVIEW

This course is designed to meet the training needs of a Firefighter Type 1 (FFT1) and an Incident Commander Type 5 (ICT5) as outlined in the Wildland Fire Qualification System Guide (PMS 310-1) and the position task book developed for the positions.

#### A. Course Objectives

At the successful completion of this course, students will be able to:

1. Identify position responsibilities, and demonstrate the ability to apply principles of Operational Leadership found in the Incident Response Pocket Guide (IRPG; PMS 461).
2. Describe how to incorporate and maintain open lines of communication with appropriate personnel, and identify documentation responsibilities.
3. Identify Look Up, Down and Around indicators, and demonstrate the ability to apply the components of Lookouts, Communications, Escape Routes, and Safety Zones (LCES) as described in the IRPG.
4. Demonstrate the ability to apply tactical decision-making procedures.

B. Instructional Methods

1. Facilitation and short lectures with PowerPoint presentations
2. Discussion
3. Exercises

C. Evaluating Student Performance

To successfully complete the course, students must:

- Participate in all classroom discussions, exercises, and scenarios.
- Complete all quizzes.
- Obtain a score of 70% or higher on the final exam to receive a certificate of completion for the course.

D. Student Training Course Evaluation Form

Students are given the opportunity to comment on the course, the units, and the quality of instruction at the end of the course.

E. Transition From FFT2 to FFT1

The FFT1 is the first level of fireline leadership, which requires:

- Sharpening communication skills
- Making sound tactical decisions
- Coordinating with other resources
- Being a leader

F. Course Reference Materials

Below is a list of materials that are referenced throughout this course:

- Wildland Fire Incident Management Field Guide (PMS 210) with NWCG Fireline Handbook, Appendix B: Fire Behavior (PMS 410-2)
- Incident Response Pocket Guide (PMS 461)
- Wildland Fire Qualification System Guide (PMS 310-1)
- Interagency Standards for Fire and Fire Aviation Operations (Red Book)

#### IV. COURSE EXPECTATIONS

##### A. Student Expectations Exercise

##### B. Instructor Expectations

Students will:

- Have an interest in becoming a Firefighter Type 1 (FFT1) and/or an Incident Commander Type 5 (ICT5).
- Have completed their pre-course work.
- Exhibit mutual cooperation with the group.
- Participate actively in all of the training exercises presented in the course.
- Return to class at stated times.
- Have all their questions answered.

## V. POSITION DESCRIPTIONS

### A. Wildland Fire Incident Management Field Guide Position Descriptions

The Wildland Fire Incident Management Field Guide (PMS 210) contains information about positions in the ICS and position descriptions for the FFT1 and ICT5. The FFT1 and ICT5 will be covered in detail throughout this course.

- The FFT1 and ICT5 are supervised by a Single Resource Boss.

### B. Position Task Book Description

The Position Task Book (PTB) identifies the common tasks for all unit leaders and additional specific tasks for the FFT1 and ICT5.

The PTB is the primary tool for observing and evaluating performance.

In the current performance-based system, trainees must complete the tasking in the PTB to become qualified as an FFT1 and/or ICT5.

The PTB can only be initiated by the home unit, not at this course.

## Firefighter Type 1, S-131

### 1 – Position Responsibilities and Operational Leadership

#### OBJECTIVES:

Upon completion of this unit, students will be able to:

1. Identify position responsibilities of Firefighter Type 1 (FFT1) and Incident Commander Type 5 (ICT5).
2. Demonstrate the ability to apply operational leadership principles.
3. Demonstrate the ability to locate and apply standard wildland fire operating procedures found in the Incident Response Pocket Guide (IRPG) and other identified fireline references.



## I. POSITION RESPONSIBILITIES

### A. Preparation and Capabilities

1. Obtain complete information from dispatch when receiving the assignment.
  - Incident name and order number
  - Incident phone number
  - Reporting time
  - Reporting location (drop point)
  - Transportation arrangements and travel routes
  - Contact procedures during travel (telephone and radio)
2. Bring adequate personal gear within established weight requirements.
3. Bring FFT1/ICT5 Kit. Kit should contain enough critical information and materials to allow you to operate for the first 48 hours without need for support.
  - IRPG and other guides
  - Incident Organizer
  - ICS Forms
  - Programmable radio
  - Cell phone
  - Writing materials
  - Compass and GPS
  - Belt weather kit
  - Flagging
  - Batteries
  - Camera

4. Follow safety procedures for transporting personnel and equipment by:
  - Foot
  - Vehicle (e.g., engines or crew buggies)
  - Boat
  - Helicopter
  - Fixed-wing aircraft
5. Arrive at the incident and check in.
6. Inspect crew members and their personal protective equipment (PPE), and ensure personnel and equipment meet agency requirements, serviceability, conditions of hire, and supervisor's instructions.
  - Check crew members' qualifications, and ensure the crew members meet agency qualification requirements for tasks and assignments.
  - Notify supervisor of any corrective action needed.
7. Obtain initial briefing from the supervisor.
  - Task or assignment (instructions may be written and/or oral).
  - Current incident situation.

8. Correctly prepare the radio for operation on the incident, and properly use the portable or mobile multichannel radio.
  - Obtain a communications plan.
  - Program the radio for incident use, and successfully complete the radio check.
  - Exercise proper radio discipline and etiquette.
  - Use clear text.
  - Protect the radio from damage.
  - Describe agency procedures for emergency notification (emergency traffic).
9. Accurately navigate to an assigned destination.
  - Properly use maps, compass, Global Positioning System (GPS), or other tools.
10. Apply the principles of the Incident Command System (ICS).
  - Follow chain of command.
  - Use appropriate ICS terminology.

B. Common Responsibilities of an FFT1 and/or ICT5

1. Provide leadership for members of your crew.
  - Obtain and understand priorities, and determine work objectives.
  - Delegate tasks to employees, and hold them accountable for their actions.
  - Ensure the supervisor's work objectives and performance standards are met.
  - Evaluate your crew members' performances.
  - Provide praise or discipline to crew members, as warranted.
2. Provide for the safety and welfare of assigned personnel.
  - Recognize, mitigate, and communicate potentially hazardous situations during tactical operations.
  - Maintain accountability of assigned personnel, and monitor their status.
  - Provide for care of crew members, and notify the supervisor in the event of sickness, injury, or accident.
3. Serve as a lookout.

## II. OPERATIONAL LEADERSHIP PRINCIPLES

### A. Wildland Fire Leadership Values and Principles

1. Exhibit principles of duty.
  - Be proficient in your job, both technically and as a leader.
  - Make sound and timely decisions.
  - Ensure tasks are understood, supervised, and accomplished.
  - Develop your subordinates for the future.
2. Exhibit principles of respect.
  - Know your subordinates and look out for their well-being.
  - Keep your subordinates informed.
  - Build the team.
  - Employ your subordinates in accordance with their capabilities.
3. Exhibit principles of integrity.
  - Know yourself and seek improvement.
  - Seek responsibility and accept responsibility for your actions.
  - Set the example.

## B. Basic Traits of an Effective Leader

1. Exhibits a command presence.
2. Establishes and maintains open and effective communications with assigned resources.
3. Develops and fosters crew cohesiveness.
  - Sets expectations and maintains accountability.
  - Seeks commitment and input.
  - Focuses on the team result.
4. Develops the ability to make good decisions.

## C. Leader's Intent

All leaders of firefighters have the responsibility to provide complete briefings and ensure that their subordinates have a clear understanding of their intent for the assignment:

- Task = What is to be done
- Purpose = Why it is to be done
- End state = How it should look when done

### III. FIRELINE REFERENCE MATERIALS

#### A. Incident Response Pocket Guide

##### 1. Purpose

Serves as a field reference guide that is comprised of checklists and other information that are considered to be standard operating procedures (SOPs) for wildland fire incidents.

##### 2. Features

a. Priority information is located on the cover pages of the IRPG.

b. The size of the IRPG is intended to fit into a pocket.

##### 3. Sections

Sections are color-coded for easy reference.

#### B. Other Reference Material

- Wildland Fire Incident Management Field Guide (PMS 210)
- Leading in the Wildland Fire Service (PMS 494-2)

## IV. EXERCISES

Through the following hands-on exercises, you will gain familiarity with fireline reference tools, which will help you perform fireline duties safely and efficiently.

### A. Exercise 1

Your crew reaches a point where you must begin building fireline downhill on the steepest terrain in the area. Briefly identify the specific reference tool items you would use to address this situation.

### B. Exercise 2

After you have analyzed your downhill line assignment, you believe it is unsafe to proceed. What are some considerations to properly refuse this risk?

### C. Exercise 3

During your supervisory briefing, you are told that potential risks exist on your new assignment. What tool will you use and what actions will you take in order to properly manage the risks that have been identified?

## Firefighter Type 1, S-131

### Unit 2 – Communication

#### OBJECTIVES:

Upon completion of this unit, students will be able to:

1. Identify the communication and documentation responsibilities of a Firefighter Type 1 (FFT1) and Incident Commander Type 5 (ICT5).
2. Demonstrate the ability to give and receive a briefing following the Briefing Checklist found in the Incident Response Pocket Guide (IRPG).



## I. WHY IS GOOD COMMUNICATION IMPORTANT?

Results of many fatalities and near-miss reviews on emergency incidents indicate poor or lack of communication was a major contributing factor.

As a firefighter, it is your responsibility to understand the importance of establishing and maintaining effective fireline communications. Communication is vital to implementing the Risk Management Process.

The quality of communication will directly affect the success of completing an assignment in a safe and effective manner.

## II. WHAT IS EFFECTIVE COMMUNICATION?

Effective communication is the transfer of information in terms that are understood by all parties.

Effective communication occurs when both parties are engaged as senders and receivers. Indicators could include body language, paraphrasing, asking questions, using checklists, etc.

## III. COMMUNICATION

### A. Five Communication Responsibilities

1. Brief others (Briefing Checklist).
2. Debrief your actions (After Action Review).
3. Communicate hazards to others (Look Up, Down and Around; Tactical Watch Outs).
4. Acknowledge messages and understand intent (Risk Management Process).
5. Ask if you don't know.

## B. Types of Communication

### 1. Oral communication

The most common forms of oral communication used during an incident are face-to-face, radios, and cell phones.

#### a. Face-to-face communication

- Perhaps the most effective and preferred method of communication.
- Logistical considerations often make this impractical.

#### b. Radio communication

One of the most efficient and practical methods used to communicate on emergency incidents.

#### c. Cell phone, satellite phone, or landline communication

Phones should be used cautiously when making tactical decisions because of the potential that numerous people might not be in the communication loop.

### 2. Visual communication

When oral methods of communication are not possible, visual methods can be used.

#### a. Hand signals may be an appropriate means of communication when:

- Distance between individuals is an issue.
- High noise levels exist within the fire environment.

b. Flagging

- A simple way of transferring information.
- Enhances recall of information that had been previously discussed.

c. Mirrors

- Can be used to locate individuals or signal aircraft.

d. Body language

- Can be used to determine if an individual exhibits fatigue, understands the task, understands intent, etc.

3. Written communication

- Unit Log (ICS-214) and General Message (ICS-213) forms
- Incident organizer
- Other

## IV. DOCUMENTATION

### A. Importance of Documentation and Records

- The importance of documenting cannot be underestimated. Records help recall events and important information regarding the incident when the memory fails.
- Documentation provides relief forces with incident activities to date.

### B. Types of Documentation

#### 1. Written

- Unit Log (ICS-214)
- General Message (ICS-213)
- Incident Briefing (ICS-201)
- Pocket notebook (DI-5A pad, Ideas pad, etc.)
- Agency-specific forms

#### 2. Electronic

- Electronic devices (e.g., camera, GPS, voice recorder, and computer)

C. What should be documented?

Any event that you think is significant enough to remember should be written down. Think of documentation as another tool to aid your memory.

- Change in fire behavior
- Weather observations
- Inappropriate behavior (human resource issues)
- Change in assignment or location
- Injuries and accidents
- Adjacent resources and call numbers
- Time of day when any of the above occurs
- Spot fires
- Deficiencies in individual and crew performance
- Additional training needed
- Resources onscene upon arrival
- Cutting fences for access into a fire
- Property modifications during structure protection or damage or loss
- Investigation of a point of origin or fire cause
- Involvement with search and rescue, vehicle accidents, or law enforcement
- Assignments, instructions, directions, etc.
- Personnel time

## V. BRIEFING EXERCISE

### **SCENARIO:**

You are one of two squad bosses on a 20-person crew, and you work directly for the crew boss. It is July 30, and at 1330, your crew has arrived at the Goat Creek fire. The local fire officer, Bud Garland, is the Type 3 Incident Commander. Aside from Bud, your crew is the only resource currently on the fire. The following observations are made by the crew boss after sizing up the fire:

Fire Size: 4 acres

Fuel Type: Pinyon/juniper with sage and grass understory.

Temperature: 94 °F

Relative Humidity: 22%

Wind Speed/Direction: Southwest, but direction variable and frequently shifting; average speed 7 mph gusting up to 15 mph with frequent changes in speed.

Fire Behavior: Active fire front with a defined head that shifts direction with the wind.

Flame Lengths: 4 feet in grass/sage with intermittent torching to 10 feet plus in pinyon/juniper.

Rate of Spread: Approximately 20–25 chains per hour.

Topography: Rolling, gentle slopes of 10–20 percent.

The IC and the crew boss agree to split the crew anchoring off at the road side using direct attack. Additional resources have been ordered including four Type 3 engines and one air tanker. The crew boss designates you as having the right flank and the other squad boss taking the left flank with his crew. Because of the intense situation, your crew boss must leave the anchor point location. As he is leaving, he reemphasizes: “One foot in the black, monitor the air-to-ground frequency on 170.000, and to stay on tactical channel (3) 168.200.”

**Exercise Ends.**

## Firefighter Type 1, S-131

### Unit 3 – Lookouts, Communications, Escape Routes, and Safety Zones

#### OBJECTIVES:

Upon completion of this unit, students will be able to:

- Demonstrate the ability to apply the principles of Lookouts, Communications, Escape Routes, and Safety Zones (LCES).



## I. INTRODUCTION

### A. A Brief History of LCES

### B. Overview of LCES

## II. LOOKOUTS

### A. Qualities of a Good Lookout

- Individuals chosen for this assignment are typically experienced, competent, and trusted. They need to be alert, thinking clearly, and knowledgeable. They must be good communicators and have good command of the radio system (frequency management).
- Understands the objectives and leader's intent as they relate to the strategies and tactics.
- Achieves a view of the fire scene. Lookout knows where Escape Routes and Safety Zones are in relation to the crew's location.
- Keeps in mind the limits of their view, and informs firefighters when they are moving out of that area.
- Accounts for everyone's location, including small groups and individuals. The use of signal mirrors (headlamps at night) is encouraged.
- Maintains communications with everyone in his or her area. This needs to be an active process.
- Monitors the fire, fire behavior, and weather and tracks weather trends. Is able to recognize trigger points and report changing conditions when the situation becomes untenable (not able to be occupied).

- Stays in position until replaced with another lookout, or the hazard is otherwise mitigated, or you (the lookout) are ordered out by the supervisor. It is important that everyone counting on a lookout knows if there is any break in the lookout's service.
- Anticipates and thinks ahead, and provides an overview on progress and the completeness of monitored communications.
- Provides communications link to the outside world.
- May be asked to handle logistics for the crew for remote operations. Makes logistical preparations for self for extended shifts that have the possibility for no support.
- Establishes their own LCES plan, and knows how they fit into the chain of command, i.e., where their communications link is.
- The lookout is not always an individual perched on an adjacent ridge, nor will the person looking out be able to see the entire scene. A crew boss or IC may serve as a lookout by being heads up (as opposed to digging), and by staying mobile.

#### B. Lookout Tools

- Notebook
- Binoculars
- Weather kit
- Compass and GPS
- Flashlight or head lamp
- Flagging (various colors)
- Extra batteries
- Map(s)
- Signal mirror or other signaling devices
- Radio(s)
- Cellular or satellite phone
- Personal Protective Equipment (PPE)
- Incident Action Plan (IAP)
- Wristwatch

### III. COMMUNICATIONS

#### A. Guidelines for Effective Communications

- Eliminate assumptions.
- Ask questions.
- Find out everything you need to know.
- Relay updated information as soon as possible, ask questions, and stay aware of your situation.
- Stay in close proximity to communications with your crew.
- Know all radio frequencies on fire and with other crews.
- Speak clearly and concisely—think before talking.
- Practice effective listening skills.
- Pay close attention to verbal and NON-verbal communications.

## IV. ESCAPE ROUTES

### A. Preparation

- Make sure everyone knows his or her escape routes.
- The ideal escape route is the shortest path to the safety zone that is clear of obstructions.
- Consider the time required to travel the escape route based on the slowest person, fatigue, and environmental factors. Avoid uphill escape routes.
- Establish alternative escape routes.
- Scout the area. Consider fuels, weather, topography, fire behavior and spotting potential when evaluating an escape route.
- Make routes known to adjoining forces and lookouts, marked for day or night.
- Park vehicles to allow for ease of escape.
- Communicate, reevaluate, and reiterate.
- You may need to change escape routes as weather, fire location, or crew location changes.

### B. Implementation

- When retreating, account for your assigned personnel.
- Notify chain of command of your actions, location, and destination.
- Depending upon the severity of the situation, radio frequencies may need to be cleared.

## V. SAFETY ZONES

### A. Factors to Consider When Selecting a Safety Zone

### B. Safety Zone Guidelines

- Safety zones are not intended to be deployment zones. The use of a fire shelter should not be necessary in a safety zone.
- Safety zones will be identified and discussed before work begins. New safety zones must be scouted and announced as people move into new areas.
- “Keep one foot in the black” or “Bring the black with you” is the first and most common safety practice.
- When a blackened area is used as a safety zone, the crown must also be absent. If you are going to use the black as your safety zone, it must be cool enough to stand in, big enough to eliminate radiant and convective heat, and have no reburn potential. Be aware of falling trees that have burned, rolling rocks, and reburnable brush.
- Safety zones can be created by burning out light fuels, or irrigation; however, the time these actions require must be factored into the LCES formula.
- Firelines located to include open meadows will eliminate the need for some last-minute firing.
- Take advantage of the aerial overview whenever possible. Make sketches or mark maps in the aircraft. Consider the use of digital photography.

- Help less-experienced people scrutinize safety zones. Give examples of good and poor safety zones.
- Each individual must be constantly engaged in the LCES process, evaluating and reevaluating as locations and situations change.

# "LCES"

Original Document

By

Paul Gleason

Former Zig Zag Hotshot Superintendent

June, 1991

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 strategic 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, firefighters 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 Lookout(s), Communications(s), Escape routes and Safety zone(s).

## Firefighter Type 1, S-131

### 4 – Look Up, Down and Around

#### OBJECTIVE:

Upon completion of this unit, students will be able to:

- Identify Look Up, Down and Around indicators.



## I. FUEL CHARACTERISTICS

This section addresses five indicators of fuel characteristics.

- Fuel characteristic indicators determine the potential for fire intensity and rate of spread.
- Over time, fuel characteristics change very slowly; however, they can change quickly over a distance as the fire moves into new fuels.

### A. Indicators

Look for these five indicators in burning fuels and in fuels adjacent to the fire.

#### 1. Continuous fine fuels

##### a. Critical indicator

It is associated with one of the major “Common Denominators of Fire Behavior on Tragedy Fires” listed in the IRPG.

##### b. Definition

Fast-drying, dead or live fuels that are  $< \frac{1}{4}$  inch in diameter and have a timelag of 1 hour or less.

##### c. Impact on fire behavior

- Fuels ignite readily and are consumed rapidly by fire.
- Increase the potential for rapid rate of spread.
- Primary carrier of fire.

2. Heavy loading of dead and down
  - a. Definition

Large load of dead material, 3-inch or larger wood, that is on the forest floor.
  - b. Impact on fire behavior
    - Increases potential for intense burning conditions.
    - Is consumed more slowly and for a longer duration than continuous fine fuels.
  - c. Look for this indicator in:
    - Older, mature stands of trees
    - Bug-killed trees
    - Hurricane blowdown
    - Thinned or logged areas
3. Ladder fuels
  - a. Impact on fire behavior
    - Provides potential for surface fires to move into the crowns.
    - High-intensity surface fires can move into the crowns with limited ladder fuels.

- b. Examples of ladder fuels
  - Conifer reproduction and brush.
  - Tree branches that hang close to the ground.
  - Lichens and moss that grow in conifer trees.
- 4. Tight crown spacing (< 20 feet)
  - a. Impact on fire behavior
    - Once a fire gets into tightly spaced crowns, the fire will move from crown to crown.
    - If there are high winds or steep slopes, a crown fire can move through more widely spaced vegetation.
  - b. Important in both timber and brush fuel types.

5. Special conditions

Pay attention to:

- a. Firebrand sources are any sources of heat capable of igniting wildland fuels.

Always assess firebrand sources because:

- Fuel type characteristics and availability may change due to local or unique conditions.
- Identifying firebrand sources helps anticipate severity of spotting problems.
- b. Snags are drier and usually ready for ignition.
- c. Preheated canopy is drier and becomes more flammable.
- d. Frost and bug-kill can cause a lot of fuel to be available.

e. Unusually fine fuels such as:

- Draped pine needles in manzanita brush stands in northern California.
- Tree lichens in the Northwest and Rockies.

## B. Review and Discussion

- Look for fuel characteristic indicators. Think about how they may interact with other indicators. Add your observations to your mental model of the fire, and predict potential fire behavior hazards.
- Fuel characteristics – five indicators.

## II. FUEL MOISTURE

This section addresses fuel moisture and its four indicators.

- When fuel moisture content is low, fires will start easily and spread rapidly.
- Fuel moisture changes diurnally, seasonally, and in an accumulative manner over several seasons or years.

### A. Timelag

The rate at which a specific size of dead fuel gains or loses moisture; the smaller the fuel size, the shorter the timelag.

- 1-hour fuels: < ¼ inch in diameter
- 10-hour fuels: ¼–1 inch in diameter
- 100-hour fuels: 1–3 inches in diameter
- 1000-hour fuels: 3–8 inches in diameter

## B. Indicators

The four indicators of fuel moisture are:

### 1. Low relative humidity (< 25%)

- a. Critical indicator
- b. Impact on fire behavior

Small changes in relative humidity (RH) can significantly impact fine fuels because they lose moisture quickly and become flammable.

### c. How to monitor RH

- Use a Belt Weather Kit
- Obtain weather information from websites such as:  
  
Remote Automated Weather Stations (RAWS)  
  
National Oceanic and Atmospheric Administration  
(National Weather Service; NOAA)  
[www.nws.noaa.gov](http://www.nws.noaa.gov)
- Refer to the Pocket Card for local thresholds for RH.
- Use the “Severe Fire Behavior Potential Related to Relative Humidity and Fuel Moisture Content” table in the IRPG.

2. Low 10-hour fuel moisture content (< 6%)

a. Impact on fire behavior

- Anticipate fire behavior problems when sticks and small stems (10-hour fuels) have < 6% fuel moisture content.

However, in Alaska and the Eastern United States, 10% fuel moisture content is considered low for 10-hour fuels.

- 10-hour fuels play an important role in carrying the fire, so pay attention to their fuel moisture content.

b. Assess

- Talk with local dispatch.
- Visit websites that contain fuel moisture information.  
<http://www.wfas.net/>
- When on the fireline, estimate 10-hour fuel moisture levels by grabbing small twigs and branches to see if they are easy to break or if they just bend.

### 3. Drought conditions

#### a. Impact on fire behavior

Drought will cause large dead and down fuels and live fuels to become available to burn.

#### b. Drought indices

Typically, these drought indices provide information on a broader scale, and the local conditions may vary. You can find these indices on the Internet:

- Palmer Drought Severity Index
- Keetch-Byrum Drought Index
- U.S. Drought Monitor

#### c. Assess local drought conditions

- Pocket Card (may have threshold for 1000-hour fuel moisture).
- Ask local fire personnel.
- Look at the vegetation and trees—how dry are the larger dead fuels?
- Observe areas where there have been recent fires. Did the large, dead logs partially burn or burn down to ash pits?

#### 4. Seasonal drying

##### a. Impact on fire behavior

- Varies in all geographical areas and occurs at different times of the year.
- Affects the fuel moisture in all fuels.
- As seasonal drying progresses, fuels that could not previously support a fire will become available to burn.

##### b. Assess

- Look at fuel conditions to help determine how far seasonal drying has progressed.
- Fine fuels usually dry first, followed by dead and down sticks and logs, then live fuels start drying.

#### C. Review and Discussion

- Estimate fuel moisture content levels. Add this assessment to your mental model of the fire, and predict potential fire behavior hazards.
- Fuel moisture – four indicators.

### III. FUEL TEMPERATURE

This section addresses the three indicators for fuel temperature.

- Fuel temperature affects the amount of heat energy and time it takes for fuels to ignite.
- Very important in fuel types dominated by fine fuels.

#### A. Indicators

The three indicators of fuel temperature are:

1. High temperatures (normally > 85 °F)
  - a. Critical indicator
  - b. Impact on fire behavior
    - Increase flammability of fine fuels and potential for rate of spread.
    - However, temperatures lower than 85 °F combined with low relative humidity can increase fire behavior.
  - c. How to monitor

Take weather readings on a regular basis.
2. High percent of fuels with direct sun
  - a. Impact on fire behavior
    - These fuels have accelerated drying rates.
    - This can increase fuel flammability and fire spread.

b. Assess

Look for fuels, especially fine fuels, that are in direct sunlight, and anticipate what may happen if the fire moves into those fuels.

3. Aspects where fuel temperature is increasing

a. Impact on fire behavior

- Fuels on slopes with direct sunlight will have higher fuel temperatures.
- This increases the risk for hazardous fire behavior.

b. Assess

Pay attention to aspect and anticipate fuel temperature based on sunlight exposure.

B. Review and Discussion

- When scouting the fire, look for these indicators. Think about how they may change as the day progresses. Continue building your mental model of the fire.
- Fuel temperature – three indicators.

## IV. TERRAIN

This section addresses terrain and its five indicators.

- Terrain has been a major factor in numerous fatality fires.
- It is one of the “Common Denominators of Fire Behavior on Tragedy Fires” listed in the IRPG.

### A. Indicators

Look for these five indicators as you scout the terrain:

1. Steep slopes (> 50%)
  - a. Steep slopes are an important indicator of potential hazardous conditions.
  - b. Impact on fire behavior
    - Expect rapid rates of spread due to flame contact and heat transfer.
    - Expect downhill spotting due to rollouts of burning materials and igniting fuels below.
2. Chutes/chimneys
  - a. Critical indicators
  - b. Impact on fire behavior

Look for rapid upslope rates of spread due to steep terrain and updrafts of air (chimney effect).
3. Box canyons

Expect air to be drawn in from the canyon bottom creating very strong upslope drafts. The result can be extreme fire behavior and can be very dangerous.

4. Saddles

Expect rapid rates of spread because of wind channeling and less topographic resistance.

5. Narrow canyons

Expect rapid rates of spread and/or erratic fire behavior:

- Radiant and convection spotting can produce multiple spot fires over short distances.
- Rapid upslope run when fire backing downhill reaches the opposite slope (slope reversal).
- Wind eddies may cause erratic fire behavior.

B. Review and Discussion

- As you scout the fire, look for these terrain indicators. The alignment of topography and wind should always be considered a trigger point to reevaluate strategy and tactics. Continue to build your mental model of the fire.
- Terrain – five indicators

## V. WIND

This section addresses wind and its seven indicators.

- Wind is a critical factor influencing fire behavior and is the most difficult of the Look Up, Down and Around indicators to predict.
- It is one of the “Common Denominators of Fire Behavior on Tragedy Fires” listed in the IRPG.

### A. Indicators

#### 1. Surface winds > 10 mi/h

##### a. Critical indicator

##### b. Foehn winds

- Result of high-pressure systems and mountainous terrain.
- Accompanied by lower relative humidity and higher temperatures.
- Can last for a few hours or several days.
- Winds can be 40–60 mi/h with higher gusts.
- Local wind regaining influence over decreasing Foehn wind is extremely dangerous.
- More commonly found in Western United States; known by local names such as Santa Ana and Chinook.

- c. Impact on fire behavior
  - Increase rate and direction of spread.
  - Transport firebrands over large areas.
  - Cause wind-driven fire runs and convective heat transfer between fuels.
  
- d. Constantly assess
  - Pay attention to weather forecasts.
  - Throw dust in the air or tie a piece of flagging to your vehicle to tell wind direction.
  - Take wind readings with a handheld anemometer or other measuring devices.
  - Reference the “Beaufort Scale for Estimating Wind Speed” in the IRPG.
  - Monitor RAWS.

2. Lenticular clouds

- a. These clouds form over the crest of mountains and indicate moderate to strong winds aloft.
- b. The winds may surface in the afternoon and could cause fire behavior hazards.

3. High, fast-moving clouds

If these clouds are moving in a direction different from surface winds, anticipate wind shifts.

4. Approaching cold front

Expect dangerous conditions due to stronger winds and changing wind direction.

5. Cumulonimbus development

- a. This is an indicator of an approaching thunderstorm.
- b. Expect strong, erratic downdraft winds and lightning, which can cause sudden and extreme fire behavior.
- c. If you see virga, downdrafts have begun; anticipate strong and gusty winds.

6. Sudden calm

Expect wind shifts or other changes in weather, which can increase the potential for hazardous fire conditions.

7. Battling or shifting winds

- a. Critical indicator
- b. Expect these winds if you observe:
  - A cold front passage
  - Wind blowing through saddles
  - Wind at the confluence of a drainage
  - Local wind effects
- c. Weather forecasts can often predict battling or shifting winds.

## B. Review and Discussion

- Pay close attention to weather forecasts. When you are on the fireline, observe what the winds are doing at all times!
- Wind – seven indicators.

## VI. ATMOSPHERIC INSTABILITY

This section addresses atmospheric instability and its eight indicators.

### A. Atmospheric Instability

#### 1. Definition of atmospheric instability

##### a. Stable atmosphere

Vertical movement of air is limited, and this decreases fire activity.

##### b. Unstable atmosphere

Vertical movement of air is occurring and this tends to increase potential for the fire to develop vertically and grow rapidly.

### B. Indicators

The eight indicators of atmospheric instability are:

#### 1. Good visibility

Indicates unstable atmosphere.

2. Gusty winds and dust devils or fire whirls
  - a. Indicates unstable atmosphere.
  - b. Can make fires more dangerous by increasing spotting and starting new fires.
3. Cumulus clouds
  - a. Indicates unstable atmosphere.
  - b. The more they develop vertically, the more unstable the atmosphere.
4. Castellatus clouds in the morning
  - a. Indicates unstable atmosphere.
  - b. Could be a warning of thunderstorms in the afternoon.
5. Smoke rising straight up  
Indicates vertical movement and an unstable atmosphere.
6. Inversion beginning to lift
  - a. Indicates atmosphere is becoming unstable.
  - b. The behavior of the fire burning beneath an inversion can change abruptly when the inversion is lifted.
7. Thermal belt  
Stable air, but fire conditions in thermal belt can remain active during the night.

8. Haines index

- a. Measures the stability and dryness of the lower atmosphere. It can be used to predict the potential for existing fires to become large fires.
- b. The higher the number (ranges between two and six), the drier and more unstable the atmosphere.
- c. Listen to weather briefings and look in the Incident Action Plan (IAP) for the Haines Index.

C. Review and Discussion

- When you are on the fire, look for atmospheric instability indicators, and estimate potential fire behavior hazards. Continue to build your mental model of the fire.
- Atmospheric instability – eight indicators.

## VII. FIRE BEHAVIOR

This section addresses the eight indicators of fire behavior.

- Fire is a heat source; therefore, it influences and modifies the fire environment.
- Constantly monitor fire behavior by observing column characteristics, flame length, and rate of fire spread.

### A. Indicators

When on the fireline, look for these eight indicators of fire behavior:

1. Leaning column
  - a. One of the first fire behavior indicators you will see when approaching a fire.
  - b. Impacts on fire behavior
    - Rapid rates of spread
    - Short-range spotting
2. Sheared column
  - a. Impacts on fire behavior
    - Long-range spotting
    - Increase fire behavior
  - b. Avoid working under a sheared column.

3. Well-developed column
  - a. Critical indicator
  - b. Impacts to fire behavior
    - Intense burning conditions
    - Strong downbursts
    - Plume-dominated fire
4. Changing column

A changing smoke column can indicate that fire intensity is building.
5. Trees torching
  - a. Critical indicator
  - b. Expect extreme fire behavior conditions if intermittent single tree torching progresses to groups of trees torching.
6. Smoldering fires picking up

Monitor flame length and spread rate.
7. Small fire whirls beginning
  - a. Fire is developing vertically and building intensity.
  - b. Potential to transport firebrands.
8. Frequent spot fires
  - a. Critical indicator
  - b. Anticipate fire behavior hazards

## B. Review and Discussion

- Look for fire behavior indicators. What other indicators are influencing fire behavior? Add these observations to your mental model of the fire.
- Fire behavior – eight indicators.



### Fire Behavior Exercise

Fire Environment Factors	Indicators
<b>Fuel Characteristics</b>	<input type="checkbox"/> Continuous fine fuels <input type="checkbox"/> Heavy loading of dead and down <input type="checkbox"/> Ladder fuels <input type="checkbox"/> Tight crown spacing (< 20 ft) <input type="checkbox"/> Special conditions: <input type="checkbox"/> Firebrand sources <input type="checkbox"/> Frost and bug-kill <input type="checkbox"/> Numerous snags <input type="checkbox"/> Unusual fine fuels <input type="checkbox"/> Preheated canopy <input type="checkbox"/> High dead to live ratio
<b>Fuel Moisture</b>	<input type="checkbox"/> Low RH (< 25%) <input type="checkbox"/> Low 10-hr FMC (<6%) <input type="checkbox"/> Drought conditions <input type="checkbox"/> Seasonal drying (sage is not green, but more gray)
<b>Fuel Temperature</b>	<input type="checkbox"/> High temps (> 85 °F) <input type="checkbox"/> High % of fuels w/direct sun <input type="checkbox"/> Aspect fuel temp. increasing
<b>Terrain</b>	<input type="checkbox"/> Steep slopes (> 50%) <input type="checkbox"/> Chutes-Chimneys <input type="checkbox"/> Box canyons <input type="checkbox"/> Saddles <input type="checkbox"/> Narrow canyons
<b>Wind</b>	<input type="checkbox"/> Surface winds > 10 mph <input type="checkbox"/> Lenticular clouds <input type="checkbox"/> High, fast-moving clouds <input type="checkbox"/> Approaching cold fronts <input type="checkbox"/> Cumulonimbus development <input type="checkbox"/> Sudden calm <input type="checkbox"/> Battling or shifting winds
<b>Atmospheric Instability</b>	<input type="checkbox"/> Good visibility <input type="checkbox"/> Gusty winds and dust devils <input type="checkbox"/> Cumulus clouds <input type="checkbox"/> Castellatus clouds in the a.m. <input type="checkbox"/> Smoke rises straight up <input type="checkbox"/> Inversion beginning to lift <input type="checkbox"/> Thermal belt
<b>Fire Behavior</b>	<input type="checkbox"/> Leaning column <input type="checkbox"/> Sheared column <input type="checkbox"/> Well-developed column <input type="checkbox"/> Changing column <input type="checkbox"/> Trees torching <input type="checkbox"/> Smoldering fires picking up <input type="checkbox"/> Small fire whirls beginning (column starting to spin) <input type="checkbox"/> Frequent spot fires (due to fuel type)



### Eastern Great Basin Exercise

Fire Environment Factors	Indicators
<b>Fuel Characteristics</b>	<input type="checkbox"/> Continuous fine fuels <input type="checkbox"/> Heavy loading of dead and down <input type="checkbox"/> Ladder fuels <input type="checkbox"/> Tight crown spacing (< 20 ft) <input type="checkbox"/> Special conditions: <input type="checkbox"/> Firebrand sources <input type="checkbox"/> Frost and bug-kill <input type="checkbox"/> Numerous snags <input type="checkbox"/> Unusual fine fuels <input type="checkbox"/> Preheated canopy <input type="checkbox"/> High dead to live ratio
<b>Fuel Moisture</b>	<input type="checkbox"/> Low RH (< 25%) <input type="checkbox"/> Low 10-hr FMC (<6%) <input type="checkbox"/> Drought conditions <input type="checkbox"/> Seasonal drying (sage is not green, but more gray)
<b>Fuel Temperature</b>	<input type="checkbox"/> High temps (> 85 °F) <input type="checkbox"/> High % of fuels w/direct sun <input type="checkbox"/> Aspect fuel temp. increasing
<b>Terrain</b>	<input type="checkbox"/> Steep slopes (> 50%) <input type="checkbox"/> Chutes-Chimneys <input type="checkbox"/> Box canyons <input type="checkbox"/> Saddles <input type="checkbox"/> Narrow canyons
<b>Wind</b>	<input type="checkbox"/> Surface winds > 10 mph <input type="checkbox"/> Lenticular clouds <input type="checkbox"/> High, fast-moving clouds <input type="checkbox"/> Approaching cold fronts <input type="checkbox"/> Cumulonimbus development <input type="checkbox"/> Sudden calm <input type="checkbox"/> Battling or shifting winds
<b>Atmospheric Instability</b>	<input type="checkbox"/> Good visibility <input type="checkbox"/> Gusty winds and dust devils <input type="checkbox"/> Cumulus clouds <input type="checkbox"/> Castellatus clouds in the a.m. <input type="checkbox"/> Smoke rises straight up <input type="checkbox"/> Inversion beginning to lift <input type="checkbox"/> Thermal belt
<b>Fire Behavior</b>	<input type="checkbox"/> Leaning column <input type="checkbox"/> Sheared column <input type="checkbox"/> Well-developed column <input type="checkbox"/> Changing column <input type="checkbox"/> Trees torching <input type="checkbox"/> Smoldering fires picking up <input type="checkbox"/> Small fire whirls beginning (column starting to spin) <input type="checkbox"/> Frequent spot fires (due to fuel type)



### Smokejumper Exercise

Fire Environment Factors	Indicators
<b>Fuel Characteristics</b>	<input type="checkbox"/> Continuous fine fuels <input type="checkbox"/> Heavy loading of dead and down <input type="checkbox"/> Ladder fuels <input type="checkbox"/> Tight crown spacing (< 20 ft) <input type="checkbox"/> Special conditions: <input type="checkbox"/> Firebrand sources <input type="checkbox"/> Frost and bug-kill <input type="checkbox"/> Numerous snags <input type="checkbox"/> Unusual fine fuels <input type="checkbox"/> Preheated canopy <input type="checkbox"/> High dead to live ratio
<b>Fuel Moisture</b>	<input type="checkbox"/> Low RH (< 25%) <input type="checkbox"/> Low 10-hr FMC (<6%) <input type="checkbox"/> Drought conditions <input type="checkbox"/> Seasonal drying (sage is not green, but more gray)
<b>Fuel Temperature</b>	<input type="checkbox"/> High temps (> 85 °F) <input type="checkbox"/> High % of fuels w/direct sun <input type="checkbox"/> Aspect fuel temp. increasing
<b>Terrain</b>	<input type="checkbox"/> Steep slopes (> 50%) <input type="checkbox"/> Chutes-Chimneys <input type="checkbox"/> Box canyons <input type="checkbox"/> Saddles <input type="checkbox"/> Narrow canyons
<b>Wind</b>	<input type="checkbox"/> Surface winds > 10 mph <input type="checkbox"/> Lenticular clouds <input type="checkbox"/> High, fast-moving clouds <input type="checkbox"/> Approaching cold fronts <input type="checkbox"/> Cumulonimbus development <input type="checkbox"/> Sudden calm <input type="checkbox"/> Battling or shifting winds
<b>Atmospheric Instability</b>	<input type="checkbox"/> Good visibility <input type="checkbox"/> Gusty winds and dust devils <input type="checkbox"/> Cumulus clouds <input type="checkbox"/> Castellatus clouds in the a.m. <input type="checkbox"/> Smoke rises straight up <input type="checkbox"/> Inversion beginning to lift <input type="checkbox"/> Thermal belt
<b>Fire Behavior</b>	<input type="checkbox"/> Leaning column <input type="checkbox"/> Sheared column <input type="checkbox"/> Well-developed column <input type="checkbox"/> Changing column <input type="checkbox"/> Trees torching <input type="checkbox"/> Smoldering fires picking up <input type="checkbox"/> Small fire whirls beginning (column starting to spin) <input type="checkbox"/> Frequent spot fires (due to fuel type)



## Firefighter Type 1, S-131

### 5 – Decision Making

#### OBJECTIVES:

Upon completion of this unit, students will be able to:

1. Demonstrate the ability to apply the Risk Management Process in a changing environment.
2. Demonstrate the ability to assess resource capabilities.
3. Demonstrate the ability to develop tactical and logistical plans.
4. Demonstrate the ability to engage tactically through sand table exercises, locally based sand table exercises (STEX), do a staff ride, or do a paper based exercise of choice.



## I. THE RISK MANAGEMENT PROCESS

The Risk Management Process (RMP) helps firefighters organize their decision-making processes. The RMP is located in the IRPG for a reason—it is a critical decision-making tool that every firefighter should be familiar with and use.

Your decisions are only as good as your perception of reality. Situation awareness (SA) for firefighters is a term used to describe awareness of the total working environment. Situation awareness combines analytical information and intuitive knowledge. Intuitive decision making is a process of combining information gained through experience and analytical knowledge that allows you to make intuitive decisions.

Continuous updating and maintaining of Situation Awareness is essential to incident management. The total working environment, including tactical and logistical information, can overwhelm effective decision making. Therefore, you will need to develop the ability to discern between essential and non-essential information.

In a changing environment, this is a continuous cycle of assessment and evaluation.

Tactical plans cannot be made without ensuring that the Standard Firefighting Orders are followed. In relatively low complexity assignments, this can be done intuitively based on experience. In more complex situations, firefighters need to have an organized decision-making process that ensures the Standard Firefighting Orders are being followed and contingencies are being considered.

## II. ELEMENTS OF THE RISK MANAGEMENT PROCESS

### A. Identify Hazards (Situation Awareness)

#### 1. Objective(s)

Knowing objectives is critical. If you know what the end result needs to be, you are in a position of developing and altering strategies and tactics to achieve the desired result.

#### 2. Communication

Communication is vital to implementing the Risk Management Process.

#### 3. Who is in charge?

This is usually evident when assigned to a module or crew. However, crews may be used independently for initial attack or special assignment purposes. This may require them to report to someone other than their immediate supervisor.

#### 4. Scout the fire

Know what your fire is doing. You can't develop a plan without knowing what the current situation is.

#### 5. Previous fire behavior

Gives valuable insight as to what to expect. Also helps establish trigger points based on conditions.

#### 6. Weather forecast

Mandatory information; your actions must be based on current and forecasted weather.

## 7. Local factors

Many areas have local weather factors that are unique. Ask questions about such factors and share information with appropriate personnel.

### B. Assess Hazards

- Estimate potential fire behavior hazards.
- Identify tactical hazards.
- As conditions change, what other safety hazards are likely to exist?
- Consider probability versus severity?

### C. Develop Controls and Make Risk Decisions

- Develop control measures that reduce risk.
- Are controls in place to mitigate risk?
- Are selected tactics based on expected fire behavior?
- Have instructions been given and understood?
- Consider risk versus gain

### D. Implement Controls

- Ensure controls are in place and being implemented by personnel.
- Ensure controls are integrated [in the] operational plan and understood at all levels.

### E. Supervise and Evaluate

- Are controls adequately mitigating the hazards?

### III. RESOURCE CAPABILITIES AND CONSIDERATIONS

#### A. Indicators of Incident Complexity

Like the Risk Management Process of evaluating risk, the complexity of your situation also needs to be evaluated. Some common indicators of complexity are:

- Location (area involved)
- Threat to life, environment, and property
- Political sensitivity
- Organizational complexity
- Jurisdictional boundaries
- Values at risk
- Weather

#### B. Resource Needs

- Order what you think you need, for today and tomorrow, based on your assessment of the situation.
- Match the right tool to the job. Right place, right form, right amount.

#### C. Resource Ordering

- Be specific.
- Be timely.
- Use proper chain of command and local protocol.

## IV. TACTICAL AND LOGISTICAL PLANNING

### A. Operational Planning Factors to Consider

- Contingency planning is a necessity. Backup plans need to be solidified and discussed before the need to implement them. All firefighters need to understand the fallback plan when the primary plan is no longer valid. Quick transitions to alternative plans are essential.
- Base plans on resource capability and availability.
- Ensure lines of communication are effective (e.g., radio frequency availability, incompatible systems, and lack of repeater coverage).
- Evaluate human factor elements (e.g., mental and/or physical condition of the resources, qualifications and experience, crew cohesion, personality conflicts and hazardous attitudes).
- Consider jurisdictional and political issues (e.g., landownership, wilderness restrictions, rural fire boundaries, and urban interface).

### B. Logistical Planning Factors to Consider

- Tactics can be limited when logistical considerations are overlooked.
- It's important to stay ahead of the power curve. Be thinking what your needs will be into the future. It takes time to provide good, adequate support.
- Ground support versus air support; consider accessibility, travel times, and routes.
- Gain local knowledge of what resources are available.

## V. TACTICAL DECISION GAMES (TDGS) EXERCISES

### **Exercise 1: Aviation**

#### **Objective:**

Decide how to utilize the proper procedures and tactics when an assignment involves directing helicopter bucket drops to support ground resources.

#### **Scenario:**

It is July 14 at 0900 hours and you are a crew boss on a Type 2 hand crew assigned to the Meadow Fire. It is your second shift on the fire. Your crew has been using direct attack handline with occasional helicopter bucket support.

The Meadow Fire is actively burning in timber and has a heavy fuel load of downed timber. A helicopter has been requested to assist your crew to control a spot fire. It is starting to show more smoke and has potential to escape containment lines and move toward some ladder fuels near a tight timber canopy. You can hear the helicopter in the distance, but you cannot see it. A minute later you can see the helicopter dropping water and going directly away from you.

What do you do now?

Fire Size: Spot fire approximately 1 acre.

Fuel Type: Timber.

Fire Behavior: Creeping and smoldering. Maximum flame lengths of 2 feet. Rate of spread of 3 chains per hour.

Assignment: Your crew boss assigns you to control a spot that was previously contained by handline. You have directed your crew to reinforce the handline and to reduce the ladder fuels in key areas.

Resources Assigned: You and your crew of five firefighters have two radios and one Type 2 helicopter; the call sign is 912KW.

Hazards: Fire behavior includes potential torching and subsequent spotting, snags, air operations, and working on a large spot fire away from the main fire.

Communication: Tactical 168.200, air to ground 170.000

## **Exercise 2: Downhill Line**

### **Objective:**

Assess a downhill line construction assignment and determine how to proceed. Communicate your decisions to the appropriate individuals.

### **Scenario:**

It is August 2 at 0800 and you are a crew boss with the Rush Valley Regulars, a Type 2 crew assigned to the Willow Creek Fire which is being managed by a Type 2 incident management team. Your identifier is Crew B.

Your crew boss wanted to have the entire crew start at the bottom near the confluence of Pioche and Willow Creeks and work uphill going direct. However, due to local initial attack priorities, the helicopter was released after only shuttling Crew A and the crew boss to the bottom. Crew B was left on the plateau at the end of the dozer line. There is no road access to the confluence of Willow and Pioche Creeks.

Fire Size: Crew assigned to a segment of a 5,000 acre fire.

Fuel Type: Primarily timber with a grass and brush mix.

Terrain: Steep with extremely rocky ridges with numerous rock outcrops.

Fire Behavior: Currently smoldering; however, yesterday during peak burning period, fire spread was 20 chains per hour and maximum flame lengths were 10 feet.

Observations: Temperature 70 °F; RH 25%; wind N/NW at 3–5 mi/h until midafternoon, at that time, forecasted to shift to the W/SW.

Assignment: Hold the fire south of the main spur ridge between the confluence of Pioche and Willow Creeks and the end of the dozer line on the plateau.

The crew boss now wants your crew to anchor at the dozer line on top and construct direct handline downhill as Crew A anchors at the bottom and works up.

Resources Assigned: You have three experienced firefighters and three rookie firefighters on your crew.

Hazards: Downhill fireline, fire behavior, terrain.

Communication: Tactical 168.050

Considering all information, how do you proceed?

### **Exercise 3: Structure Protection**

#### **Objective:**

Assess a structure protection assignment and determine how to proceed.  
Communicate your decisions to the appropriate individuals.

#### **Scenario:**

It is September 7 at 0900 and you are the lead firefighter on Engine 76. Your engine is assigned to the Achin structure group on the Dutch Fire.

The Dutch Fire started the previous day and burned actively all day, pushed by a south wind. However, during the night, it slowed considerably with minimal spread. At the present time, the Flores Mine Road is holding the fire on the north flank.

The fire has good spread potential, as today's winds are expected to exceed 20 mi/h out of the south. Typical wind conditions for this area are out of the west, blowing downhill at 10 mi/h. At lower elevations the wind is typically cross-canyon, out of the south.

Achin Hills is comprised of approximately 47 residences situated on about 60 acres. Of the residences, about 17 are occupied year round, the remainder being vacation homes or vacant. All roads in this area are single-lane dirt roads. An extremely narrow substandard road with very few turnouts serves the area.

Fuel Type: Brush and grass, with scattered pines and scrub oaks.

Terrain: Achin Hills sits between 2,900 and 3,200 feet in elevation on an eastern aspect with an average slope of about 20% in and around the structures, and in excess of 30% in the adjacent hillsides. There are numerous drainages and gullies throughout the area.

Observations: Temperature, 75 °F; RH, 20%; winds south, 2–3 mi/h.

Assignment: Your engine has been assigned to do structure protection along David Road. You are to check three structures and get back to your supervisor with your plan of action and, if agreed, to implement the plan.

Resources Assigned: Engine 76 personnel include the engine boss, you (FFT1), an engine operator, and a rookie firefighter.

Hazards: Structures, access, roads, possible evacuations, entrapment, hazardous materials.

Communication: Tactical 168.050

## **Exercise 4: Initial Attack**

### **Objective:**

Assess an initial attack assignment and determine how to proceed. Communicate your decisions to the appropriate personnel.

### **Scenario:**

It is August 2 at 1730 hours, and your crew of five firefighters has put in a full day of falling hazard trees and hand-piling brush in Canyon Winds Campground. You report to dispatch that your crew is “returning to station.”

Just a few miles northeast of the campground on Highway 55, the crew comes across a vehicle accident. A car has run off the road and hit a boulder. The car is fully engulfed in flames and has started a wildfire. You notice that two elderly people, probably occupants, are out of the car and appear to be uninjured. They are obviously quite concerned about the situation. Traffic is backed up on the highway just past the local rural grocery store.

Fire Size: ¼ acre.

Fuel Type: Primarily timber with a grass and brush mix.

Terrain: Slopes are steep, averaging 45% with valley-to-ridge elevation gains of 3,000 feet.

Fire Behavior: Flame lengths of 1 to 2 feet, rate of spread of 5 chains an hour.

Observations: Temperature 70 °F; RH 25%; wind W/SW at 5 mi/h.

Assignment: Determine type of initial attack, and notify dispatch.

Resources Assigned: You have five firefighters with hand tools and chain saws.

Hazards: Snags, fire behavior, terrain, traffic, hazardous materials.

You are the only firefighters on scene – what do you do?

**Notes:**

## **Exercise 5: Initial Attack Support**

### **Objective:**

Assess an initial attack assignment in unfamiliar territory and determine how to proceed. Communicate your decisions to the appropriate individuals.

### **Scenario:**

It is November 10 and you are a crew leader on a western Type 1 crew, which has recently arrived at the Coastal Heron Wildlife Sanctuary in southern Mississippi to support initial attack efforts. This is the first time the crew has been dispatched to the southeast, and the crew is excited to see the Gulf Coast.

Your crew has been fighting fire all season in the Rockies, and the superintendent has commented that you have great leadership skills, a good working knowledge of fire, and is going to count on you to perform more challenging tasks.

Coastal Heron Wildlife Sanctuary is a 40,000 acre wildlife management area bordered by residences, businesses, and highways. The area is made up of mostly “heavy” southern rough fuel types with scattered hardwood drainages, bogs, and long leaf pine savannahs.

The in-brief given by the Fire Management Officer (FMO) on the crew’s arrival details the recent weather and fuel conditions. It is peak fire season for the area. Temperatures have been in the low 70s, and the humidity has been averaging 33 percent. The Fire Management Officer points out that the sea breeze has started at around 1300 hours every day for the past week. He also mentions that the Keetch Byram Drought Index (KBDI) is almost 350; therefore, the drainages

should be holding water. He mentions that your task force leader will give more specifics if you have questions.

Fire Size: 25 acres.

Fuel Type: Heavy southern rough.

Terrain: Flat.

Fire Behavior: Flame lengths are 6–8 feet and occasional torching in the pines is observed. Spotting is a factor.

Observations: Winds, northwest 5–7 mi/h, gusts to 10; RH, 31%.

Assignment: You are informed that your crew will be divided, and each crew will be assigned to a separate task force. Your crew is on Task Force Bravo, which was dispatched to initial attack a fire 25 minutes ago, and the FMO wants your crew to assist them as soon as possible. Upon arriving at the fire, you radio your task force leader for instructions. His response is “Glad you’re here. We have most of our folks on the right flank trying to corral this thing. Why don’t you assist the tractor plow unit on the left flank. Contact is Tractor 49. Oh, and heads up, this thing is walking the dog!”

Resources Assigned: Your crew, tractor 49, Task Force Leader Bravo, other miscellaneous resources unknown.

Hazards: Entrapment, traffic, erratic fire behavior, snags, fuel type, unfamiliar with tactics, unfamiliar with safety zones.

## **Exercise 6: Lookout**

### **Objective:**

Assess a lookout assignment and determine how to proceed. Communicate your decisions to the appropriate individuals.

### **Scenario:**

It is October 24 at 0700, and your crew is assigned to Division Zulu (Z) on the Stanley Incident. Division Z can be described as having underslung handline through moderate to heavy chaparral brush on moderate terrain.

You have recently moved into one of the lead crew member slots with the Pinnacle Hotshots. Your supervisor has indicated that you have good potential to move up to more advanced positions in fire by keeping up the good work.

During the previous night shift, hand crews made good progress but stopped short of an underslung segment below the road. The crew superintendent wants one crew to stay on the ridge top and finish the handline to the road. The other two crews will anchor at the road and pick up the underslung segment below the road. The crew superintendent feels it can be done before the onset of the peak burning conditions.

Fire Size: 60,000 acres.

Fuel Type: Chaparral brush combination of fuel models 4 and 5.

Terrain: Slopes average 30%.

Fire Behavior: Currently smoldering.

Observations: The weather forecast in the Incident Action Plan (IAP) indicates expected high temperature of 100 °F; RH at 21%; wind, W-SW, 6-10 mi/h with the possibility of a slight Santa Ana wind condition. Currently it is 0700 with a temp of 65 °F; RH 45% and no wind.

Assignment: You are the lookout for the crew today.

Your crew's assignment is to contain the underslung segment of line before the heat of the day.

Resources Assigned: One Type 1 crew.

Hazards: Snags, fire behavior, downhill line, entrapment.

The crew superintendent hurries away before taking time to brief you on where you are to be located. Looking around, you notice a good vantage point on a larger hill adjacent to the fire. How do you proceed?

## EXERCISE EVALUATION FORM

### Exercise 1: Aviation

Team Leader: \_\_\_\_\_  
 Team Members: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Assign points based on the team’s initiative to apply and adhere to the standards in the IRPG and the Wildland Fire Incident Management Field Guide. Use the following scale to rate exercise:

**POSSIBLE POINTS**

- 3 = DID NOT MEET INPUT OBJECTIVE**
- 4 = MET INPUT OBJECTIVE**
- 5 = EXCEEDED INPUT OBJECTIVE**

STANDARDS	POINTS 3-5	REMARKS
1. Give general location on incident.		
2. Describe target from your location and explain mission.		
3. Assure pilot all personnel are safe and know aircraft intentions before the drop.		
4. Finalize location with: clock direction, position on slope, prominent landmarks, aspect etc.		
5. Establish anchor point and work from it.		
6. Maintain effective communication between ground and air.		
7. Give feedback to pilot about drop accuracy. Report low drops immediately. Be honest and constructive.		
<b>TOTAL POINTS</b>		

TIME TO COMPLETE \_\_\_\_\_



## EXERCISE EVALUATION FORM

### Exercise 2: Downhill Line

Team Leader: \_\_\_\_\_  
 Team Members: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Assign points based on the team’s initiative to apply and adhere to the standards in the IRPG and the Wildland Fire Incident Management Field Guide. Use the following scale to rate exercise:

**POSSIBLE POINTS**

- 3 = DID NOT MEET INPUT OBJECTIVE**
- 4 = MET INPUT OBJECTIVE**
- 5 = EXCEEDED INPUT OBJECTIVE**

STANDARDS	POINTS 3-5	REMARKS
1. Supervisor and overhead discussed assignment prior to commitment. TFLD or ICT4 qualified or better stays with job until complete.		
2. Decision made after proposed line is scouted by supervisor of involved crew.		
3. LCES coordinated for all personnel. Supervisor is in direct contact with lookout who can see the fire. Communication established between all crews. Rapid access to safety zones in case the fire crosses below.		
4. Direct attack used whenever possible. If not possible, line should be completed between two anchor points and fired out.		
5. Fireline will not lie in or adjacent to a chute or chimney.		
6. Starting point will be anchored for personnel building line down from the top.		
<b>TOTAL POINTS</b>		

TIME TO COMPLETE \_\_\_\_\_



## EXERCISE EVALUATION FORM

### Exercise 3: Structure Protection

Team Leader: \_\_\_\_\_  
 Team Members: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Assign points based on the team’s initiative to apply and adhere to the standards in the IRPG and the Wildland Fire Incident Management Field Guide. Use the following scale to rate exercise:

- POSSIBLE POINTS**  
**3 = DID NOT MEET INPUT OBJECTIVE**  
**4 = MET INPUT OBJECTIVE**  
**5 = EXCEEDED INPUT OBJECTIVE**

STANDARDS	POINTS 3-5	REMARKS
1. Determine if road access meets equipment needs (width, drivable surface, grade, clearance problems, bridges, turnouts and staging areas).		
2. Determine property address or ranch name, etc., and if residents are on site.		
3. Evaluate structural elements and debris such as the roof material, exposed wood siding, attached decks, windows facing heat source, wood piles, and other flammables.		
4. Determine if the structure has adequate defensible space.		
5. Determine if hazardous materials are present (pesticides, fuel, LPG tanks, etc.).		
6. Determine available water supply (hydrant, ponds, storage tanks, etc.).		
7. Estimate the type and number of resources needed to implement the protection plan.		
<b>TOTAL POINTS</b>		

TIME TO COMPLETE \_\_\_\_\_



## EXERCISE EVALUATION FORM

### Exercise 4: Initial Attack

Team Leader: \_\_\_\_\_  
 Team Members: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Assign points based on the team’s initiative to apply and adhere to the standards in the IRPG and the Wildland Fire Incident Management Field Guide. Use the following scale to rate exercise:

**POSSIBLE POINTS**

- 3 = DID NOT MEET INPUT OBJECTIVE**
- 4 = MET INPUT OBJECTIVE**
- 5 = EXCEEDED INPUT OBJECTIVE**

STANDARDS	POINTS 3-5	REMARKS
1. First arrival: size up fire and report to dispatch. Do not cross the head of the fire unless it can be done safely. Park vehicles in a safe place, pointing away from the fire, windows closed, and doors unlocked, and keys left in the ignition.		
2. Determine an initial attack plan based on the sizeup. Determine: escape routes and safety zones, anchor points, hazards, where to attack, direct or indirect, line specifications, additional needs, locate and preserve point of origin.		
3. Brief the crew and begin work. Make sure everyone understands their work assignment. Take prompt decisive actions during the early stages.		
4. Preview the Initial Attack Safety Checklist found in the PMS 210 as needed.		
<b>TOTAL POINTS</b>		

TIME TO COMPLETE \_\_\_\_\_



## EXERCISE EVALUATION FORM

### Exercise 5: Initial Attack (Support)

Team Leader: \_\_\_\_\_  
 Team Members: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Assign points based on the team’s initiative to apply and adhere to the standards in the IRPG and the Wildland Fire Incident Management Field Guide. Use the following scale to rate exercise:

**POSSIBLE POINTS**

**3 = DID NOT MEET INPUT OBJECTIVE**

**4 = MET INPUT OBJECTIVE**

**5 = EXCEEDED INPUT OBJECTIVE**

STANDARDS	POINTS 3-5	REMARKS
1. Situation Awareness: objectives, communication, who’s in charge, previous fire behavior, weather forecast, local factors.		
2. Hazard Assessment: estimate potential fire behavior hazards, look up/down/around indicators, other safety hazards, consider severity vs. probability.		
3. Hazard Control. Fire Orders and the LCES checklist are mandatory; establish anchor points, downhill checklist if needed, other controls?		
4. Decision point. Are hazard controls in place for identified hazards? Are tactics based on expected fire behavior? Have instructions been given and understood? If any of the above is NO, then reassess.		
5. Evaluate: personnel and the situation. Factors: experience, distractions, fatigue, stress, attitude, conditions, etc.		
<b>TOTAL POINTS</b>		

TIME TO COMPLETE \_\_\_\_\_



## EXERCISE EVALUATION FORM

### Exercise 6: Lookout

Team Leader: \_\_\_\_\_  
 Team Members: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Assign points based on the team’s initiative to apply and adhere to the standards in the IRPG and the Wildland Fire Incident Management Field Guide. Use the following scale to rate exercise:

**POSSIBLE POINTS**

- 3 = DID NOT MEET INPUT OBJECTIVE**
- 4 = MET INPUT OBJECTIVE**
- 5 = EXCEEDED INPUT OBJECTIVE**

STANDARDS	POINTS 3-5	REMARKS
1. Your location: is your location safe? Do you have access to an escape route and safety zone? Can you see the fire adequately?		
2. Crew’s location: stay informed of crew location; have changing priorities or conditions changed the crew’s location? Make positive confirmation (visual, mirror flash, etc.). Are multiple lookouts needed? Will smoke or terrain obscure view?		
3. Communication: establish and maintain communications, report changes in fire behavior, weather conditions and spot fires immediately.		
4. Escape routes and safety zone locations: know the location of the crew’s Safety Zone(s) and Escape Route(s) and notify the crew should they become compromised.		
<b>TOTAL POINTS</b>		

TIME TO COMPLETE \_\_\_\_\_



## EXERCISE EVALUATION FORM

**Exercise:**

Team Leader: \_\_\_\_\_  
 Team Members: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Assign points based on the team’s initiative to apply and adhere to the standards in the IRPG and the Wildland Fire Incident Management Field Guide. Use the following scale to rate exercise:**

**Possible Points**

- 3 = DID NOT MEET INPUT OBJECTIVE**
- 4 = MET INPUT OBJECTIVE**
- 5 = EXCEEDED INPUT OBJECTIVE**

STANDARDS	POINTS 3-5	REMARKS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
<b>TOTAL POINTS</b>		

TIME TO COMPLETE \_\_\_\_\_

