NFPA® 1143

Standard for Wildland Fire Management

2014 Edition

NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

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NFPA® 1143

Standard for

Wildland Fire Management

2014 Edition

This edition of NFPA 1143, *Standard for Wildland Fire Management*, was prepared by the Technical Committee on Forest and Rural Fire Protection. It was issued by the Standards Council on May 28, 2013, with an effective date of June 17, 2013, and supersedes all previous editions.

This edition of NFPA 1143 was approved as an American National Standard on June 17, 2013.

Origin and Development of NFPA 1143

The first edition of NFPA 295, titled *Community Forest Fire Fighting Equipment,* was adopted by NFPA in 1934. The next edition was issued in 1956 as *Community Equipment and Organization for Fighting Forest, Grass and Brush Fires*. The document was retitled *Recommendations for Forest, Grass and Brush Fire Control* when it was issued in 1965 and retitled again, as *Recommendations for Wildfire Control and Environmental Improvement*, in 1972. In 1973, the document became a standard, was titled *Standard for Wildfire Control by Volunteer Fire Departments*, and carried that title in the 1978 edition. The document was titled *Standard for Wildfire Control* with the issuance of the 1985 edition. Subsequent editions were issued in 1991 and 1998.

The 2003 edition was a complete rewrite of the document, which was renumbered and renamed NFPA 1143, *Standard for Wildland Fire Management*. In developing the 2003 edition, the Technical Committee recognized the development of the National Fire Plan in the United States and numerous mitigation efforts to solve the ailing forests and endangered communities in or near forested areas. In addition, the Committee incorporated material to help small community and volunteer fire departments prepare for not only fire suppression in forested and wildland areas but also the broader task of wildland fire management, including mitigation, prevention, and community coordination.

The 2009 edition reflected the continued evolution of best practices in wildland fire management at the national level and further emphasized the full cycle of wildland fire management through mitigation, prevention, preparation, and suppression. The Committee incorporated information to help make the document more consistent with NFPA standards on emergency services incident management and disaster management programs, and to reflect current practices in regard to fire fighter safety.

The 2014 edition of NFPA 1143 is a reconfirmation of updates made in the 2009 edition. The committee updated cross-references throughout the document and updated figures to provide examples of modern equipment being utilized for wildland fire management. These updates provide the user with new examples of equipment such as dozers, helicopters, and airtankers.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on fire protection for rural, suburban, forest, grass, brush, and tundra areas. This Committee shall also have primary responsibility for documents on Class A foam and water enhancing gels, and their utilization for all wildland and structural fire fighting. This excludes fixed fire protection systems.

Contents

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex C. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex C.

Chapter 1 Administration

1.1 Scope. This standard provides minimum requirements to fire protection organizations on the management of wildland fire, including prevention, mitigation, preparation, and suppression.

1.2* Purpose. The purpose of this standard is to specify management practices and policies necessary for a fire protection organization to develop a wildland fire management program.

1.3 Wildland Fire Control Policies.

1.3.1 The authority having jurisdiction (AHJ) shall develop a policy for managing the organization in all aspects of wildland fire, including prevention, mitigation, preparation, and suppression.

1.3.1.1 As a minimum, the policy shall be established in accordance with legal mandates, organization priorities, planning procedures, incident management, personnel safety and training, and cooperative agreements.

1.3.1.2 Additional policy items shall be included as determined necessary by the AHJ.

1.3.2 Where the possibility of wildland fire constitutes a threat, the AHJ shall have a management plan to perform the activities as required by this standard.

1.3.3 The goal shall be to reduce wildland fire loss through the establishment, maintenance, and coordination of policies and programs addressing fire prevention, risk assessment and mitigation, planning, incident management, personnel, infrastructure, training, communications, and safety.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications,* 2014 edition.

NFPA 1051, *Standard for Wildland Fire Fighter Professional Qualifications,* 2012 edition.

NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas,* 2012 edition.

NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire,* 2013 edition.

NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program,* 2013 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2013 edition.

NFPA 1521, *Standard for Fire Department Safety Officer,* 2008 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System,* 2008 edition.

NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments,* 2013 edition.

NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting,* 2011 edition.

2.3 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA *101®*, *Life Safety Code®*, 2012 edition.

NFPA 1051, *Standard for Wildland Fire Fighter Professional Qualifications,* 2012 edition.

NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas,* 2012 edition.

NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program,* 2013 edition.

NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program,* 2013 edition.

NFPA 1561, *Standard on Emergency Services Incident Management System,* 2008 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.2.7 Standard. A document, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the *Manual of Style for NFPA Technical Committee Documents*.

3.3 General Definitions.

3.3.1 Agency. A division of government with a specific function or a nongovernmental organization (e.g., private business) that offers a particular kind of assistance.

3.3.2* Apparatus. A motor-driven vehicle or group of vehicles designed and constructed for the purpose of fighting fires.

3.3.3 Brush. A collective term that refers to a stand of vegetation dominated by shrubs, woody plants, or low-growing trees.

3.3.4 Brush Fire. See 3.3.32, Wildland Fire.

3.3.5 Command. The act of directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority.

3.3.6* Company. A group of members (1) under the direct supervision of an officer; (2) trained and equipped to perform assigned tasks; (3) usually organized and identified as engine companies, ladder companies, rescue companies, squad companies, or multifunctional companies; (4) operating with one piece of fire apparatus (pumper, aerial fire apparatus, elevating platform, quint, rescue, squad, ambulance) except where multiple apparatus are assigned that are dispatched and arrive together, continuously operate together, and are managed by a single company officer; (5) arriving at the incident scene on fire apparatus. [**1500,** 2013]

3.3.7 Company Officer. The officer or any other position of comparable responsibility in the department in charge of a fire department company or station.

3.3.8 Crew. An organized group of fire fighters under the leadership of a crew leader or other designated official.

3.3.9 Crew Boss (Leader). A person who is in supervisory charge of usually 10 to 20 fire fighters and who is responsible for their performance, safety, and welfare.

3.3.10 Finance. The incident management section responsible for all incident costs and financial considerations.

3.3.11 Fire Hazard. A fuel complex, defined by volume, type, condition, arrangement, and location, that determines the degree of ease of ignition and of resistance to control.

3.3.12 Forest Fire. See 3.3.32, Wildland Fire.

3.3.13 Grass Fire. See 3.3.32, Wildland Fire.

3.3.14 Incident. An occurrence, either human-caused or a natural phenomenon, that requires action or support by emergency services personnel to prevent or minimize loss of life or damage to property and/or natural resources.

3.3.15* Incident Action Plan (IAP). A plan that contains objectives reflecting the overall incident strategy, specific tactical actions, and supporting information for the next operational period.

3.3.16 Incident Commander (IC). The individual responsible for the management of all incident operations at the incident site.

3.3.17* Incident Management System (IMS). A system that defines the roles and responsibilities to be assumed by responders and the standard operating procedures to be used in the management and direction of emergency incidents and other functions. [**1561,** 2008]

3.3.18 Jurisdiction. Any governmental unit or political division or subdivision including, but not limited to, township, village, borough, parish, city, county, state, commonwealth, province, freehold, district, or territory over which the governmental unit exercises power and authority. [**1141,** 2012]

3.3.19 Liaison. The individual responsible for the coordination of activities with assisting agencies.

3.3.20 Logistics. The incident management section responsible for providing facilities, services, and materials for the incident.

3.3.21 Mitigation. Action that moderates the severity of a fire hazard or risk.

3.3.22 Operations. The incident management section responsible for all tactical operations at the incident.

3.3.23 Planning. The incident management section responsible for the collection, evaluation, and dissemination of tactical information related to the incident and for preparation and documentation of incident management plans.

3.3.24 Prescribed Fire. Any fire ignited by management actions to meet specific objectives.

3.3.25 Prevention. Activities, including public education, law enforcement, personal contact, and reduction of fuel hazards, directed at reducing the incidence of fires.

3.3.26 Risk. A measure of the probability and severity of adverse effects that result from exposure to a hazard. [**1451,** 2013]

3.3.27 Rural. Those areas that are not unsettled wilderness or uninhabitable territory but are sparsely populated, with densities below 500 persons per square mile.

3.3.28 Stakeholder. An individual, or representative of same, having an interest in the successful completion of a project. [***101,*** 2012]

3.3.29* Unified Command. A standard method to coordinate command of an incident where multiple agencies have jurisdiction.

3.3.30* Values at Risk. Public and private resources, which include, but are not limited to, property, structures, physical improvements, natural and cultural resources, community infrastructure, and economic, environmental, and social values.

3.3.31 Wildfire. See 3.3.32, Wildland Fire.

3.3.32* Wildland Fire. An unplanned and uncontrolled fire spreading through vegetative fuels, including any structures or other improvements thereon. [**1141,** 2012]

3.3.33* Wildland/Urban Interface. Locations in which the AHJ determines that topographical features, vegetation fuel types, local weather conditions, and prevailing winds result in the potential for ignition of the structures within the area from flames and firebrands of a wildland fire.

3.3.34* Wildland/Urban Interface Coordinator. The person responsible for the development of the plan(s) for the reduction of the fire risks and hazards associated in the wildland/urban interface. [**1051,** 2012]

3.3.35 Wildland/Urban Interface Protection Specialist. The person responsible for the development and/or implementation of a plan to protect people, animals, communities, individual structures, or other improvements from a wildland fire. [**1051,** 2012]

3.3.36 Wildland/Urban Intermix. An area where improved property and wildland fuels meet with no clearly defined boundary.

Chapter 4 Risk/Hazard Assessment and Mitigation

4.1* General. The AHJ shall develop a written risk and hazard assessment and mitigation plan based on values at risk and consistent with fire fighter and public safety.

4.2 Values at Risk.

4.2.1 The AHJ shall involve the community, landowners, industry, and other stakeholders in the identification of values to be protected within the jurisdiction.

4.2.2 The values shall include, but not be limited to, health, safety, property, and resource values, as well as the social, economic, environmental, and political concerns of the local jurisdiction.

4.3 Ignition Risk Assessment.

4.3.1 The AHJ shall evaluate the potential and historical sources of ignition.

4.3.2* The evaluation shall include both natural and human sources of ignition.

4.4* Fire Hazard Assessment.

4.4.1 The AHJ shall assess the severity of wildland fires within or threatening the jurisdiction.

4.4.2 The assessment shall consider, but not be limited to, the following:

(1) Vegetation (fuels)
(2) Topography
(3) Aspect
(4) Fire history
(5) Historical fire weather
(6) Fire danger rating
(7) Potential fire behavior
(8) Fire-fighting capabilities and limitations

4.4.3 In the assessment of wildland/urban interface hazards to structures, the requirements in NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire*, shall apply.

4.5* Mitigation Plan.

4.5.1 Plan Development. Based on the values, ignition risk assessment, and fire hazard assessment, the AHJ shall develop a plan identifying the required mitigation activities, responsible party, priorities, and implementation schedule.

4.5.1.1* This plan shall be developed and implemented in coordination with the stakeholders.

4.5.2 Activities. The mitigation activities shall include, but not be limited to, the details outlined in 4.5.3 through 4.5.8.

4.5.3 Ignitions. The AHJ shall identify the prevention activities that reduce the occurrence of human-caused ignition.

4.5.4 Fuels Treatment.

4.5.4.1 The AHJ shall identify activities necessary to mitigate fire behavior characteristics through fuel modification.

4.5.4.2 Acceptable methods of fuel treatment include, but are not limited to, prescribed burning by qualified personnel, mowing, pruning, removing, species substitution, mulching, chemical treatments, converting to compost, and grazing.

4.5.5* Public Education. The AHJ shall appoint a qualified individual(s) whose duties shall include, but not be limited to, the following:

(1) Scheduling and facilitating public meetings to identify values at risk, wildland fire threats, and potential mitigation strategies
(2) Disseminating information concerning activities and their status through development and distribution of prevention information
(3) Familiarizing press and media representatives with the threat of wildland fire and mitigation strategies

4.5.6 Structures.

4.5.6.1 Where a wildland fire ignition risk and fire hazard severity assessment indicates the need, mitigation activities for existing construction shall be consistent with NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire.*

4.5.6.2 The design criteria for new construction and land development in and near wildland fire threats shall be consistent with NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas*, and NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire.*

4.5.7 Infrastructure. The AHJ shall evaluate and consider the need for modification or additions to the infrastructure, including the following:

(1) Roads — including ingress/egress
(2) Water supply
(3) Communications
(4) Utility corridors
(5) Transportation corridors
(6) Airports

4.5.7.1 All new or modified infrastructure shall comply with the provisions of NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas.*

4.5.8* Special Considerations. The AHJ shall comply with civil and environmental laws in the planning and implementation of mitigation activities, including those pertaining to threatened and endangered species and historical and cultural resources.

4.6* Evaluation of Mitigation Plan. The AHJ shall review the mitigation plan annually to monitor progress of mitigation activities and to determine if priorities have changed.

Chapter 5 Preparedness

5.1 Fire Response Planning.

5.1.1 The AHJ shall evaluate the capabilities and limitations of existing fire-fighting resources.

5.1.2 When the situation indicates that additional resources are needed, consideration shall be given to the following:

(1)*Mutual Aid and Cooperative Fire Protection agreements
(2) Budget adjustments for additional personnel, apparatus, or other equipment
(3) Government and private sector grants
(4) Volunteer recruitment
(5) Additional training
(6) Improved tactics
(7) Use of improved and innovative techniques

5.1.3 Preparedness Planning. The AHJ shall develop a written preparedness plan(s) for wildland fire control consistent with fire fighter and public safety.

5.1.3.1 The plan(s) shall be based on life safety, followed by property and natural resources to be protected, as well as the political, social, economic, environmental, and other concerns of the local jurisdictions.

5.1.3.2 This plan shall be reviewed annually and, as a minimum, include the following:

(1) Identification of specific wildland fire hazards, ignition risks, and potential hazard areas within the jurisdiction and other hazards that negatively affect wildland fire control efforts
(2) Identification of fire protection features such as lakes, rivers, water points, natural firebreaks, potential escape routes, and other areas or features that are beneficial to wildland fire control efforts
(3)*A list of fire-fighting resources, including personnel, apparatus, and equipment
(4) A list of all cooperating agencies and other mutual aid resources and the procedures for requesting assistance from those agencies and resources
(5) A reference to any and all existing mutual aid agreements, contracts, and other protection agreements applicable to wildland fire control efforts
(6) A list of specific objectives relating to training, safety, response times, and staffing levels
(7) A list of other resources that provide analyses of fire cause, identification of special fire hazards, identification of ignition risks, assessment of wildland/urban interface and intermix fire protection problems, and proposed measures to reduce fire occurrence

5.2* Financial Planning. The financial element of the preparedness plan shall include, as a minimum, the contractual agreements to provide for the following services:

(1) Fuel, oil, and lubricants
(2) Medical services, including injury reports
(3) Catering services, food, and drinking water
(4) Personnel hiring and hourly pay
(5) Outside services, including lodging and communications
(6) Equipment maintenance
(7) Specialized fire-fighting equipment
(8) Purchasing practices, procedures, and agreements
(9) Other incident support

5.3* Safety Requirements. The AHJ shall develop safety requirements that include 5.3.1 through 5.3.5.

5.3.1 The AHJ shall develop a safety program that includes all aspects of wildland fire incident operation, personnel welfare, and the use of personal protective clothing and equipment.

5.3.1.1 The program shall be established in accordance with jurisdictional policies and procedures and reflect the established guidance provided by NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program.*

5.3.1.2* All personal protective clothing and equipment shall meet the requirements of NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting.*

5.3.2 The safety officer's function shall be to carry out duties in accordance with established wildland fire incident procedures and the criteria outlined in NFPA 1521, *Standard for Fire Department Safety Officer.*

5.3.3 Protective measures shall be taken for apparatus and equipment used during wildland fire incidents.

5.3.4 Equipment operators shall meet the requirements of NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*, and be properly trained as outlined in NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program.*

5.3.5 The AHJ shall follow the medical examination standards established in NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments.*

5.4* Training and Qualifications.

5.4.1 All personnel responding to wildfires shall meet the requirements of NFPA 1051, *Standard for Wildland Fire Fighter Professional Qualifications.*

5.4.2* All wildland fire fighters shall have a working knowledge of basic wildfire safety standards and procedures.

5.4.3* All members of the fire protection organization involved in wildland fire suppression shall be trained in safety procedures around air operations.

Chapter 6 Incident Management

6.1* Organizational Structure. In the management of wildland fire incidents, the AHJ shall utilize an incident management system (IMS) as specified in NFPA 1561, *Standard on Emergency Services Incident Management System.*

6.1.1 At the initial stages of the incident, all command and support functions shall be the direct responsibility of the incident commander (IC).

6.1.2 As the incident grows in size and complexity, the functions shall be delegated as appropriate to qualified personnel.

6.2* General Staff Functions. Each of the following functions as specified in 6.2.1 through 6.2.10 shall be addressed regardless of the size and complexity of the incident:

(1) Command
(2) Operations
(3) Planning
(4) Logistics
(5) Finance

6.2.1* Incident Command Functions.

6.2.1.1* The responsibilities of incident command shall be carried out by the IC. These responsibilities shall include, but not be limited to, the following:

(1)*Developing the command organization for the incident
(2) Establishing a command post
(3) Developing, reviewing, revising, evaluating, approving, and distributing an incident action plan (IAP) for each operational period
(4) Ensuring adequate safety measures are followed, using the following principles:
  (a) Activities that present a significant risk to the safety of fire fighters shall be limited to situations where there is a potential to save endangered lives.
  (b) In those situations where improved property is threatened but lives are not at risk, threats to fire fighter safety shall be minimized.
(5) Maintaining incident command throughout the duration of the incident, including transfer and termination of command
(6)*Acquiring a formal Delegation of Authority
(7) Controlling access of essential and nonessential individuals to the incident scene
(8) Maintaining awareness of situation status
(9) Evaluating progress of fire control
(10) Maintaining awareness of deployment of all assigned units
(11) Maintaining personnel accountability
(12) Requesting additional resources as needed
(13) Notifying key people, officials, and the agency administrator of incident status
(14) Approving release of information to the public
(15) Approving the demobilization of resources

6.2.2* Command Staff Functions. Standard operating procedures (SOPs) shall define the roles and responsibilities of responders assigned to command staff functions. Three specific staff positions shall be identified: information officer, liaison officer, and incident safety officer.

6.2.3* Additional staff functions shall be assigned, depending on the nature and location of the incident or on requirements established by the IC.

6.2.3.1 The IC shall make assignments based on the availability, qualifications, and expertise of individuals.

6.2.4 Information Officer.

6.2.4.1 The information officer shall develop and release information about the incident to the news media, to incident personnel, and to other appropriate agencies and organizations.

6.2.4.2 Only one information officer shall be assigned for each incident, including incidents operating under Unified Command and multijurisdictional incidents.

6.2.4.3 The information officer shall be permitted to have assistants as necessary, and the assistants shall be permitted to also represent assisting agencies or jurisdictions.

6.2.4.4 Responsibilities of the Information Officer. The following are the major responsibilities of the information officer, which shall apply to any incident:

(1) Determine from the IC if there are any limits on information release
(2) Develop material for use in media briefings
(3) Obtain IC's approval of media releases
(4) Inform media and conduct media briefings
(5) Arrange for tours and other interviews or briefings as requested
(6) Obtain media information that can be useful to incident planning
(7) Maintain current information summaries and/or displays on the incident and provide information on status of incident to assigned personnel
(8) Maintain unit log

6.2.5 Liaison Officer.

6.2.5.1 Incidents that are multijurisdictional, or have several agencies involved, shall be permitted to establish the position of liaison officer on the command staff.

6.2.5.2* The liaison officer shall be the contact for the personnel assigned to the incident by assisting or cooperating agencies.

6.2.5.3 The following are the major responsibilities of the liaison officer, which shall apply to any incident:

(1) Be a contact point for agency representatives
(2) Maintain a list of assisting and cooperating agencies and agency representatives
(3) Assist in establishing and coordinating interagency contacts
(4) Keep agencies supporting the incident aware of incident status
(5) Monitor incident operations to identify current or potential inter-organizational problems
(6) Participate in planning meetings and provide current resource status, including limitations and capability of assisting agency resources
(7) Maintain unit log

6.2.6 Incident Safety Officer.

6.2.6.1 SOPs shall define criteria for the response or appointment of an incident safety officer.

6.2.6.2 If the incident safety officer is designated by the IC, the fire department shall establish criteria for appointment based upon 6.2.3.1.

6.2.6.3* The incident safety officer and assistant incident safety officer(s) shall be specifically identifiable on the incident scene.

6.2.6.4 Incident Scene Safety.

6.2.6.4.1 The incident safety officer shall monitor conditions, activities, and operations to determine whether they fall within the criteria as defined in the fire department's risk management plan. When the perceived risk(s) is not within these criteria, the incident safety officer shall take action as outlined in 6.2.1.1(4).

6.2.6.4.2 The following are the major responsibilities of the incident safety officer, which shall apply to any incident:

(1) Participate in planning meetings
(2) Identify hazardous situations associated with the incident
(3) Review the incident action plan (IAP) for safety implications
(4) Exercise emergency authority to stop and prevent unsafe acts
(5) Investigate accidents that have occurred within the incident area
(6) Assign assistants as needed
(7) Review and approve the medical plan
(8) Maintain unit log

6.2.7 Operations Function. The operations function shall be responsible to the command function for carrying out the strategic and tactical plans of the incident and shall include incident and postincident planning and actions.

6.2.7.1 The responsibilities of operations are carried out by the IC until delegated to a qualified operations section chief. These responsibilities shall include, but not be limited to, the following:

(1) Evaluating, organizing, and assigning available resources following SOPs based on the scale and complexity of operations
(2) Evaluating the number of qualified and equipped people available, their physical condition, their experience and skill levels, and the daytime and evening hours they are available
(3) Evaluating the types and amount of equipment and apparatus normally available within a specified response time, where the resources are located, how quickly and easily they can be transported to the incident, and the suitability of such equipment for use in wildland fire control, considering terrain and other local conditions
(4) Carrying out tactical functions to support the IAP
(5) Ensuring that all safety elements of the IAP are followed
(6) Maintaining accountability for all tactical resources
(7) Developing the operations portion of the IAP in coordination with subordinate staff and other command functions
(8) Requesting resources as needed to implement the IAP
(9) Maintaining close contact with subordinate tactical supervisors
(10) Directing release of resources from assigned status (not release from the incident)
(11) Implementing tactical changes to the IAP during the operational period as necessary
(12) Maintaining close communication with the IC
(13) Maintaining unit log

6.2.8 Planning Function. The planning function shall be the responsibility of the IC for the preparation of all plans necessary to carry out the purpose and goals of the fire control organization.

6.2.8.1 The responsibilities of planning are carried out by the IC until delegated to a qualified planning section chief. These responsibilities shall include, but not be limited to, the following:

(1) Organizing a planning section to include the following units as necessary:
  (a) Resources unit
  (b) Situation unit
  (c) Documentation unit
  (d) Demobilization unit
  (e) Specialized positions
(2) Collecting, evaluating, developing, and disseminating information
(3) Accounting for organizational structure, availability of resources, and deployment of resources
(4) Maintaining, documenting, and displaying situation and resource status
(5)*Developing the proposed IAP in coordination with command and general staff
(6) Disseminating the IAP for each operational period
(7) Reassigning personnel already on site to IMS organizational positions as appropriate
(8) Determining the need for any specialized resources in support of the incident
(9) Overseeing preparation of incident demobilization plan
(10) Maintaining unit log

6.2.9* Logistics Function. The logistics function shall be responsible to the IC for providing support resources that meet the goals and purposes of the wildland fire control effort.

6.2.9.1 The responsibilities of logistics shall be carried out by the IC until delegated to a qualified logistics section chief and shall include, but not be limited to, the following:

(1) Assessing and determining the need for facilities, communications, support services, supplies, and equipment
(2) Organizing a logistics section to include the following units as necessary:
  (a) Supply unit
  (b)*Facilities unit
  (c)*Ground support unit
  (d)*Communications unit
  (e) Food unit
  (f)*Medical/fire fighter rehabilitation unit
(3) Managing all incident logistics
(4) Providing logistical input for preparing the IAP
(5) Identifying anticipated and known incident service and support requirements
(6) Requesting or acquiring additional resources as needed
(7) Preparing and disseminating the communications plan, medical plan, and traffic plan for the IAP
(8) Supporting demobilization

6.2.10 Finance/Administration Function. The IC shall be responsible for the finance/administration function for all aspects of financial management in support of the fire protection organization.

6.2.10.1 The responsibilities of finance/administration shall be carried out by the IC until delegated to a qualified finance section chief and shall include, but not be limited to, the following:

(1) Organizing a finance/administration section to include the following units as necessary:
  (a) Time unit
  (b) Procurement unit

(c) Compensation/claims unit
(d) Cost unit

(2) Managing all financial aspects of an incident
(3) Providing financial and cost analysis information to the IC and to others as requested
(4) Gathering pertinent information from briefings with responsible agencies
(5) Developing an operating plan for the finance/administration section
(6) Filling supply and support needs
(7) Meeting with representatives of assisting and cooperating agencies as needed
(8) Maintaining daily contact with agency administrator's headquarters on finance/administration matters
(9) Ensuring that all personnel time records are accurately completed and transmitted to home agencies, according to policy
(10) Providing financial input to demobilization planning
(11) Ensuring that all obligation documents (e.g., contracts, purchase orders) initiated at the incident are properly prepared and completed
(12) Following a methodology for the timely and accurate disbursement of funds

6.3 Multijurisdictional Incidents.

6.3.1* The AHJ shall develop a unified command system in coordination with other agencies that have jurisdiction at the incident scene.

6.3.2* The unified command system shall provide a plan to coordinate with other agencies that have jurisdiction at the incident scene.

6.3.3* This plan shall include a standard procedure to designate one IC or to establish unified command.

6.4 Coordination.

6.4.1* Where the incident is under the command authority of a single AHJ, the IC shall provide for liaison and coordination with all assisting and cooperating agencies.

6.4.2 Where the incident is under the overall jurisdiction of another agency that has not implemented an IMS, the AHJ shall utilize the IMS to manage its own operations and coordinate its activities with the agency having overall jurisdiction.

Chapter 7 Fire Suppression

7.1 Size-Up.

7.1.1 Upon arrival at a fire incident, the IC shall determine the extent of the fire and its potential for becoming a major event.

7.1.2 The IC shall immediately report the fire size-up to the communications center and request additional resources as necessary.

7.1.3 The following conditions shall be addressed:

(1) Special or unusual hazards or potential hazards
(2) Type and amount of fuel
(3) Terrain
(4) Present and predicted weather conditions
(5) Fire intensity and behavior
(6) Available resources
(7) Need for specialized personnel and equipment to address special or unusual hazards

7.2* Fire Attack and Control.

7.2.1 The IC shall deploy personnel and equipment to the incident according to strategic and tactical plans [the incident action plan (IAP)], within the priorities established for the incident and with consideration for the safety of civilians and fire-fighting personnel.

7.2.2 Once the threat to life and property is evaluated, the IC shall plan for and execute tasks necessary for the containment, control, and mop-up of the fire.

7.2.2.1 The plan of containment and control shall address the following:

(1) Fire fighter safety
(2) Available resources
(3) Proposed fireline location
(4) Method of fireline construction
(5)*Application of water and fire-fighting chemicals from ground and aircraft resources

7.3 Mop-Up and Demobilization.

7.3.1 When the IAP requires containment and control of the fire, the IC shall ensure that mop-up operations meet the needs of the local unit and facilitate the return of the incident to the local fire manager.

7.3.2 The IC shall begin an orderly demobilization of resources used on the fire as they are no longer needed.

Chapter 8 Post-Incident Activities

8.1* Reporting.

8.1.1 The AHJ shall complete and file incident reports as required.

8.1.2 Such reports, whether hard copy or electronic, shall be filed within the time frame specified by the state, provincial, or federal authority.

8.2 Incident Review and Close Out.

8.2.1 After completion of the incident, the AHJ, in conjunction with the IC, shall conduct a review of the actions taken during the incident.

8.2.2 Designated personnel from all functional areas of the fire shall be in attendance to provide for a thorough review of the operation.

8.2.3 The AHJ shall review all activities related to the fire incident, including safety practices and provisions; strategy and tactics; the deployment of personnel, equipment, and apparatus; support functions; and the overall management of the fire.

8.2.4 The AHJ shall take corrective actions in all areas where deficiencies exist or problems occurred.

8.2.5 All reviews and evaluations shall be conducted as constructive critiques to determine the facts related to the incident.

8.2.6 As a minimum, evaluations shall cover the following:

(1) Examination of accidents, injuries, or fatalities connected to the incident to determine cause(s) and contributing factors and, where applicable, to recommend corrective actions

(2) Examination of the actions used on the incident and confirmation of effective decisions or corrected deficiencies
(3) Identification and evaluation of new or improved procedures, techniques, or tactics used on the incident
(4) Identification of potential alternative procedures, techniques, tactics, or equipment for effective use in future incidents
(5) Examination of the incident to determine fire cause(s) and contributing factors and, where applicable, to recommend preventive or mitigating measures

8.3 Finance/Administration.

8.3.1 The AHJ shall satisfy all financial commitments related to the incident, including cost-share agreements.

8.3.2 The AHJ shall review and investigate any known financial claims or potential liabilities related to the incident.

8.3.3 The AHJ shall prepare and distribute, as required, a summary report that will provide the necessary information to initiate the issuing of reimbursable bills to the appropriate parties.

8.3.4 The AHJ shall establish a process to ensure payment is received as required.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.2 This standard provides wildfire management information and minimum requirements for communities in rural and forested areas. Many of these communities are exposed to the dangers of large fires involving many acres of natural fuels, such as forest, grass, or brush. To prepare for such emergencies, the responsible fire protection organizations and individuals should be aware of the most recent and useful wildland fire management techniques, equipment, training, and operations.

This standard includes a list of mandatory requirements that must be met if fire fighters are to be safe in the prevention and suppression of wildland fires. Additional information on large equipment, heavy power tools, specialized wildland firefighting equipment, and techniques for landscape management, prescribed fire, smoke management, community and subdivision planning, and other mitigation measures is available in other publications.

In many rural and wildland areas, forest, grass, crop, and brush fires are a continual problem. These fires, if not controlled, can endanger human life and cause serious damage to property, natural resources, and the environment. Evaluation of wildland fires has shown that fire damage can be prevented or minimized if mitigation efforts are made and when, in the case of such fires, aggressive suppression actions by trained fire fighters are executed in the early stages of fire development.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.2.4 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations do not recognize equipment as listed unless it is also labeled. The authority having jurisdiction should utilize the system employed by the listing organization to identify a listed product.

A.3.3.2 Apparatus. Examples include fire engines, water tenders, and ladder trucks.

A.3.3.6 Company. Companies are often assigned to specific apparatus or stations.

A.3.3.15 Incident Action Plan (IAP). The plan might be oral or written. When written, the plan might have a number of attachments, including incident objectives, organization assignment list, division assignment, incident radio communication plan, medical plan, traffic plan, safety plan, and incident map. Formerly called "shift plan."

A.3.3.17 Incident Management System (IMS). The system is also referred to as an incident command system (ICS). [**1561,** 2008]

A.3.3.29 Unified Command. Unified command is a team effort that allows all agencies with jurisdictional responsibility, either geographical or functional, to manage an incident by establishing a common set of objectives and strategies. This should be accomplished without loss of or abdication of authority, responsibility, or accountability.

A.3.3.30 Values at Risk. Such resources include timber, watershed, wildlife, unique scenic and recreation areas, range, air quality, structures, and people.

A.3.3.32 Wildland Fire. The terms *wildfire* and *wildland fire* are often used interchangeably by many in and out of the fire protection community. This document prefers the term *wildland fire* as all encompassing when referring to fires in the wildland, wildland/urban interface, and/or wildland/urban intermix areas.

A.3.3.33 Wildland/Urban Interface. The term *wildland/urban interface* can distort the perception of the primary issue. It can

direct attention to "where" structures are located (e.g., at the edge of communities near the wildland) rather than if they are highly ignitible. And if so, the focus on "where" can result in a concern about things that won't make a big difference in reducing structure loss (i.e., how fire fighters and equipment get there, what type of fire equipment is needed, and the location of fire hydrants and water sources). How wide the roads are and where the fire hydrants are located become of little value if there are more structures at risk than equipment to protect them, or if it's too dangerous to safely be there with firefighting forces.

The essence of this issue is not where structures and domestic landscapes adjoin wildland, but the location, density, and availability of ignitible structures. Which structures are at the greatest risk, ignition-resistant homes bordering the wildland or a dense subdivision with wood shingle roofs several miles away from wildland fuels? The wildland/urban interface is not geographic location but rather a set of conditions that can exist in many communities. [**1144,** 2013]

A.3.3.34 Wildland/Urban Interface Coordinator. This person coordinates with local residents, local government, and the responsible fire service agency.

A.4.1 The wildland/urban interface coordinator should be responsible for developing the risk and hazard assessment with community and stakeholder involvement. For specific information regarding hazard and risk assessment in wildland areas, refer to NFPA 1144, *Standard for Reducing Structure Ignition Hazards from Wildland Fire*, Figure A.4.1.2, which shows a structure assessment guide, and Table A.4.1.2, which illustrates a sample structure assessment rating form.

A.4.3.2 These sources can include, but are not limited to, the following:

(1) Natural occurrences (e.g., lightning, volcanic eruptions)
(2) Utility and transportation corridors
(3) Industry
(4) Recreation
(5) Arson

A.4.4 The probability of a wildland fire starting is largely dependent on an ignition source, fuel conditions, and the weather. Accurate determination of fire danger can be made only through specific weather-related observations such as temperature, humidity, wind speed, and fuel moisture. These observations are used by systems such as the National Fire Danger Rating System and the Canadian Forest Fire Danger Rating System.

A seasonal risk analysis is a method of incorporating important information into a fire hazard assessment. A seasonal risk analysis requires fire managers to step back, review current and predicted weather and fuels information, compare this information with historic weather and fuels records, and predict the upcoming fire season's severity and duration for any given area. It is important to incorporate drought indices into this assessment. Information from a seasonal risk analysis can be used to modify step-up and re-attack plans. It provides the basis for actions such as prepositioning critical resources, requesting additional funding, and modifying memoranda of understanding (MOUs) to meet anticipated needs.

Each field office selects and compares to normal the current value and seasonal trend of one or more of the following indicators that are most useful in predicting fire season severity and duration in that field office's area:

(1) National Fire Danger Rating System (NFDRS) [or Canadian Forest Fire Danger Rating System (CFFDRS)] index values [Energy Release Component (ERC), Burning Index (BI)]
(2) Temperature levels
(3) Precipitation levels
(4) Humidity levels
(5) Palmer Drought or Standardized Precipitation Index
(6) 1000-hour fuel moisture (timber fuels)
(7) Vegetation moisture levels, live fuel moisture (brush fuels), and curing rate (grass fuels)
(8) Episodic wind events (moisture drying days)

A.4.5 It is important to identify problems or potential problems accurately. Any wildland fire mitigation planning process that does not accurately assess or identify wildland fire prevention problems is doomed to fail. Identification of priority wildland fire mitigation should look at a number of variables, including ignition risks, fire hazards, and values.

Once risks, hazards, and values have been evaluated, it is possible to determine when, where, and how to implement fire mitigation programs. By comparing an area's potential to have an ignition (risks) with its potential to burn after ignition (hazards) and identifying the values threatened by a wildland fire, a fire prevention plan can be written. This plan can focus on the highest priority wildland fire problems within a given area. It is not necessary to have an extensive fire mitigation effort in an area where a number of risks exist but the hazard is minimal and no real values are threatened. In contrast, it is important to have a comprehensive effort in an area where there are substantial risks, a high hazard, and a threat to high values.

The wildland fire mitigation plan should address what needs to be done in each area based on the type of activities and uses. It should clearly define what actions will take place and when, and who is responsible. Wildland fire mitigation activities generally fall into three broad categories:

(1) *Education.* Education is aimed at changing people's behavior by informing them. People can be informed through printed materials, mass media (radio, television, etc.), one-on-one contacts, or group presentations. Information can also be delivered through signs, displays, fairs, parades, and so forth.
(2) *Engineering.* Engineering is an activity designed to shield an ignition source (e.g., spark arrester) or remove the fuel that would ignite from a spark (e.g., clearance around a home).
(3) *Enforcement.* Enforcement is used to gain compliance with fire codes and ordinances. The wildland fire mitigation plan should select the most cost-effective mix of activities to mitigate potential fire problems within each priority area. The wildland fire mitigation plan should be evaluated annually. If ignitions are occurring in an area where an active fire mitigation program is implemented, the fire mitigation activities should be reviewed. This review could result in a change of activities within the area. If the plan is working, there will be no need to make any changes.

A.4.5.1.1 Examples of stakeholders include, but are not limited to, the following:

(1) Neighboring fire organizations
(2) Police organizations
(3) Public works agencies
(4) Service/support organizations
(5) Public utilities

(6) Medical/health facilities
(7) Media and the general public
(8) Dispatch/communications centers
(9) Insurance companies
(10) Local government stakeholders
(11) Homeowner organizations
(12) Environmental agencies and organizations
(13) Planners, builders, and developers
(14) Other special interest groups

These stakeholders could have plans or activities that should be integrated with the wildfire mitigation plan. Furthermore, the jurisdiction for which the AHJ is developing the mitigation plan might be required to develop a Community Wildfire Protection Plan (CWPP) as mandated by the federal Healthy Forests Restoration Act (P.L. 108-148). The guidelines for CWPPs require stakeholder coordination and should be followed in this case. Guidelines can be found at http://www.safnet.org/policyandpress/cwpphandbook.pdf.

A.4.5.5 Depending on the needs of the AHJ, an individual with qualifications as a public fire and life safety educator or as a public information officer might be suitable. NFPA 1035, *Standard for Professional Qualifications for Fire and Life Safety Educator, Public Information Officer, and Juvenile Firesetter Intervention Specialist*, provides information on qualifications for these types of positions.

A.4.5.8 In the pursuit of wildfire safety and mitigation, the AHJ will need to carefully coordinate plans and activities with a wide variety of stakeholders. In this process, care should be taken to avoid conflicts with existing laws or local ordinances and to minimize the possibility of creating new hazards (fire and other) while mitigating identified wildfire hazards.

A.4.6 Periodic review and revision of the mitigation plan will help to determine if activities are reaching the goals of reducing fire hazards and if priorities need to be shifted to meet changing conditions.

A.5.1.2(1) Several model plans exist. Some state and federal agencies have standard elements for inclusion in such plans. *NFPA 1600, Standard on Disaster/Emergency Management and Business Continuity Programs*, provides additional guidance to the AHJ for developing all-hazard preparedness plans and ensuring consistency with state and federal plans.

The AHJ should use the following as the basis for establishing new cooperative agreements and for reviewing existing cooperative agreements:

(1) Cooperation in prevention, pre-incident, and suppression operations *[see Figure A.5.1.2(1)(a) and Figure A.5.1.2(b) for model agreement language]*
(2) Coordination in development and implementation of wildland fire control plans, protection standards, strategies, tactics, and procedures
(3) Identification of parties responsible for implementing various aspects of the agreement
(4) Existence of a command structure *(see Chapter 6)*
(5) Communications capability
(6) Minimum qualification requirements of personnel
(7) Existence of an annual operating plan used to define and update specific operating procedures prior to each fire season

A.5.1.3.2(3) *Equipment and Apparatus.*

Hand Tools. Tools needed will vary by sections of the country due to differences in fuels, soil, and topography. All equipment selected for fire control work should be dependable, properly maintained, and used for the type of work for which it was designed. Many national standards and specifications are available to help fire department organizations purchase the proper equipment. Assistance in selecting appropriate tools can be obtained from federal, state, or provincial wildland fire-fighting agencies.

Power Saws. It is not necessary that fire suppression organizations own power saws; they are frequently available from woods operators, the same operators that communities often rely on for additional fire-fighting manpower. Information on power saws can be secured from the manufacturers as well as from operators who have used the various makes and types. Because fire suppression can require carrying saws long distances over rough terrain, saw weight is an important consideration. Saws should be equipped with adequate spark arresters to minimize the possibility of hot exhaust particles igniting nearby fuels. References for information on approved spark arresters for power saws can be found in Annex C.

Tractor Plows and Dozers. Tractor plows and dozers are valuable tools for wildland fire suppression *[see Figure A.5.1.3.2(3)(a) and Figure A.5.1.3.2(3)(b)]*. Most fire departments will not find it economical to own tractors or bulldozers, but they should carefully evaluate the use possibilities under existing conditions of terrain, fuels, and rates of fire spread. Heavy tractor equipment is frequently available from construction and logging operators, whose names and telephone numbers should be included in the fire plan. Recommendations for safe operation of tractor plows and dozers can be found in the National Wildfire Coordinating Group (NWCG) *Fireline Handbook*.

Any tractor plows or dozers used for wildland fire suppression should be equipped with protective canopies, winches, and adequate lights for operating at night. Unless turbocharged, tractor plows or dozers should also be equipped with approved spark arresters. References for information on approved spark arresters for tractor plows and dozers can be found in Annex C.

A.5.2 *Supplemental Fire Suppression and Cost-Share Agreement.* This agreement provides for a coordinated cooperative fire suppression operation on this fire and describes the cost divisions. This agreement is a supplement to the master agreement/contract among the agencies listed. See http://www.nwcg.gov/teams/ibpwt/documents/cooprelations/master_coop_agreement_template.pdf for the full text of the master agreement template. *(See Figure A.5.2.)*

A.5.3 Fire fighting requires fast action, sustained effort, and greater energy than most other work. Fire fighting is always potentially hazardous. In the United States, fire fighting has one of the highest accident rates of any occupation. Wildland fire control can be particularly hazardous unless the necessary safety procedures and principles are constantly practiced and obeyed. Most accidents can be prevented by careful procedures and training before emergencies. The safety and welfare of the entire fire-fighting organization are the responsibility of the incident commander. All persons in authority are likewise responsible for the safety of the personnel under their direction.

SAMPLE FIRE DEPARTMENT MUTUAL AID AGREEMENT

WHEREAS, the governmental units of _____ have rendered mutual aid in fire services in the past and anticipate a continuing demand for such mutual aid and cooperation in the use of their fire personnel and equipment for the safety, health, and welfare of the people of their respective governmental units during times of emergency;

NOW THEREFORE, _____ does hereby agree that its fire department will render mutual aid to _____ under the following conditions:

(1) In the event of any serious emergency, the parties to this agreement shall cooperate in an effort to provide fire services subject to the terms and conditions prescribed in this agreement.

(2) The fire chief, the director of public safety, or commanding officer of the fire department of the parties to this agreement, or such other individual as the governing body of such governmental unit may from time to time designate by resolution, shall have the authority in the event of serious emergency to determine whether men and/or equipment shall be sent beyond the jurisdictional limits of the responding party. It is the intention of this agreement to vest in each party to this agreement the sole right to determine when its needs will permit it to respond to a call by the other unit of government, and it is further agreed by the parties thereto that if the fire department shall refrain from sending any personnel and/or equipment beyond its jurisdiction, that such unit thus failing to respond shall not be liable for damage to the party to this agreement.

(3) The fire chief, director of public safety, or commanding officer of the department requesting mutual aid shall be in command of all units responding from other governmental units. All personnel and equipment of a responding unit shall be under the immediate command of the highest ranking officer attached to such responding units. All commands and orders for the use of such personnel and equipment shall be made for the commanding officer of the requesting department through the ranking officer of the units responding, whenever possible. The officer in charge of the department sending assistance shall, however, at all times have the power to recall to the responding department any personnel or equipment from an assistance mission.

(4) Each governmental unit entering this agreement shall continue to provide the same salaries, compensation for death or disability, and retirement and furlough payments to their employees who are assigned to render assistance to another governmental unit in performance of this agreement as that employee would receive if on duty within the corporate limits of the governmental unit by which he or she is employed. (Cost of repairs and maintenance of equipment used or expended while rendering assistance under this agreement will be borne by the governmental unit owning the equipment.)

(5) When a governmental unit responds with mutual aid, it should be understood that the responsibility of providing and/or requesting aid to protect the unprotected area is that of the responding unit.

(6) Either party to this agreement shall be permitted at any time to withdraw from further participating in this agreement by giving 30 days prior written notice of termination to the other parties of this agreement.

In witness whereof, the parties sign and execute this agreement as of this _____ day of _____, 20____.

NFPA 1143

FIGURE A.5.1.2(1)(a) Sample Fire Department Aid Agreement. ***(Source: Michigan Townships Association, www.michigantownships.org)***

MODEL COOPERATIVE FIRE PROTECTION AGREEMENT

Suggested Items for Consideration During Development

I. Title

II. Authorities

Reference applicable laws or higher level agreements.

III. Purpose/Recitals

Describe why agreement is necessary.
Describe who is involved.
Describe mutual benefit.

IV. Definitions

The key definitions in this section will standardize usage in the context of the agreement, thereby simplifying and improving communications. Include as appropriate key definitions such as the following:

Reciprocal (Mutual Aid) Fire Protection: Reciprocal initial attack zones for lands of intermingled or adjoining protection responsibility can be established. Within such zones a supporting party will, upon request or voluntarily, take initial attack action in support of the protecting party as they are in a position to provide. The protecting party will not be required to reimburse the supporting party for costs incurred. The reciprocal assistance period, defined in Annual Operating Plans, does not usually exceed 24 hours.

Reimbursable (Cooperative) Fire Protection: The protecting party can request fire suppression resources from supporting parties, per conditions set in the agreement, (and Annual Operating Plans). Such resources are to be paid for by the protecting party.

Offset (Exchange) Fire Protection: The parties are permitted to exchange responsibility for fire protection for lands under their jurisdiction. The rate of exchange will be based upon comparable cost, acreage involved, complexity, and other factors as might be appropriate and mutually agreed to by the parties. The exchange zones are often documented in Annual Operating Plans. The goal is to gain an equal exchange that provides greater overall fire protection.

Fee Basis (Contract) Fire Protection: For an agreed upon fee, one party is permitted to assume fire protection responsibilities on lands under the jurisdiction of another. The terms and conditions of such arrangements are generally outlined in a contract agreement.

Annual Operating Plan: An annually updated document that outlines operational procedures in support of a multi-year Cooperative Fire Protection Agreement. Annual Operating Plans are normally developed locally, and must be authorized by appropriate officials.

V. Interagency Cooperation

Identify sources of oversight and direction as needed to cover specific actions. Require local Annual Operating Plans. Enable and direct cooperative efforts, such as the following:

(1) Area coordinating group
(2) Local cooperative initiatives
(3) Joint projects and local agreements
(4) Incident command system
(5) Interagency dispatch centers/service centers
(6) Multi-agency coordination (MAC) groups
(7) Fire prevention
(8) Prescribed fire and fuels management
(9) Licensing training
(10) Communication systems
(11) Weather data processing system
(12) Automatic weather stations
(13) Aviation operations
(14) Joint facilities
(15) Inmate use
(16) Military resources

VI. Fire Protection

Define jurisdictional responsibilities and limitations. Include protection area and boundaries. Methods of fire protection assistance pursuant to agreement, as follows:

(1) Reciprocal
(2) Reimbursable
(3) Offset
(4) Fee basis or contract

VII. Fire Suppression

(1) Closest forces concept
(2) Shared resources
(3) Joint resources
(4) Fire notifications
(5) Protection priorities

NFPA 1143 (p. 1 of 2)

FIGURE A.5.1.2(b) Model Cooperative Fire Protection Agreement. *(Source: National Wildland/ Urban Interface Fire Program)*

MODEL COOPERATIVE FIRE PROTECTION AGREEMENT *(continued)*

(6) Boundary fires
(7) Independent action on lands protected by another agency
(8) Applicable suppression response policies
(9) Escaped fire situation analysis (EFSA)
(10) Determination of cause and preservation of evidence
(11) Fire reports and documentation
(12) Post-fire analysis
(13) Law enforcement actions
(14) Fire disasters and relief

VIII. Reimbursements

Appropriated fund limitation: "Nothing herein shall be interpreted as obligating the parties to this agreement to expend funds, or as involving them in any contract or other obligation for the future payment of money in excess of appropriations authorized by law and administratively allocated for the work contemplated in this Agreement."

(1) Specific reimbursable services and procedures
(2) Cost sharing (for incidents affecting more than one agency)
(3) Procurement
(4) Billing procedures

IX. General Provisions

(1) Duration of emergency assignments
(2) Loaned equipment
(3) Mutual sharing of information
(4) Local cooperation (levels in terms of geographical authority)
(5) Accident investigations
(6) Nonwildland fire and medical aid responses
(7) Previous agreements (replacement intentions)
(8) Employment policy
(9) Suppression and damage collection
(10) Waiver of claims (liability responsibility to remain with employing party)
(11) Third-party claims (liability to third parties)
(12) Officials not to benefit ("No member of, or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this Agreement or to any benefit to arise therefrom, unless it is made with a corporation for its general benefit.")
(13) Amendments procedures
(14) Examination and audit (specific auditable agreement provisions)
(15) Civil rights
(16) Duration of agreement (number of years or indefinite; describe termination progress

NFPA 1143 (p. 2 of 2)

FIGURE A.5.1.2(b) ***Continued***

FIGURE A.5.1.3.2(3)(a) A Dozer Properly Equipped with Protective Canopy, Lights, Brush Guards, and a Winch.

FIGURE A.5.1.3.2(3)(b) Tractor Plows Being Used in Suitable Terrain to Build Firelines Along the Flanks and Rear of a Wildland Fire. ***(Source: Florida Division of Forestry)***

SUPPLEMENTAL FIRE SUPPRESSION AND COST-SHARE AGREEMENT

Exhibit F

The purpose of this agreement is to provide for a coordinated cooperative fire suppression operation on this fire and to describe the cost divisions. This agreement is a supplement to the Master Cooperative Wildland Fire Management Agreement or _____ (list other agreement and number) between the agencies listed.

(1) Fire name _____ Origin date _____ Time _____

(2) Origin: Township _____ Range _____ Section _____

(3) Estimated size _____ acres at the time of this agreement.

(4) Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____
Agency _____ Fire # _____ Accounting code _____

(5) This agreement becomes effective on: _____

_____

at _____ and remains in effect until amended or terminated.

(6) Overall direction of this incident will be by ( ) Unified Command, or by ( ) Single Command structure. Identify below personnel filling the following positions:

Position	Name(s)	Agency
Incident Commander		
Agency Administrator		
Representative		
Liaison		
Finance		
Operations		

(7) Suppression action will be subject to the following special conditions and land management considerations:

_____

_____

_____

(8) Geographic responsibility (if appropriate) by agency is defined as follows:

Agency _____ Geographic responsibility _____
Agency _____ Geographic responsibility _____
Agency _____ Geographic responsibility _____
Agency _____ Geographic responsibility _____

NFPA 1143 (p. 1 of 2)

FIGURE A.5.2 Sample Supplemental Fire Suppression and Cost-Share Agreement. *(Source: Master Cooperative Wildland Fire Management and Stafford Act Response Agreement, National Wildfire Coordinating Group, 2007)*

SUPPLEMENTAL FIRE SUPPRESSION AND COST-SHARE AGREEMENT *(continued)*

(9) The agency responsible for structural protection will be _____

_____

(10) Special operational conditions agreed to (include as appropriate air operations, base camp, food service, fire investigation, security, etc.). List cost share information in Item #11.

_____

_____

_____

_____

_____

_____

_____

(11) Fire suppression COSTS will be divided between agencies as described:

Cost Centers	Agency	Agency	Agency

(12) Other conditions relative to this agreement (notifications, incident information, etc.) _____

_____

_____

(13)

Agency	Agency	Agency	Agency
Signature	Signature	Signature	Signature
Title/Date	Title/Date	Title/Date	Title/Date

List of attachments (if any): _____ / _____ / _____

NFPA 1143 (p. 2 of 2)

FIGURE A.5.2 *Continued*

A.5.3.1.2 During wildland fire suppression activities, protective clothing should include approved head protection, gloves, protective footwear, and flame-resistant clothing as defined in NFPA 1977, *Standard on Protective Clothing and Equipment for Wildland Fire Fighting*.

Hard hats greatly reduce the number of serious injuries and must be worn on the fireline. A safety hard hat with chin strap is preferred, but a standard fire fighter's helmet can be permitted to be worn as an alternative. Lightweight "bump" hats are unacceptable because they do not provide adequate protection in wildland fire control.

Footwear should be leather lace-up boots. It is recommended that boots be without steel toes except for those used by chain saw operators. The boots should have slip-resistant soles, such as a hard rubber lug-type or tractor tread, which allows for maximum traction and prevents melting when exposed to normal fireline conditions. Soles should not be made of composition rubber or plastic, which have low melting points. This does not preclude the use of boots with smooth, hard rubber soles or those with a well-defined tread. However, the disadvantage of those soles is their tendency to slip on smooth rocks, logs, dry grass, and pine needles, surfaces that are often encountered in wildland fires. The height of the boot tops should be a minimum of 15.24 cm (6 in.), with 20.32 cm (8 in.) or greater preferred. Low-quarter boots or shoes should not be worn because they do not provide ankle support, keep out sparks and dirt, or protect from stubs and other foreign objects. Pull on–type boots, such as structural fire-fighting rubber boots, cowboy boots, or engineering boots, are not recommended because they do not provide adequate ankle support and protection, do not keep out sparks and dirt, and are loose-fitting and can cause blisters.

Fire shelters should be worn only by individuals trained in their use but should be available for use by all fire fighters during suppression activities. If available, flame-resistant clothing specially designed for wildland fire fighting should be worn. If flame-resistant clothing is not available, fire fighters should wear loose, cuffless trousers and shirts made of cotton or wool. Loose-fitting clothing reduces chafing and affords more protection. Collars and cuffs should be buttoned to protect the arms and neck from heat, burns, scratches, and insects. Gloves should be worn to protect hands and make hand work easier. Fire fighters should wear goggles for eye protection in excessively smoky or dusty environments.

A.5.4 All personnel should receive initial and refresher training in first aid, fireline safety, fire behavior, and techniques and methods of wildland fire suppression. Hands-on training with hand tools and equipment, as well as crew and fireline organization, should be included. Crew leaders and company officers need specialized training in fire control tactics to ensure their competence when directing fire suppression operations. It is recommended that cooperative training with other wildland fire control organizations be conducted. Federal, state, and provincial forest fire officers have technical training materials and are usually available to assist.

Many organizations have established programs to provide training in structural fire fighting. Training in wildland fire tactics and techniques can be obtained from state, provincial, or federal wildland fire protection agencies, which frequently conduct special fire schools, seminars, and other forms of instruction. A number of publications dealing with wildland fire control are available from state forestry offices or from the National Wildfire Coordinating Group (NWCG). *(See Annex C.)*

A.5.4.2 The safety and welfare of personnel are the first and foremost considerations in all incident operations and decisions. The following references provide basic knowledge of fire suppression safety standards and procedures:

(1) Fire behavior: NWCG S-190, *Introduction to Fire Behavior*
(2) Ten standard fire orders: NFES 0065, *Fireline Handbook*. These orders are categorized as follows:
  (a) Fire behavior
    i. Keep informed on fire weather conditions and forecasts.
    ii. Know what your fire is doing at all times.
    iii. Base all actions on current and expected behavior of the fire.
  (b) Fireline safety
    i. Identify escape routes and make them known.
    ii. Post lookouts when there is possible danger.
    iii. Be alert. Keep calm. Think clearly. Act decisively.
  (c) Organizational control
    i. Maintain prompt communications with your forces, your supervisor, and adjoining forces.
    ii. Give clear instructions and ensure they are understood.
    iii. Maintain control of your forces at all times.
  (d) If the preceding nine orders have been considered, the tenth order is this: Fight the fire aggressively, having provided for safety first.
(3) Eighteen "watch out" situations: NWCG-NFES 0065, *Fireline Handbook*
  (a) Fire not scouted and sized up
  (b) In country not seen in daylight
  (c) Safety zones and escape routes not identified
  (d) Unfamiliar with weather and local factors influencing fire behavior
  (e) Uninformed on strategy, tactics, and hazards
  (f) Instructions and assignments not clear
  (g) No communication link between crew members and supervisor
  (h) Constructing line without safe anchor point
  (i) Building line downhill with fire below
  (j) Attempting frontal assault on fire
  (k) Unburned fuel between you and the fire
  (l) Cannot see main fire and not in contact with anyone who can
  (m) On a hillside where rolling material can ignite fuel below
  (n) Weather becoming hotter and drier
  (o) Wind increasing and/or changing direction
  (p) Getting frequent spot fires across line
  (q) Terrain or fuels making escape to safety zones difficult
  (r) Feeling like taking a nap near the fireline
(4) Four major common denominators of fire behavior on fatal and near-fatal fires, as outlined in NWCG-NFES 2225, *Common Denominators of Fire Behavior on Tragedy and Near-Miss Forest Fires*, are as follows:
  (a) On relatively small fires or deceptively quiet areas of large fires
  (b) In relatively light fuels, such as grass, herbs, and light brush
  (c) When there is an unexpected shift in wind direction or in wind speed

(d) When fire responds to topographic conditions and runs uphill

Alignment of topography and wind during the burning period should always be considered a trigger point to re-evaluate strategy and tactics.

(5) Downhill indirect line construction guidelines: NWCG-NFES 0065, *Fireline Handbook*

(6) LCES (lookouts, communications, escape routes, and safety zones): LCES Course, NWCG-S-134, *Lookouts, Communications, Escape Routes and Safety Zones (LCES)*. LCES include the following:
   (a) Adequate lookouts posted to observe potential changes in fuel, weather, topography, and fire behavior
   (b) Communication provided for and maintained with the supervisor at all times
   (c) Escape routes for emergency evacuation identified and clearly understood by all fire fighters
   (d) Safety zones in cleared or natural areas devoid of flammable material reconnoitered and/or provided for and known to all crew members

(7) The ten Wildland/Urban Interface Fire "Watch Out Situations": NWCG-NFES 0065, *Fireline Handbook*. These situations are as follows:
   (a) Poor access and narrow congested one-way roads
   (b) Bridge load limits
   (c) Wooden construction and wood shake roofs
   (d) Power lines, propane tanks, and HazMat threats
   (e) Inadequate water supply
   (f) Natural fuels closer than 30 ft (9 m) to structures
   (g) Structures in chimneys, box or narrow canyons, or on steep slopes (30 percent or greater)
   (h) Extreme fire behavior
   (i) Strong winds
   (j) Evacuation of public (panic)

A.5.4.3 *Fixed-Wing Aircraft.* The use of fire retardants dropped from aircraft is a modern, sophisticated attack tool in wildland fire control *[see Figure A.5.4.3(a)]*. It is likely that members of fire departments will become involved in the use of airtankers; therefore, they should be cognizant of the safety rules regarding airtanker operations.

Ground forces should be warned when drops will be made in their area. Often the airtanker pilot will make a dry run or high pass over the portion of the fire where the drop will be made. This usually indicates that the drop will be made within 1 to 3 minutes. If drops have already been made in the area, there usually will be no dry runs.

A fire fighter who is unable to retreat to a safe place when an airdrop is imminent should observe the following safety procedures:

(1) Lie face down with head toward oncoming aircraft and hard hat in place. If possible, grab something solid and get behind it to prevent being carried or rolled about by the drop. Spread feet apart for better body stability and to assist digging in.
(2) Hold tools firmly out to the side and away from the body. Flying tools or equipment can cause injury.
(3) Do not run unless escape is assured. Never stand up in the path of an airdrop.
(4) Stay away from large old trees and snags. Tops, limbs, or entire trees could break and fall, causing injury.

After the retardant drop has been made, there is a follow-up advantage on the fire. However, the following factors should be considered after the drop:

(1) Most retardants are slippery; therefore, be careful of footing and wipe off all hand tools, especially the handles.
(2) Heavy application of retardant on surfaced roads can be hazardous and should be washed down as soon as possible.
(3) Retardant should be washed from equipment and structures as soon as possible to prevent damage to finishes.
(4) Retardant could also damage agricultural or ornamental vegetation; actions should be taken to minimize such damage.

Rotary Wing Aircraft (Helicopters). The use of helicopters has become a key part of wildland fire protection *[see Figure A.5.4.3(b) and Figure A.5.4.3(c)]*. As with any other piece of fire-fighting equipment, definitive safety rules should be followed when using or operating equipment near a helicopter. The following safety procedures apply to helicopter operations:

(1) Approach and departure
   (a) Get the pilot's attention and permission before approaching the helicopter.
   (b) Always approach in full view of the pilot. Never approach from the rear of the helicopter.
   (c) Always approach or depart in a crouched position. Gusts of wind can cause the rotor blades to drop dangerously low to the ground.
   (d) Safety helmets should be held securely to prevent their being blown away or blown up into the rotors by the rotor blast.
   (e) Never approach or depart from a helicopter from or to ground that is upslope from the main rotor. Rotors are almost invisible when turning at high speed or under poor lighting conditions.
   (f) Keep clear of the main and tail rotors at all times. Do not walk to the rear of the helicopter when entering or exiting the helicopter.
   (g) Carry all long-handled tools in such a manner that the handles will not be inadvertently raised into the rotor path.

(2) Working around heliports
   (a) Stay at least 30 m (100 ft) from helicopters at all times unless you have a specific job that requires otherwise. Your presence can cause confusion and disrupt the pilot's concentration.
   (b) Do not face a landing helicopter unless you are wearing goggles.
   (c) Do not remain in an area that is consistently under the flight path of any helicopter.
   (d) Do not smoke within 15 m (50 ft) of any helicopter or fueling area.

(3) In-flight safety
   (a) Do not smoke in the helicopter.
   (b) Use the seat belt and keep it secured until the pilot instructs you to leave the helicopter.
   (c) Ensure that all loose gear and helmets, maps, papers, and so forth, are securely held to prevent their being blown about the helicopter or out the windows.
   (d) Do not let any gear get in the way of the pilot or the pilot's controls.
   (e) Never throw anything out of a helicopter.
   (f) Do not talk to the pilot unless necessary, particularly during takeoff and landing.
   (g) Be alert for hazards such as other aircraft and especially telephone and power lines.
   (h) Never slam the doors of a helicopter. The doors do not have spring-loaded locks, so the handles must be physically turned to close the door securely.

FIGURE A.5.4.3(a) An Airtanker Making a Drop of Fire Retardant on a Wildland Fire.

FIGURE A.5.4.3(b) A Helicopter Using a Bucket to Make a Water Drop on a Wildland Fire.

FIGURE A.5.4.3(c) Heavy-Lift Helicopter Making a Water Drop on a Wildland Fire. *(Source: Erickson Air-Crane)*

A.6.1 To provide fire prevention and control and to protect life and property from wildland fire, a community should establish the following:

(1) An officially designated formal organization headed by a fire chief or fire warden charged with the responsibility of prevention and suppression of wildland fires. The chief would be in charge of the entire departmental operation. The chief should be appointed by the governing body, if one exists, or elected by the membership on the basis of merit and ability. The chief can be a paid professional, a part-time paid employee, or a volunteer.
(2) A well-organized, equipped, and trained fire company or crew who will operate under the authority of the chief, fire warden, or subordinate officer. If attacked quickly, most small wildland fires can be handled by a well-trained squad or company of two to five fire fighters. Large or rapidly spreading fires require more fire fighters, more equipment, expert supervision, and extensive radio and telephone communications.
(3) Three or four small companies or squads of five or six fire fighters, with leaders, can be grouped together under the command of a crew leader or company officer. The leader can be one of several crew leaders commanding similar groups. All personnel under the leader's command, as well as others concerned with incident management, should know who the crew leader is and the scope of the leader's authority. The crews or companies can be assigned to action only on a designated portion of the main fire. This designated portion of the fire is commonly called a *sector* or *division*.

A.6.2 On a small incident, one person can handle all of the functions in Section 6.2.

A.6.2.1 The first responsible authority (ranger, warden, company officer, crew leader, or other officer) who arrives at the emergency is the incident commander (IC) until someone with higher authority specifically assumes command. Whenever a new IC assumes command, all officers, crew leaders, and others involved in the incident should be notified immediately. The IC is responsible for planning and directing the fire control efforts; assembling crews of fire companies and telling them where and how to work; making the best use of personnel; arranging for communications, rest periods, and

relief crews; making the best use of equipment and tools; obtaining supplies; and ensuring that the fire is completely extinguished before the last crews are released from the scene. In other words, the IC is responsible for all activities and operations at an emergency incident. The IC delegates more and more responsibility to assistants as the needed organizational effort grows, but the IC is always the final authority and bears total operational responsibility.

A.6.2.1.1 The responsibilities listed are not necessarily needed in all incidents. This listing of responsibilities is not in any particular order.

A.6.2.1.1(1) The IC should provide for public information, safety, and liaison functions in which each function should be filled as needed depending on the size and complexity of the incident. Command staff functions should include those elements of the IMS that operate in direct support of the IC and contribute to the overall management of the incident.

A.6.2.1.1(6) A Delegation of Authority is the formal process authorizing the IC to act on behalf of the AHJ. See Figure A.6.2.1.1(6).

A.6.2.2 The IMS should include command staff functions that are automatically activated upon escalation of an incident or with multiple alarms. Specific individuals should be designated to respond and assume command staff duties automatically.

A.6.2.3 The basic function of the command staff is to support the IC. The assigned individuals should be able to differentiate between routine actions and those that could have a significant impact on the overall incident. Part of their responsibility is to inform the IC of significant information and to request direction when major decisions are necessary.

A.6.2.5.2 These are personnel other than those on direct tactical assignments or those involved in a unified command.

A.6.2.6.3 This can be accomplished by wearing a highly visible vest, helmet, or other indicator.

A.6.2.8.1(5) The planning function should include the development of alternative strategies. The IAP should include, as appropriate, a safety plan (from the safety officer), an incident traffic plan (from ground support), a communications plan (from the communications unit), and other supporting plans.

A.6.2.9 Logistics shall provide services and support systems to all the organizational components involved in the incident, including facilities, transportation, supplies, equipment maintenance, fueling, feeding, communications, and medical services/fire fighter rehabilitation. The logistics function is vital to the proper management of organizations involved in wildland fire control. Resource determinations need to be made before, during, and following wildland fire incidents. For many fire protection organizations, existing resources need to be reapplied only to meet wildland fire control requirements.

A.6.2.9.1(2)(b) If the IC or logistics section chief determines the need for facilities, the following items should be considered:

(1) Location for appropriate facilities
(2) Evaluation of the physical facilities and usable space required to meet pre-incident planning objectives
(3) Identification of locations for apparatus storage, equipment and personnel staging, base camp operations, lodging of personnel, and support services sites

The establishment of appropriate facilities and usable space locations is an important aspect of the logistics function. Elements that should be considered when determining strategic locations include probable wildland fire locations, other emergency services available, adequacy of public roads and utilities, scope of communications networks, and extent of outside assistance required. A general checklist for facilities includes the following items:

(1) Keep incident facilities at a manageable size.
(2) Enforce rules of conduct at facilities.
(3) Provide a bulletin board at an assembly area.
(4) Maintain proper accountability of all property.
(5) With safety in mind, locate a sleeping area.
(6) Participate in the development of a demobilization plan.
(7) Control dust when needed.
(8) Consider environmental protection when locating incident facilities.
(9) Keep first aid facilities accessible and well marked.
(10) Inspect facilities for safety and fire hazards and take corrective action when needed.
(11) Consider and supply computer support when needed.
(12) Have well-marked parking areas.
(13) Keep facilities clean.
(14) Locate shaded eating areas.

A.6.2.9.1(2)(c) The IC or logistics section chief determines the need for various kinds of ground support. The logistics pre-incident plan should identify necessary support services, including personnel, equipment, and supplies, that facilitate continual operations throughout the incident. These can include the following:

General Ground Support. The ground support checklist should include the following:

(1) Provide direction signs on roads to facilities and drop points.
(2) Place signs at incident facilities and drop points.
(3) Plan adequate rest for drivers.
(4) Isolate and place signs at fuel storage area.
(5) Develop and enforce vehicle control plan.
(6) Plan for transportation for both personnel and equipment to and from incident camp to actual incident.
(7) Provide maintenance and fueling according to schedule.
(8) Inspect equipment condition.
(9) Maintain all equipment records.
(10) Provide transportation and support vehicles.

Emergency Medical Support. The logistics function should determine the required level of emergency medical support and identify available resources. During incidents, appropriate emergency medical support, including transportation capabilities, should be made at the incident locations.

Food Services Support. The logistics function should determine the required level of food services support and identify available resources. Applicable health standards should be reviewed and placed in perspective with the size and complexity of anticipated incident activity. Pre-incident plans should include identification of providers and probable location sites and include available utilities, tentative operation schedules, and contract prices. The food service checklist should include the following:

(1) Sanitation requirements (i.e., state, local, and OSHA) should be met.
(2) Food service sanitation requirements should be met.

DELEGATION OF AUTHORITY

Colorado State Office
Montrose Field Office

As of 1800, May 20, 2005, I have delegated authority to manage the Crystal River Fire, Number E353, San Juan Resource Area, to Incident Commander Bill Jones and his Incident Management Team.

The fire, which originated as four separate lightning strikes occurring on May 17, 2005, is burning in the Crystal River Drainage. My considerations for management of this fire are the following:

(1) Provide for fire fighter and public safety.

(2) Manage the fire with as little environmental damage as possible. The guide to minimum impact suppression tactics (MIST) is attached.

(3) Key cultural features requiring priority protection are Escalante Cabin, and overlook boardwalks along the south rim.

(4) Key resources considerations are protecting endangered species by avoiding retardant and foams from entering the stream; if the ponderosa pine timber sale is threatened, conduct a low intensity under burn and clear fuels along road 312.

(5) Restrictions for suppression actions include no tracked vehicles on slopes greater than 20 percent on meadow soils, except where roads exist and are identified for use. No retardant will be used within 100 ft of water.

(6) Minimum tools for use are Type 2/3 helicopters, chainsaws, hand tools, and portable pumps.

(7) My agency Resource Advisor will be Eric Johnson (wildlife biologist).

(8) The NE flank of the fire borders private property and must be protected if threatened. John Dennison of the Big Pine Fire Department will be the local representative.

(9) Manage the fire cost-effectively for the values at risk.

(10) Provide training opportunities for the resources area personnel to strengthen our organizational capabilities.

(11) Minimum disruption of residential access to private property, and visitor use consistent with public safety.

(Signature and Title of Agency Administrator) (Date)

Amendment to Delegation of Authority

The Delegation of Authority dated May 20, 2005, issued to Incident Commander Bill Jones for the management of the Crystal River Fire, number E353, is hereby amended as follows. This will be effective at 1800, May 22, 2005.

(3) Key cultural features requiring priority protection are: Escalante Cabin, overlook boardwalks along the south rim, and the Ute Mountain study site.

(12) Use of tracked vehicles authorized to protect Escalante Cabin.

(Signature and Title of Agency Administrator) (Date)

NFPA 1143

FIGURE A.6.2.1.1(6) Sample Delegation of Authority. ***(Source: USDA Forest Service)***

(3) Food handlers should keep hands clean and should avoid handling food without wearing proper clothing and gloves.
(4) Food handlers should be free of communicable disease.
(5) Perishable foods should be stored under refrigeration at 4°C (40°F) or lower until served.
(6) Hot foods should be kept at 66°C (150°F) or higher until served.
(7) Reusable food utensils should be cleaned thoroughly and immersed for 2 minutes in at least 77°C (170°F) water.
(8) First aid material and first aid treatment should not be in kitchen or serving areas.
(9) Recycling should be considered.

Sanitation Services Support. The logistics function should determine the required level of sanitation services, including resources for ample toilets, with cleaning, inspection, and maintenance schedules; trash and garbage collection and removal to approved sites; and ample replacement of consumable supplies. The sanitation checklist should include the following:

(1) Provide adequate toilet facilities and establish a regular inspection and maintenance schedule to keep them clean.
(2) Provide trash and garbage collection points and daily removal.
(3) Locate garbage or trash collection points downwind of sleeping or eating areas.

Water Supply. The logistics function should determine the requirements for potable water and identify sources and a system of water distribution. The water supply checklist should include the following:

(1) Use a safe local water supply or haul it from a domestic water supply in trucks approved for potable water only.
(2) Have the water tested and protect it from contamination.

Security. The logistics function should determine and provide for security for personnel and equipment.

A.6.2.9.1(2)(d) The IC or logistics section chief determines the need for a communications function, which can include resources such as various radio networks (fixed and portable); landline and cellular telephones; pagers, scanners, and other audible alert equipment; and computer, data, and fax capabilities.

Communications needs can also include radio system needs, including frequency allocation, availability, and compatibility of equipment between responding agencies, transmission and security priorities and procedures, and equipment assignment and accountability.

The communications element of the logistics function is vital to personnel safety and organizational effectiveness when wildland fires occur. A functional communications network provides rapid notification of wildland fire emergencies, alerting of organizational units, notification of the general public of incident status and/or evacuation needs, and uninhibited communication with key cooperators and other outside agencies.

A communications system by which fires and emergencies can be reported to the fire organization is essential. There must be telephone communications to some central location that serves as a dispatch center. An emergency telephone number, widely publicized in the response area and published in the local telephone company directory, must be established. It is essential that the fire protection organization have an alerting system by which its personnel can be summoned at any time of the day or night. Communication can come in a number of ways, including the use of radio-activated pagers and monitors, sirens, and telephone systems.

A.6.2.9.1(2)(f) Medical/fire fighter rehabilitation refers to the rehabilitation of members operating within an incident management system rehabilitation component, including, but not limited to, the following:

(1) Medical evaluation and treatment
(2) Food and fluid replenishment
(3) Relief from climatic conditions
(4) Rest and recovery
(5) Member accountability

See NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*, for specific guidance on establishing a medical rehabilitation unit.

A.6.3.1 The IMS should be a component of interagency and multijurisdictional planning for emergency operations. An emergency services organization is seldom the only agency involved in activities at the scene of emergency incidents, particularly large-scale incidents. Any other agencies that have an established role at emergency incidents also should be included.

The IMS also should be integrated with plans for major emergencies that could involve activities at different sites. In these circumstances, the IMS as defined in this document should apply specifically to activities conducted at a particular site and should be integrated with large-scale plans for the coordination of activities at multiple sites.

A.6.3.2 At large-scale and complex incidents, several agencies could become involved and could have legal jurisdiction over different aspects of the situation or different areas that are involved in the incident. An AHJ needs to build into its IMS a system for interaction and coordination with other agencies. This is best accomplished by developing an integrated system in cooperation with all of the agencies that would be expected to work together at routine or large-scale incidents. Incident command can be transferred at different stages of an incident, as objectives are accomplished and priorities change.

It is possible that other agencies might be unwilling to develop fully integrated IMSs with the AHJ. In these circumstances, the AHJ should utilize its own capabilities to develop and implement an IMS that meets the intent of this standard. If plans are not established in advance, the authority for overall command of the incident could be in question. Most emergency incidents occur clearly within the jurisdictional area of one AHJ. The agency having jurisdiction is normally responsible for designating the IC, although pre-established plans could provide for an individual from a different agency to assume command under some circumstances. The basic concept should be to designate one emergency services organization IC, even where several emergency services organizations are involved in the incident.

A.6.3.3 One approach that is used for multijurisdictional incidents is "unified command." In this system, each agency having jurisdictional or statutory responsibility for the outcome of the incident can have its own designated IC, with all of the ICs working together to develop one unified plan of action. This approach should be used only within a well-established interagency SOP.

Unified command is a team effort process, allowing all agencies with responsibility for an incident, geographical, functional, or statutory, to establish a common set of incident objectives and strategies that all can subscribe to. This is accomplished without

losing or abdicating agency authority, responsibility, or accountability.

Where multiple jurisdictions are responsible for the outcome of the incident, the plan should incorporate a process to assign, divide, or share overall command responsibilities in a standard manner. It is essential to establish the roles, responsibilities, and relationships of the different agencies that could be involved in advance of a major incident.

In IMS unified command, resources stay under the administrative and policy control of their agencies. Operationally, resources are deployed by a single operations section chief based on the requirements of the IAP.

The operations section chief will normally be from the jurisdiction or agency that has the greatest involvement in the incident. The selection of the operations section chief should be agreed upon by the unified command, as the operations section chief will have full authority to implement the operations portion of the IAP. It is also necessary to agree on other general staff personnel who will be implementing their portions of the IAP.

Unified command represents an important element in increasing the effectiveness of multijurisdictional or multiagency incidents. As incidents become more complex and involve more agencies, the need for unified command is increased.

Under unified command, the various jurisdictions and/or agencies are blended together into an integrated unified team. The resulting organization could be a mix of personnel from several jurisdictions or agencies, each performing functions as appropriate and working toward a common set of objectives.

Lack of knowledge about the IMS can limit the willingness of some jurisdictions or agencies to participate in a unified command incident organization. It is impossible to implement unified command unless agencies have agreed to participate in the process.

A single incident command post should be established, as should other facilities where all agencies can operate together, as needed. The confusion created by separate command, planning, and logistical set-ups should be avoided.

A.6.4.1 Designated representatives should be assigned by other agencies involved in emergency incidents to ensure that all functions performed by their agencies support and are coordinated with AHJ activities. There should be an established system for representatives of cooperating agencies to report to the command post. Where necessary, the IC should assign a designated liaison officer to manage interaction with representatives of other agencies. Where AHJs routinely work together under mutual aid or automatic aid systems, SOPs and communications capabilities should provide for activities to be managed routinely by one IC under a management system that does not necessarily require representatives of each AHJ to be present at the command post.

A.7.2 The threat to the lives of fire fighters and citizens is always the highest priority, and the IC's fire attack decision should be based on safety as the top priority. For low-intensity fires, consideration should be given to direct attack. For high-intensity fires with unpredictable fire behavior or difficult terrain, consideration should be given to indirect attack.

A.7.2.2.1(5) Several types of wildland fire-fighting chemicals are used in wildland fire suppression and fire management, including prescribed burning. Each product has specific requirements for mixing, handling, and applying. Most suppliers are willing to provide the necessary expertise and/or training for working with their product. The types of wildland fire-fighting chemicals are as follows:

Long-Term Retardants. Long-term retardants contain salts (typically phosphate fertilizers) that alter the way the fire burns, decreasing the fire intensity and slowing the advance of the fire, even after the water they originally contained has evaporated. The water they contain serves primarily to aid in uniform dispersal of the chemical over the target area. They continue to work until they are removed by water application, rain, or erosion.

Long-term retardants are used for direct or indirect attack, especially where ground crews have not arrived on scene or no crews are available. They can also be used to protect structures and forest fuels adjacent to a fireline, to aid in prescribed burning and backfiring, and to aid in mop-up.

Chemical retardants can be applied to a fire by fixed-wing airtankers, including single-engine airtankers (SEATs), helicopters with buckets or fixed tanks, fire engines, portable pumps, or back pumps.

Class A Foams. The foam solution is a homogeneous mixture of water and a foam concentrate. An aerated solution is created by forcing or entraining air into a foam solution by means of suitably designed equipment or by cascading it through the air at a high velocity.

Foam fire suppressants contain foaming and wetting agents. The foaming agents affect the accuracy of an aerial drop, how fast the water drains from the foam, and how well the products cling to the fuel surfaces. The wetting agents increase the ability of the drained water to penetrate fuels. The selection of concentrate dilution (between 0.1 and 1.0 percent by volume) and application equipment will yield a range of products with different uses, as shown in the following:

(1) Foam solutions and very sloppy foam with little bubble structure for mop-up where the wetting agent increases penetration of the water into the fuel and char
(2) Fluid foam for wet line and reducing the runoff of the applied water
(3) Dry foam for insulating blankets and exposure protection

The fire suppression and protection effectiveness of Class A foams depends on their capability to retain moisture. As the water evaporates, so does the fire suppression capability of suppressing fire. Under optimum conditions, suppressants remain effective from a few minutes to 1 hour.

Foams can be used in direct attack in support of on-the-line fire crews or for short-term protection of structures (e.g., decks, outbuildings) and forest fuels adjacent to a fireline, as well as in prescribed burning, backfiring, and mop-up. The methods of application include fixed-wing airtankers, helicopters with buckets or fixed tanks, fire engines, and back pumps. For more information on Class A foams and their application in structure fire fighting, refer to NFPA 1150, *Standard on Foam Chemicals for Fires in Class A Fuels*, and NFPA 1145, *Guide for the Use of Class A Foams in Manual Structural Fire Fighting*.

Water Enhancers (Gels). Water enhancers, commonly known as gels, alter the physical characteristics of water in increased effectiveness, accuracy of aerial drops, and adhesion to fuels (by clinging to vertical and smooth surfaces). The fire suppression or protection effectiveness for water enhancers depends on the amount and characteristics of the water they contain.

Water enhancers are mixed with water at fairly low concentrations (less than 3 percent). When mixing most of the water enhancers, the amount of concentrate required to obtain a desired consistency is dependent on the hardness of the water used. Specialized mixing and blending equipment might be required, and cleanup is more difficult than with foams. Gel products are generally not compatible with each other. Gels contain thickeners but do not necessarily contain wetting agents. Because of their incompatibility of the products with salts, including those in retardants, thorough cleanup is necessary when first changing to gels. Always follow the manufacturer's recommendations for preparation, mixing, application, and cleanup.

Water enhancers can be used in direct attack or close indirect attack. Gels containing salts can be used further away from the fire front because their effectiveness is longer lasting. The methods of application include fixed-wing airtankers, including SEATs, helicopters with buckets or fixed tanks, and ground apparatus.

A.8.1 The reporting of fires is an important function of the fire department. Fire reports provide a realistic and factual basis for fire prevention planning, support for funding requests, and aid in organizational development. The reports can be significant documents during investigations and in insurance claims adjustment cases. A report must be completed on every fire or false alarm responded to by the fire department. It is important that information be compiled while it is fresh in the reporting officer's mind. The U.S. Fire Administration (USFA), in conjunction with the National Fire Information Council (NFIC), has developed the National Fire Incident Reporting System (NFIRS), which includes several modules that provide information specific to wildland fire incidents. At the state level, NFIRS provides for the collection of reports on incidents to which local communities responded. NFIRS uses the local databases from individual states to form the national database. The USFA analyzes this database and publishes the analysis. Current forms are available from the following web site: www.nfirs.fema.gov. The basic form, NFIRS-1 *[see Figure A.8.1(a)]*, captures data relevant to fire location (B), incident type (C), dates and times (E1), actions taken (F), resources (G1), estimated dollar losses and values (G2), and completed modules (e.g., NFIRS-8, Wildland Fire). NFIRS-8 *[see Figure A.8.1(b)]* focuses on wildland fire and provides in-depth information about, among other things, the cause of the fire (D1), human factors contributing to ignition (D2), the weather (H), and National Fire Danger Rating System (NFDRS) fuel model at origin (K). Although field forms can assist in information gathering, the NFIRS system is a computer-based program developed to reduce recordkeeping time and improve output reporting capability. The AHJ should complete and file incident reports as required.

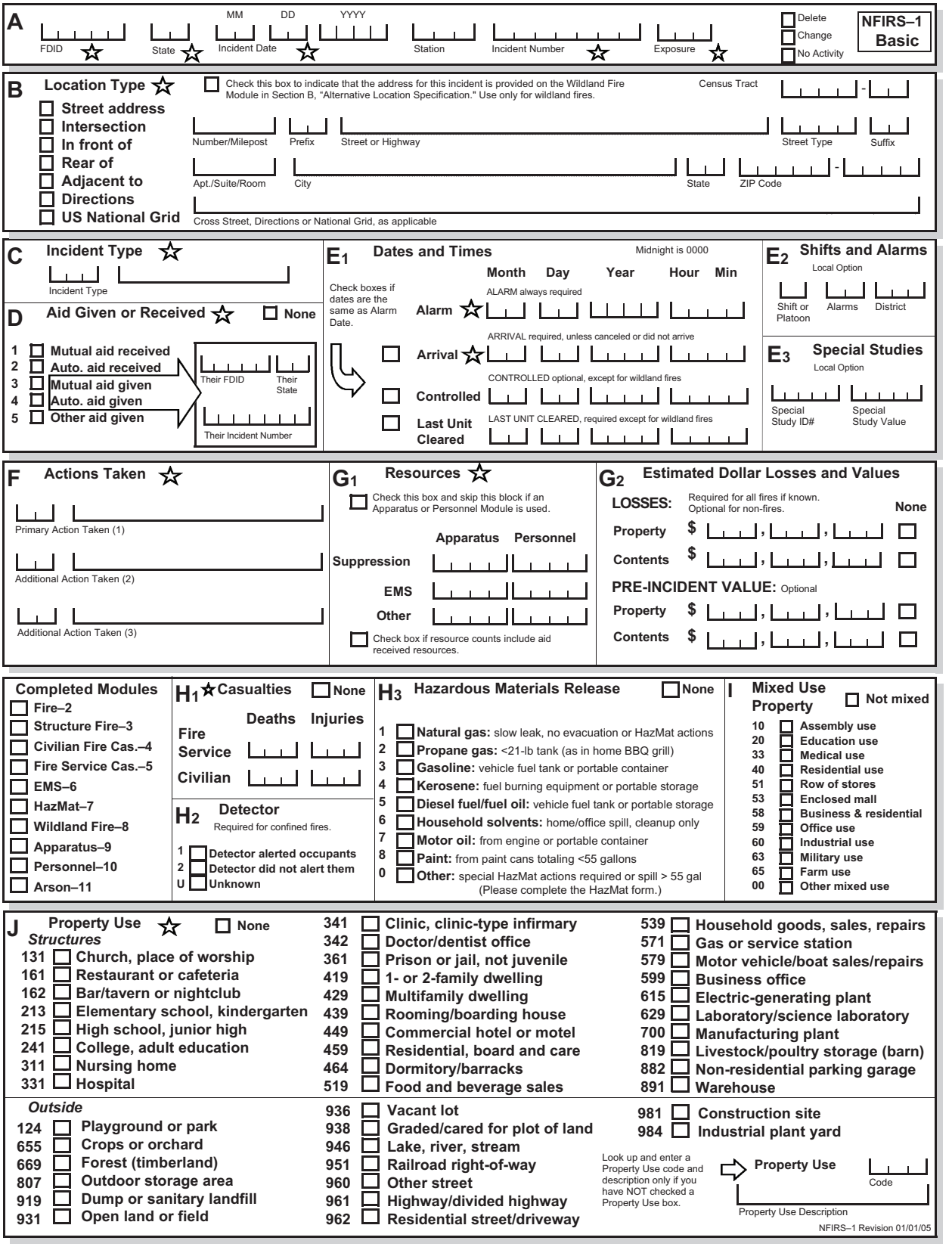

FIGURE A.8.1(a) NFIRS-1, Basic Reporting Form.

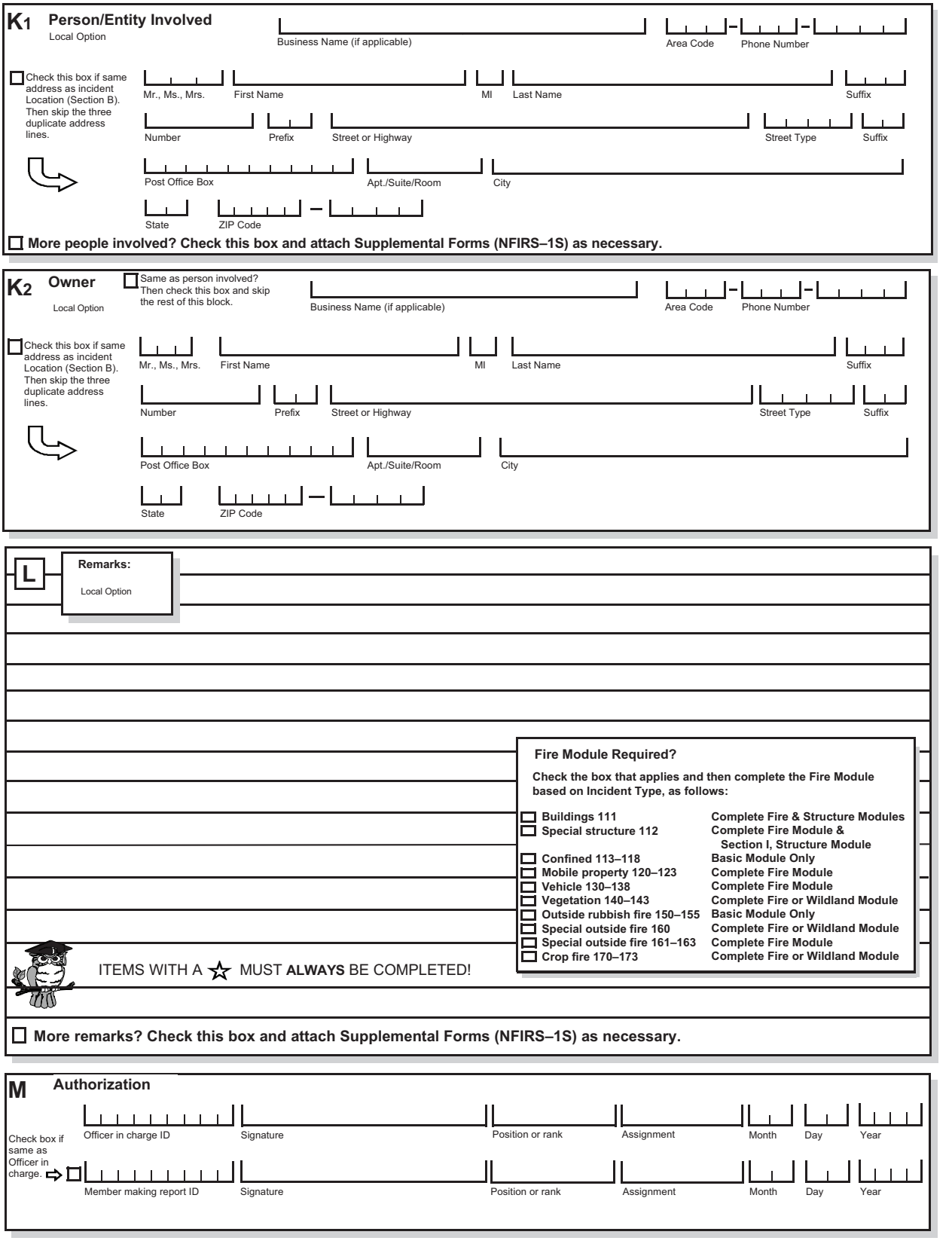

FIGURE A.8.1(a) *Continued*

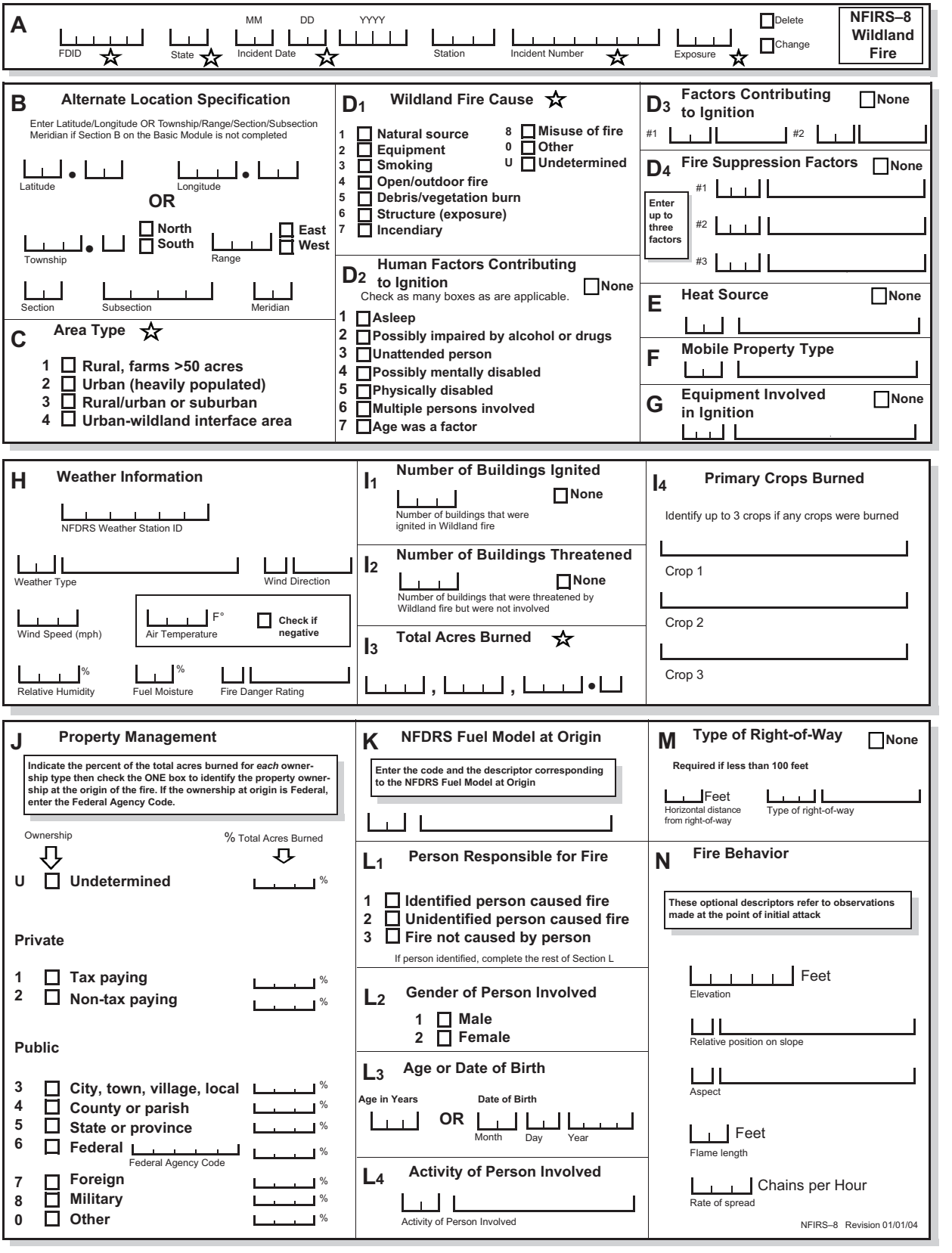

FIGURE A.8.1(b) NFIRS-8, Wildland Fire Reporting Form.

Annex B Air Operations for Forest, Brush, and Grass Fires

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 General. This annex presents fundamental information for agencies desiring to use aircraft for any and all aspects of wildland fire prevention, detection, and suppression. It presents necessary and useful information on procedures, practices, organization, and management, as well as suggested policy.

B.1.1 Aircraft Uses. Many agencies in different countries use aircraft for reconnaissance, fire detection, fire suppression, fuel management, and coordination of ground control forces.

B.1.2 Definitions of Aeronautical and Air Operations Terminology.

B.1.2.1 Abort. An order to terminate a preplanned aircraft maneuver (e.g., abort takeoff, abort retardant drop run).

B.1.2.2 AGL. Above ground level.

B.1.2.3 Air Attack. An operation involving the use of aircraft as part of the fire suppression action.

B.1.2.4 Air Tactical Group Supervisor (ATGS). The officer, normally airborne, in tactical command of all aircraft operating at an incident.

B.1.2.5 Air Traffic. Aircraft operating in the air or on an airport surface, exclusive of loading ramps and parking areas.

B.1.2.6 Airtanker. A fixed-wing aircraft equipped to drop fire retardants or fire suppressants.

B.1.2.7 Airtanker Coordinator/Birddog Pilot/Lead Plane Pilot. The pilot of the control aircraft, working under supervision of the air tactical group supervisor (ATGS), who designates targets of retardant drops and coordinates the movement of airtankers.

B.1.2.8 Autorotation. A nonpowered flight condition, with the rotor system maintaining the required flight rpm at a given forward airspeed. Autorotation is due to the relative wind upward through the rotors, caused by the weight, forward speed, and descent of the helicopter.

B.1.2.9 Birddog/Air Attack. The aircraft carrying the officer or individual in charge of air attack operations over a fire.

B.1.2.10 Break. Weak or missed area in retardant or suppressant drop.

B.1.2.11 Bucket. A specially designed bucket carried by the helicopter like a sling load and used to drop retardants or suppressants.

B.1.2.12 Candling. See B.1.2.67, Torching.

B.1.2.13 Canopy. The uppermost layer of tree foliage.

B.1.2.14 Chicot (*French*). See B.1.2.62, Snag.

B.1.2.15 Crown Fire. Fire traveling in the upper foliage of standing timber.

B.1.2.16 Density Altitude. Pressure altitude for ambient temperature. In standard International Civil Aviation Organization (ICAO) atmosphere, density and pressure altitude are equal. For a given pressure altitude, the higher the temperature, the higher the density altitude.

B.1.2.17 Direct Attack. A drop with the main portion of retardant or suppressant falling on the flame front.

B.1.2.18 Down Loading. The reduction in aircraft gross weight made to compensate for loss of performance due to increase in density altitude.

B.1.2.19 Dozer Line. A physical fire break made by dozers or tractor plows.

B.1.2.20 Drift. The effect of wind or smoke on retardant/suppressant drop.

B.1.2.21 Drop Accuracy. The assessment of a drop (i.e., where a load lands in relation to the target) made by the air tactical group supervisor or a fireline supervisor.

B.1.2.22 Drop Sequence. The order and method in which the tanks are released.

B.1.2.23 Drop Zone. Drop target area.

B.1.2.24 Dry Run. A simulated retardant or suppressant run made on a target by the birddog, lead plane, or airtanker. Used to indicate approach and target to airtanker and to check for flight hazards.

B.1.2.25 Early. Landing before the target. Retardant/suppressant dropped before the target is reached. Sometimes referred to as *short*.

B.1.2.26 Elevation. The elevation of the lead plane or the birddog when it is over the target on a dry run.

B.1.2.27 ETA. Estimated time of arrival.

B.1.2.28 ETD. Estimated time of departure.

B.1.2.29 Final. That portion of the flight path that is aligned with the retardant/suppressant drop line.

B.1.2.30 Flank. Side of a fire joining base or rear to head.

B.1.2.31 Ground Effect. Reaction of the wing or rotor downwash against ground surface, forming a "ground cushion" that increases lifting capability of that section of air.

B.1.2.32 Ground Fire. Fire in duff, ground debris, or low-growing vegetation.

B.1.2.33 Head. The side of the fire having the fastest rate of spread.

B.1.2.34 Heading. The compass direction in which the longitudinal axis of an aircraft points.

B.1.2.35 Helibase. Location for parking, fueling, and maintenance of helicopters within the general area of an incident.

B.1.2.36 Helibase Manager. The officer responsible for managing resources/supplies at a helibase, heliport, or helispot.

B.1.2.37 Helibucket. See B.1.2.11, Bucket.

B.1.2.38 Helicopter Coordinator. With instructions from the air tactical group supervisor (ATGS), the person responsible for coordinating tactical or logistical mission(s) by helicopters assigned to an incident.

B.1.2.39 Heliport. A designated landing area that is accessible by road and large enough to accommodate, at a minimum, two helicopters. It should have fueling facilities, a wind indicator, fire extinguishers, surfaced pads, tie-downs, parking areas, a water source, telephone and radio communications, officers for base personnel, pilots' rest areas, and lights.

B.1.2.40 Helispot. Location where a helicopter can land and take off.

B.1.2.41 Helitack. The initial attack phase of fire suppression using helicopters and trained airborne teams to achieve immediate control of wildland fire in a safe and economical manner.

B.1.2.42 Helitack Crew Member. A fire fighter trained in the use of helicopter accessories and in techniques to attack and suppress wildland fire.

B.1.2.43 Helitack Supervisor. The person directly in charge of a helitack crew.

B.1.2.44 Helitank. A tank that is attached to a helicopter and used to carry liquids such as suppressants or retardants.

B.1.2.45 Hot Spot. A particularly active part of a fire within or along the fire boundary.

B.1.2.46 Incident Commander (IC). The chief of an incident management team under the ICS.

B.1.2.47 Incident Command System (ICS). Qualifying and organizing personnel to manage wildland fires or other incidents.

B.1.2.48 Initial Attack. The first action taken to suppress a fire, whether it be ground or air attack.

B.1.2.49 Knot. Nautical mile per hour.

B.1.2.50 Late Drop. Retardant or suppressant landing beyond the target.

B.1.2.51 Line. A stretch of retardant or suppressant laid by aircraft to support constructed line or to retard fire spread.

B.1.2.52 Line Length. The distance actually covered on the ground by a single retardant or suppressant drop at a given coverage level.

B.1.2.53 "Load and Return." An order to a pilot to return to air tanker base, reload, and return to the drop area.

B.1.2.54 Low Drop. A drop lower than recommended minimum drop height.

B.1.2.55 Orbit. The circular holding pattern an aircraft makes over one specific spot or area.

B.1.2.56 Paracargo. Cargo and equipment that is attached to parachutes for dropping from aircraft for support of ground crews.

B.1.2.57 Parallel Attack. An outside (indirect) attack parallel to and removed from the fire's edge. A parallel attack generally is used only with long-term retardants in an air attack operation.

B.1.2.58 Restricted Air Space. See B.1.2.66, Temporary Flight Restriction.

B.1.2.59 Retardant, Long-Term. Solution having a chemical retarding action on fire even after water content has evaporated.

B.1.2.60 "Return and Hold." An order to a pilot to return to base and wait for further instructions; denotes mission completed and further loads not required.

B.1.2.61 Salvo. The dropping of the entire retardant or suppressant load at one time.

B.1.2.62 Snag. Any dead or living tree rising above the forest canopy.

B.1.2.63 Split Load. A drop sequence wherein the load is dropped in increments.

B.1.2.64 Spot Fire. A fire outside or ahead of the main fire boundary.

B.1.2.65 Suppressants. Agents (i.e., water or foam) used to extinguish the flaming and glowing phases of combustion by direct application to burning fuels.

B.1.2.66 Temporary Flight Restriction (TFR). Special use airspace obtained under U.S. Federal Aviation Regulations, Part 91.137, for the use of air attack or other incident aircraft.

B.1.2.67 Torching. The burning of the foliage of a single tree, or a small group of trees, from the bottom up.

B.1.2.68 Traffic Pattern. The traffic flow that is prescribed for aircraft landing at, taxiing on, and taking off from an airport. The usual components of a traffic pattern are upwind leg, crosswind leg, base leg, and final approach.

B.1.2.69 Trail Drop. To drop retardant from separate compartments in rapid succession in order to give an extended pattern on the ground.

B.1.2.70 Weather Advisory. In aviation forecast practice, an expression of hazardous weather conditions not predicted in the area forecast, as they affect the operation of air traffic and as prepared by the National Weather Service.

B.1.2.71 Wetting Agent. Chemical added to water to reduce surface tension.

B.2 Aircraft and Equipment Suitability and Selection.

B.2.1 Fixed-Wing Aircraft.

B.2.1.1 Detection, Reconnaissance, and Survey. Small airplanes (single- and multi-engine) are used for detection, reconnaissance, and surveys. Airplanes for fire reconnaissance are used in combination with ground detection systems in areas of high fire occurrence. The use of aircraft for checking areas not visible from ground detection units is an accepted practice. Reconnaissance flights are usually scheduled following lightning storms. Flights to check "going" fires and controlled fires from previous days provide the latest information on conditions and progress.

Recently, heat-sensing systems, known as forward-looking infrared (FLIR) systems, have been developed for use with small aircraft. These systems are economically feasible, and simplicity of operation warrants their consideration for detection and reconnaissance activities. With further development, the detection could be computerized.

Surveys of an area before and after a burn can provide a detailed review and study of an area that could otherwise be expensive and time consuming. Many times the measurement of burn areas can be accomplished with a minimal amount of flying time.

Small airplanes can be made available for other jobs in connection with wildland fire protection. It is standard practice for agencies that do not own their own aircraft to contract with a local fixed base operator (FBO) to provide the aircraft and pilot.

B.2.1.2 Paracargo and Freight. Numerous types of small, medium, and large airplanes are used for transporting freight and dropping paracargo to fire camps or isolated crews. Not all airplanes are suitable for freight activities, and relatively few can be modified into good paracargo aircraft. Most civilian

airplanes now being used were designed and built for carrying passengers and require special modifications to be suitable for freight or paracargo work.

Desirable features for airfreight and paracargo airplanes are as follows: sufficient capacity, smooth floors, inherent stability, moderate or low stalling and landing speeds, suitable paracargo discharge aperture, ample reserve power at near gross weight (multi-engine), easy control under marginal flying conditions, good visibility, stripped utility interior, cargo tie-down facilities, and approved seats, seat belts, and shoulder harnesses.

B.2.1.3 Amphibious Operations. Amphibious aircraft or float-equipped aircraft can be more versatile and serve more functions than land-based aircraft. In Alaska and some parts of Canada and the contiguous United States where suitable lakes and rivers are numerous and in coastal areas, this type of aircraft is used extensively.

As long as adequate water depth and an unobstructed water surface area are maintained, little or no preparation other than suitable docking or ramp facilities is required for a water-based operation. If no safe natural docking or beaching site is available, temporary docks can be constructed to facilitate loading and unloading and to avoid damage to the aircraft.

Many amphibious aircraft are equipped to drop suppressants such as foam.

B.2.1.4 Airtankers. Aircraft selection for wildland fire suppression and related uses presents certain problems. The performance characteristics of the aircraft should be such that safe and efficient operations can be conducted over typical terrain and at necessary elevations. The aircraft integrity should be such that atmospheric conditions will not present a structural problem.

Light airtankers can be operated cost effectively as initial attack aircraft on wildland fires where the fires are within 48 km (30 miles) of the air attack base. These aircraft are also capable of support action and accurate low-volume drops in confined areas.

Medium and larger airtankers with 7600 L or more (2000 gal or more) capacities, like the one shown in Figure B.2.1.4, are more cost effective for long-range, high-volume cascading on fires and retardant fireline construction. This should not preclude the use of large airtankers at short range, because many times fires are contained or controlled by several high-volume cascading actions.

FIGURE B.2.1.4 P2V-5F Airtanker.

B.2.2 Rotary-Wing Aircraft. The helicopter has become a familiar multi-use fire-fighting aircraft in wildland fire suppression. This aircraft has become as necessary in today's fire suppression as hand tools, crews, tractors, smoke jumpers, engines, and airtankers.

B.2.2.1 Retardant and Suppressant Dropping. The versatility and maneuvering capabilities of the helicopter make this aircraft an important initial attack tool. Helicopters with capacities for dropping 303 L to 11,356 L (80 gal to 3000 gal) of suppressants or retardants are principal weapons in the helitack phase of wildland fire suppression. Helicopters generally utilize two methods of dropping: a bucket slung underneath the helicopter or a fixed external tank.

B.2.2.2 Initial Attack Transport. Helitack functions are designed to transport trained personnel to a fire as quickly as possible. Small crews, trained and properly equipped, can gain control of most incipient wildland fire situations if they can make fast initial attack. This can be accomplished by landing or rappelling near the fire.

B.2.2.3 Reconnaissance and Scouting. Performance characteristics of the helicopter make it an excellent reconnaissance and scouting aircraft. Slow speed and the ability to operate in areas that could not be observed from fixed-wing aircraft, plus its usefulness in providing terrain and fire intelligence that otherwise could not be obtainable, are obvious benefits. Helicopters provide an ideal platform for using heat-sensing and mapping systems. The systems range from handheld units to permanently mounted units.

B.2.2.4 Shuttling Equipment and Personnel. Equipment can be moved to other fire areas by heliport to heliport or, where landings cannot be safely accomplished, by paracargo or sling load methods. Personnel (fire crews, helitack personnel, and others) can be airlifted as conditions warrant. Food and water can be delivered to line crews, and spike camps can be supported in this manner.

B.2.2.5 Rescue. Helicopters are an essential part of many rescue operations. The following are some uses:

(1) Airlifting medical personnel to care for and move injured persons to medical aid sites or hospitals
(2) Scouting and directing rescue crews
(3) Servicing isolated parties until rescue can be accomplished
(4) Rescue operations, although weather and performance limitations of the aircraft can, at times, prevent their use in rescue operations.

B.2.2.6 Other Uses. Helicopters can also be used for the following:

(1) Aerial ignition operations using helitorches, ping-pong dispensers, and other devices
(2) Rappelling of trained crews
(3) Retrieving of smoke jumpers
(4) Detection and prevention activities

B.3 Ground Facilities.

B.3.1 Ground Support Facilities. Permanent or auxiliary bases for aircraft engaged in wildland fire or related operational activities are arranged so that aircraft ground traffic, parking, and public movement will not delay or hinder the