

FIRE FIGHTER ADVISORY COMMITTEE

AGENDA

June 26, 2014, 9:00 A.M.

1701 N. Congress Avenue, William B. Travis Building, Room 1-104, Austin, Texas

The Fire Fighter Advisory Committee will convene in open session to deliberate and possibly take formal action on any of the following agenda items:

- 1. Roll call – 9:00 a.m.**
- 2. Adoption of April 2, 2014 Fire Fighter Advisory Committee meeting minutes.**
- 3. Report from the Curriculum and Testing Committee with discussion and possible action on recommendations regarding possible changes to the Certification Curriculum Manual, including but not limited to:**
 - a. Driver Operator Curriculum, outline and reference list**
 - b. Fire Investigator Curriculum, outline and reference list**
 - c. Fire Officer I Curriculum, outline and reference list**
 - d. Fire Officer II Curriculum, outline and reference list**
 - e. Fire Officer III Curriculum, outline and reference list**
 - f. Fire Officer IV Curriculum, outline and reference list**
- 4. Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 421, Standards for Certification, including but not limited to, §421.1, Procedures for Meetings, §421.3, Minimum Standards Set by the Commission, §421.5 Definitions, §421.9, Designation of Fire Protection Duties, §421.11, Requirement to be Certified Within One Year, §421.13, Individual Certificate Holders, §421.15, Extension of Training Period, and §421.17, Requirement to Maintain Certification.**
- 5. Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 441, Continuing Education, including but not limited to, §441.1, Objective, §441.3, Definitions, §441.5, Requirements, §441.7, Continuing Education for Structure Fire Protection Personnel, §441.9, Continuing Education for Aircraft Rescue Fire Fighting Personnel, §441.11, Continuing Education for Marine Fire Protection Personnel, §441.13, Continuing Education for Fire Inspection Personnel, §441.15, Continuing Education for Arson Investigator or Fire Investigator, §441.17, Continuing Education for Hazardous Materials Technician, §441.19, Continuing Education for Head of a Fire Department, §441.21, Continuing Education for Fire Service Instructor, and §441.23, Continuing Education for Wildland Fire Fighter.**
- 6. Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 449, Head of a Fire Department, including but not limited to, §449.1, Minimum Standards for the Head of a Fire Department, §449.3, Minimum Standards for Certification as Head of a Suppression Fire Department, §449.5, Minimum Standards for Certification as Head of a Prevention Only Department.**
- 7. Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 457, Incident Safety Officer, including but not limited to, §457.1, Incident Safety Officer Certification, §457.3, Minimum Standards for Incident Safety Officer Certification, and §457.5, Examination Requirements.**
- 8. Discussion regarding status of issue related to protective clothing for airport firefighters and the National Fire Protection Association's response to the formal interpretation request.**
- 9. Discussion and possible action on future meeting dates, locations and agenda items.**
- 10. Adjourn meeting.**

1. Roll call---9:00 a.m.

2. Adoption of the April 2, 2014 Fire Fighter Advisory Committee meeting minutes.

TEXAS COMMISSION ON FIRE PROTECTION

Presiding Officer Jim Reidy called the April 2, 2014 meeting of the Fire Fighter Advisory Committee to order at 9:00 a.m. at the William B. Travis Building, 1701 N. Congress Ave., Room 1-104, in Austin, Texas.

Attending Jim Reidy Michael Wisko Tommy Anderson Amado Cano, Jr. Ken Swindle
Jason Collier Daniel DeYear J. P. Steelman Michael Jones*

*absent entire meeting

**absent part of meeting

Staff Tim Rutland Deborah Cowan Mollie Clakley Mark Roughton
George Noelke, Assistant Attorney General

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1. Roll call Secretary J. P. Steelman called roll and a quorum was present.

 2. Adoption of Minutes A motion was made by J. P. Steelman and seconded by Mike Wisko to approve the minutes of the December 12, 2013, fire fighter advisory committee meeting as discussed. The motion carried.

 3. Report from Curriculum & Testing Committee After discussion, no action necessary.

 4. Life Safety Initiative No. 9 Danny Kistner was unable to make the meeting. No action taken.

 5. 37 TAC, Chapter 421 After discussion, no action taken.

 6. 37 TAC, Chapter 425 A motion was made by Daniel DeYear and seconded by Amado Cano, Jr. to approve for recommendation to the commission amendments to 37 TAC, Chapter 425, §§425.3, 425.5, 425.7, and 425.11 as discussed. The motion carried.

 7. 37 TAC, Chapter 429 A motion was made by Tommy Anderson and seconded by Daniel DeYear to approve for recommendation to the commission amendments to 37 TAC, Chapter 429, §429.203 as discussed. The motion carried.

 8. 37 TAC, Chapter 451 A motion was made by J. P. Steelman and seconded by Amado Cano, Jr. to approve for recommendation to the commission amendments to 37 TAC, Chapter 451, §451.303, and §451.403 as discussed. The motion carried.

 9. 37 TAC, Chapter 453 A motion was made by Tommy Anderson and seconded by Jason Collier to approve for recommendation to the commission amendments to 37 TAC, Chapter 453, §453.203 as discussed. The motion carried.

 10. Fire Fighter Injury Reporting Reporting A motion was made by Tommy Anderson and seconded by Daniel DeYear that the fire fighter advisory committee has received and reviewed the fire fighter injury data and has identified no apparent issues to make a recommendation at this time. However, it is clear from the data collected there is a clear picture that every aspect of fire fighters duties inherently carries a risk of injury or death. The motion carried.

11. Future meeting dates, locations agenda items The committee scheduled its next meeting for June 26, 2014 at 9:00 a.m. NFPA 1851
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12. Adjournment A motion was made by Daniel DeYear and seconded by J. P. Steelman to adjourn the meeting. The motion carried.

Jim Reidy
Presiding Officer

- 3. Report from the Curriculum and Testing Committee with discussion and possible action on recommendations regarding possible changes to the Certification Curriculum Manual, including but not limited to:**
 - a. Driver Operator Curriculum, outline and reference list**
 - b. Fire Investigator Curriculum, outline and reference list**
 - c. Fire Officer I Curriculum, outline and reference list**
 - d. Fire Officer II Curriculum, outline and reference list**
 - e. Fire Officer III Curriculum, outline and reference list**
 - f. Fire Officer IV Curriculum, outline and reference list**

CHAPTER SEVEN
DRIVER/OPERATOR-PUMPER
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
700-4.1	General	2
700-4.2	Preventive Maintenance	8
700-4.3	Driving/Operating	16
700-5.1	General	8
700-5.2	Operations	26
	TOTAL RECOMMENDED HOURS*	60

*Actual hours required will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

RECOMMENDED REFERENCE LIST FOR THE DRIVER/OPERATOR-PUMPER CURRICULUM

Certified Training Facilities approved to teach this curriculum, must have the following reference materials:

~~NFPA 13: Standard for the Installation of Sprinkler Systems (2007ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.~~

~~NFPA 13D: Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes (2007ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.~~

~~NFPA 13E: Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems (2005ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.~~

~~NFPA 13R: Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height (2007ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.~~

~~NFPA 14: Standard for the Installation of Standpipe and Hose Systems (2007ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.~~

Fire Service Pump Operator: Principles and Practice (2nd ed.) (2014). Sudbury, MA: Jones and Bartlett Publishers.

NFPA 1002: Standard on Fire Apparatus Driver/Operator Professional Qualifications (2009 ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1901, Standard for Automotive Fire Apparatus, (2009 ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

*Pumping Apparatus Driver/Operator Handbook (2nd 3rd ed.) (2006 **2014**). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.*

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

SECTION 700

DRIVER/OPERATOR-PUMPER

A Fire Apparatus Driver is the firefighter who has met the requirements defined in 700-4.2 and 700-4.3.

A Pump Operator is the fire apparatus driver/operator who has met the requirements of 700-5.1 and 5.2 for the operation of apparatus equipped with an attack or fire pump.

700-4.1 General

Prior to operating fire department vehicles, the fire apparatus driver/operator shall meet the job performance requirements defined in Sections 700-4.2 and 700-4.3.

700-4.2 Preventive Maintenance

700-4.2.1 Perform routine tests, inspections, and servicing functions on the systems and components specified in the following list, given a fire department vehicle, its manufacturer's specifications, and policies and procedures of the jurisdiction, so that the operational status of the vehicle is verified:

- 1) Routine tests, inspections and servicing functions contribute to the goal of emergency-response readiness
- 2) Battery(ies)
 - a) Determine maintenance/maintenance-free
 - i. Check water level if applicable
 - ii. Check overall cleanliness
 - b) Terminals
 - i. Tightness
 - ii. Corrosion
 - c) General appearance and condition
 - i. Damage
 - a. Bulging
 - b. Cracks
 - c. Case deterioration
 - ii. Battery tie-down
- 3) Braking system
 - a) Air actuated
 - i. Check for leaks

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- ii. Ensure manual or automatic purging of any excess condensation
 - iii. Determine that system meets NFPA requirements for recovery
 - b) Hydraulic system
 - i. Check for leaks
 - ii. Check hydraulic fluid level
 - c) Check for obvious contamination (e.g. fluid color change, excessive metallic particulates)
- 4) Coolant system
 - a) Check for leaks
 - b) Check condition of coolant hoses or lines
 - c) Check fluid level
 - d) Check for obvious contamination (e.g. fluid color change, excessive metallic particulates)
- 5) Electrical system
 - a) Charging system
 - b) Gauges
 - c) Ignition system
 - d) Lights (e.g. headlights, turning signals, brake lights)
 - e) Emergency warning devices (visual and audible)
 - f) General condition of wires and connections
- 6) Fuel
 - a) Fuel gauge level
 - b) Check for leaks
- 7) Hydraulic fluids
 - a) Check for leaks
 - b) Check fluid level
- 8) Oil
 - a) Check for leaks
 - b) Check fluid level
 - c) Check for obvious contamination (e.g. milky appearance, fuel odor, excessive metallic particulates)
 - d) Check oil pressure gauge
- 9) Tires
 - a) Condition of valve
 - b) Condition of tread (e.g. wear patterns)
 - c) Depth of tread
 - d) Damage

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- e) Check air pressure
- f) Lug nuts
 - i. Tightness
 - ii. Rust
 - iii. Missing lug nuts

10) Steering system

- a) Check fluid level
- b) Check for excessive play

11) Belts

- a) Proper adjustment
- b) Excessive wear
- c) Cracking

12) Tools, appliances, and equipment

- a) Ensure required tools, appliances and equipment are present as determined by policies of the authority having jurisdiction
- b) Ensure required tools, appliances and equipment are in good working order for response readiness

13) Transmission

- a) Manual
 - i. Check for leaks
 - ii. Check clutch fluid level (if applicable)
 - iii. Check clutch pedal
 - iv. Check shift linkage
- b) Automatic
 - i. Check for leaks
 - ii. Check fluid level
 - iii. Check for obvious contamination (e.g. fluid color change, odor)

14) NFPA 1915 Standard for Fire Apparatus Preventive Maintenance Program, Chapter 3 General Inspection and Maintenance

700-A.4.2.1 Routine tests, inspections, and servicing functions should be performed on a daily, weekly, monthly, or other periodic basis as determined by departmental policy. The specifications provided by the manufacturer for these functions should be followed.

Requisite Knowledge: Manufacturer specifications and requirements, policies, and procedures of the jurisdiction.

- 1) Manufacturer specifications and requirements
- 2) Policies, and procedures of the jurisdiction

Requisite Skills: The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

- 700-4.2.2 Document the routine tests, inspections, and servicing functions, given maintenance and inspection forms, so that all items are checked for operation and deficiencies are reported.

Requisite Knowledge: Departmental requirements for documenting maintenance performed and the importance of keeping accurate records.

- 1) Departmental requirements for documenting maintenance performed
 - a) Paper-based
 - b) Electronic
- 2) The importance of keeping accurate records
 - a) Safety
 - b) Risk management
 - c) Training opportunities
 - d) Warranty issues
 - e) Vehicle longevity

Requisite Skills: The ability to use tools and equipment and complete all related departmental forms.

700-4.3 **Driving/Operating**

- 700-4.3.1 Operate a fire department vehicle, given a vehicle and a predetermined route on a public way that incorporates the maneuvers and features, specified in the following list, that the driver/operator is expected to encounter during normal operations, so that the vehicle is operated in compliance with all applicable state and local laws, departmental rules and regulations., and the requirements of NFPA 1500, Section 4.2.

- 1) Four left turns and four right turns
- 2) A straight section of urban business street or a two-lane rural road at least 1 mile (1.6 km) in length
- 3) One through-intersection and two intersections where a stop has to be made

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- 4) One railroad crossing
- 5) One curve, either left or right
- 6) A section of limited-access highway that includes a conventional ramp entrance and exit and a section of road long enough to allow two lane changes
- 7) A downgrade steep enough and long enough to require down-shifting and braking
- 8) An upgrade steep enough and long enough to require gear changing to maintain speed
- 9) One underpass or a low clearance or bridge

700-A.4.3.1 ~~The maneuvers and features specified for this job performance requirement include driving situations that the NFPA committee has determined to be essential. The NFPA committee recognizes that each of these situations might not exist in all areas. Where this occurs, those specific requirements can be omitted.~~

The committee's intent is to have the following maneuvers and features accomplished by the driver/operator. The committee recognizes that each of these situations might not exist within the authority having jurisdiction. The committee considers the following driving situations essential to driver/operator skills:

- (1) Four left turns and four right turns**
- (2) A straight section of urban business street or a two-lane rural road at least 1 mi (1.6 km) in length**
- (3) One through-intersection and two intersections where a stop has to be made**
- (4) One railroad crossing**
- (5) One curve, either left or right**
- (6) A section of limited-access highway that includes a conventional ramp entrance an exit and a section of road long enough to allow two lane changes**
- (7) A downgrade steep enough and long enough to require down-shifting and braking**
- (8) An upgrade steep enough and long enough to require gear changing to maintain speed**
- (9) One underpass or a low clearance or bridge**

Requisite Knowledge: The importance of donning passenger restraint devices and ensuring crew safety; the common causes of fire apparatus accidents and the recognition that drivers of fire apparatus are responsible for the safe and prudent operation of the vehicle under all conditions; the effects on vehicle control of liquid

surge, braking reaction time, and load factors; effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, and gear patterns; negotiating intersections, railroad crossings, and bridges; weight and height limitations for both roads and bridges; identification and operation of automotive gauges; and operational limits.

- 1) **The importance of donning passenger restraint devices and ensuring crew safety**
 - a) **Personnel safety**
 - b) **Equipment failure**
 - c) **Policy and procedure compliance**
 - d) **National standards**

- 2) **The common causes of fire apparatus accidents**
 - a) **Improper backing of the apparatus**
 - b) **Reckless driving by the public**
 - c) **Excessive speed by the fire apparatus driver/operator**
 - d) **Lack of driving skill and experience**
 - e) **Poor apparatus design or maintenance**
 - f) **Weather conditions**

- 3) **Recognition that drivers of fire apparatus are responsible for the safe and prudent operation of the vehicle under all conditions**
 - a) **Road traffic awareness**
 - b) **Weather**
 - c) **Defensive driving**
 - d) **Road conditions**
 - e) **Emergency response**
 - f) **Psychological and physiological limitations of driver**

- 4) The effects on vehicle control of liquid surge (Newton's Three Laws of Motion)
 - a) An object in motion tends to stay in motion unless acted upon by an outside force
 - i. Weight transfer
 - ii. Greater stopping distance
 - iii. Overturning fire apparatus
 - b) An object at rest tends to stay at rest unless acted upon by an outside force
 - i. Acceleration/deceleration
 - ii. Outside curves

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- c) For every action there is an equal and opposite reaction
 - i. Braking
 - ii. Skidding

- 5) The effects on vehicle control of braking reaction time
 - a) Braking reaction time defined
 - b) Methods to improve braking reaction time
 - i. Scanning
 - ii. Look ahead
 - iii. Use mirrors
 - iv. Cover the brake
 - v. Prepare to yield the right of way
 - c) Under the influence
 - i. Prescription medications
 - ii. Over the counter medications
 - iii. Exposure to products of incomplete combustion/toxins
 - iv. Illicit drugs/alcohol
 - d) Driver fatigue

- 6) The effects on vehicle control of load factors
 - a) Acceleration/deceleration
 - b) Weight distribution
 - i. Emergency maneuvers
 - ii. Normal handling characteristics
 - c) Exceeding load limits
 - i. Personnel
 - ii. Equipment
 - iii. After market modifications

- 7) Effects of high center of gravity on roll-over potential
 - a) Momentum
 - b) Inertia
 - c) Centrifugal force

- 8) Effects of high center of gravity on general steering reaction
 - a) Over steering
 - b) Under steering
 - c) Plowing/pushing (Newton's first law)

- 9) Effects of high center of gravity on speed
 - a) Grades
 - b) Curves

- 10) Effects of high center of gravity on centrifugal force

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- a) Skidding
 - b) Overturning
 - c) Plowing/pushing
- 11) Applicable laws and regulations
- a) Governmental
 - b) Authority having jurisdiction
 - c) Departmental policies
- 12) Principles of skid avoidance
- a) Influencing factors
 - i. Driver error
 - a. Driving too fast for road conditions
 - b. Apparatus weight shifts
 - c. Failure to anticipate obstacles
 - d. Improper use of auxiliary braking devices
 - e. Improper maintenance of tire pressure
 - f. Tread depth
 - ii. Environmental
 - a. Rain
 - b. Snow
 - c. Ice
 - d. Fog
 - e. Wind
 - iii. Skid recovery
 - a. Steer into the skid
 - b. Accelerate or decelerate
 - c. Do not push the clutch pedal if equipped
- 13) Principles of night driving
- a) Reduced speed
 - b) Reduced visibility
 - c) Safety features on fire apparatus (e.g. strobe light dimmer)
 - d) Driver/Operator fatigue
- 14) Principles of shifting and gear patterns
- a) Downshifting
 - b) Up shifting
 - c) Premature shifting
- 15) Negotiating
- a) Intersections
 - i. Be prepared to yield
 - ii. Scan for hazards

- iii. Observe traffic
- iv. Cover brake pedal
- b) Railroad crossings
 - i. Be prepared to yield
 - ii. Scan for rail traffic
 - iii. Cover brake pedal
- c) Bridges
 - i. Remain cognizant of weather hazards
 - ii. Recognize bridge width

16) Weight and height limitations for both roads and bridges according to the Authority Having Jurisdiction (AHJ).

17) Identification and operation of automotive gauges

- a) Oil pressure gauge
- b) Coolant temperature gauge
- c) Speedometer
- d) Tachometer
- e) Fuel gauge
- f) Voltmeter
- g) Air pressure gauge(s)
- h) Automatic transmission temperature gauge

18) Operational limits

- a) Operational limits including, but not limited to the following:
 - i. Acceleration
 - ii. Braking
 - iii. Turning radius
 - iv. Steering wheel play
 - v. Tilt test
 - vi. Air pressures
 - vii. Weight and height limitations
 - viii. Normal operating ranges for automotive gauges
- b) Manufacturer's specified operating limits
- c) NFPA 1901, as applicable to operational limits

Requisite Skills: The ability to operate passenger restraint devices; maintain safe following distances; maintain control of the vehicle while accelerating, decelerating, and turning, given road, weather, and traffic conditions; operate under adverse environmental or driving surface conditions; and use automotive gauges and controls.

700-4.3.2 Back a vehicle from a roadway into restricted spaces on both the right and left sides of the vehicle, given a fire department vehicle, a spotter, and

restricted spaces 12 ft. (3.7 m.) in width, requiring 90-degree right-hand and left-hand turns from the roadway, so that the vehicle is parked within the restricted areas without having to stop and pull forward and without striking obstructions.

Requisite Knowledge: Vehicle dimensions, turning characteristics, spotter signaling, and principles of safe vehicle operation.

- 1) Vehicle dimensions
 - a) Length
 - b) Width
 - c) Height
 - d) Wheel base
- 2) Turning characteristics
 - a) Wheel base
 - b) Front wheel cramp angle
 - c) Rear axle pivot points
 - d) Speed
 - e) Steering wheel gear ratio
- 3) Spotter signaling
 - a) Headset
 - b) Hand signals per department standard practice
 - c) Radio
- 4) Principles of safe vehicle operation
 - a) Adjustment of cab features
 - b) Wearing of occupant restraints
 - c) Verification of personnel locations before proceeding
 - d) Right of way considerations

Requisite Skills: The ability to use mirrors and judge vehicle clearance.

- 700-4.3.3 Maneuver a vehicle around obstructions on a roadway while moving forward and in reverse, given a fire department vehicle, a spotter for backing, and a roadway with obstructions, so that the vehicle is maneuvered through the obstructions without stopping to change the direction of travel and without striking the obstructions.

Requisite Knowledge: Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation.

- 1) Vehicle dimensions
 - a) Length
 - b) Width
 - c) Height
 - d) Wheel base

- 2) Turning characteristics
 - a) Wheel base
 - b) Front wheel cramp angle
 - c) Rear axle pivot points
 - d) Speed
 - e) Steering wheel gear ratio

- 3) The effects of liquid surge (Newton's Three Laws of Motion)
 - a) An object in motion tends to stay in motion unless acted upon by an outside force
 - i. Weight transfer
 - ii. Greater stopping distance
 - iii. Overturning fire apparatus
 - b) An object at rest tends to stay at rest unless acted upon by an outside force
 - i. Acceleration/deceleration
 - ii. Outside curves
 - c) For every action there is an equal and opposite reaction
 - i. Braking
 - ii. Skidding

- 4) Spotter signaling
 - a) Headset
 - b) Hand signals per department standard practice
 - c) Radio

- 5) Principles of safe vehicle operation
 - a) Adjustment of cab features
 - b) Wearing of occupant restraints
 - c) Verification of personnel locations before proceeding
 - d) Right of way considerations

Requisite Skills: The ability to use mirrors and judge vehicle clearance.

- 700-4.3.4 Turn a fire department vehicle 180 degrees within a confined space, given a fire department vehicle, a spotter for backing up, and an area in which the vehicle cannot perform a U-turn without stopping and backing up, so

that the vehicle is turned 180 degrees without striking obstructions within the given space.

Requisite Knowledge: Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation. (Reference requisite knowledge in 700-4.3.3 for clarification)

Requisite Skills: The ability to use mirrors and judge vehicle clearance.

700-4.3.5 Maneuver a fire department vehicle in areas with restricted horizontal and vertical clearances, given a fire department vehicle and a course that requires the operator to move through areas of restricted horizontal and vertical clearances, so that the operator accurately judges the ability of the vehicle to pass through the openings and so that no obstructions are struck.

Requisite Knowledge: Vehicle dimensions, turning characteristics, the effects of liquid surge, spotter signaling, and principles of safe vehicle operation. (Reference requisite knowledge in 700-4.3.3 for clarification)

Requisite Skills: The ability to use mirrors and judge vehicle clearance.

700-4.3.6 Operate a vehicle using defensive driving techniques ~~under emergency conditions~~, given **an assignment and** a fire department vehicle **apparatus** and ~~emergency conditions~~, so that control of the vehicle is maintained.

700-A.4.3.6 **Simulated** emergency driving ~~simulation~~ **conditions** should be restricted to a driving track or similar controlled area. ~~Emergency driver training should not be conducted on~~ Public ways **should not be used for these activities.**

Requisite Knowledge: **The importance of donning passenger restraint devices and ensuring crew safety; the common causes of fire apparatus accidents and the recognition that drivers of fire apparatus are responsible for the safe and prudent operation of the vehicle under all conditions;** the effects on vehicle control of liquid surge, braking reaction time, and load factors; the effects of high center of gravity on roll-over potential, general steering reactions, speed, and centrifugal force; applicable laws and regulations; principles of skid avoidance, night driving, shifting, gear patterns; and automatic braking systems in wet and dry conditions; negotiation of intersections, railroad crossings, and bridges; weight and height limitations for both roads and

bridges; identification and operation of automotive gauges; and operational limits.

- 1) **The importance of donning passenger restraint devices and ensuring crew safety**
 - a) **Personnel safety**
 - b) **Equipment failure**
 - c) **Policy and procedure compliance**
 - d) **National standards**

- 2) **The common causes of fire apparatus accidents**
 - a) **Improper backing of the apparatus**
 - b) **Reckless driving by the public**
 - c) **Excessive speed by the fire apparatus driver/operator**
 - d) **Lack of driving skill and experience**
 - e) **Poor apparatus design or maintenance**
 - f) **Weather conditions**

- 3) **Recognition that drivers of fire apparatus are responsible for the safe and prudent operation of the vehicle under all conditions**
 - a) **Road traffic awareness**
 - b) **Weather**
 - c) **Defensive driving**
 - d) **Road conditions**
 - e) **Emergency response**
 - f) **Psychological and physiological limitations of driver**

- 4) The effects on vehicle control of liquid surge (Newton's Three Laws of Motion)
 - a) An object in motion tends to stay in motion unless acted upon by an outside force
 - i. Weight transfer
 - ii. Greater stopping distance
 - iii. Overturning fire apparatus
 - b) An object at rest tends to stay at rest unless acted upon by an outside force
 - i. Acceleration/deceleration
 - ii. Outside curves
 - c) For every action there is an equal and opposite reaction
 - i. Braking
 - ii. Skidding

- 5) The effects on vehicle control of braking reaction time
 - a) Braking reaction time defined

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- b) Methods to improve braking reaction time
 - i. Scanning
 - ii. Look ahead
 - iii. Use mirrors
 - iv. Cover the brake
 - v. Prepare to yield the right of way
 - c) Under the influence
 - i. Prescription medications
 - ii. Over the counter medications
 - iii. Exposure to products of incomplete combustion/toxins
 - iv. Illicit drugs/alcohol
 - d) Driver fatigue
- 6) The effects on vehicle control of load factors
- a) Acceleration/deceleration
 - b) Weight distribution
 - i. Emergency maneuvers
 - ii. Normal handling characteristics
 - c) Exceeding load limits
 - i. Personnel
 - ii. Equipment
 - iii. After market modifications
- 7) Effects of high center of gravity on roll-over potential
- a) Momentum
 - b) Inertia
 - c) Centrifugal force
- 8) Effects of high center of gravity on general steering reaction
- a) Over steering
 - b) Under steering
 - c) Plowing/pushing (Newton's first law)
- 9) Effects of high center of gravity on speed
- a) Grades
 - b) Curves
- 10) Effects of high center of gravity on centrifugal force
- a) Skidding
 - b) Overturning
 - c) Plowing/Pushing
- 11) Applicable laws and regulations
- a) Governmental

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- b) Authority having jurisdiction
- c) Departmental policies

12) Principles of skid avoidance

- a) Driver error
 - i. Driving too fast for road conditions
 - ii. Apparatus weight shifts
 - iii. Failure to anticipate obstacles
 - iv. Improper use of auxiliary braking devices
 - v. Improper maintenance of tire pressure
 - vi. Tread depth
- b) Environmental
 - i. Rain
 - ii. Snow
 - iii. Ice
 - iv. Fog
 - v. Wind
- c) Skid recovery
 - i. Steer into the skid
 - ii. Accelerate or decelerate
 - iii. Do not push the clutch pedal if equipped

13) Principles of night driving

- a) Reduced speed
- b) Reduced visibility
- c) Safety features on fire apparatus (e.g. strobe light dimmer)
- d) Driver/Operator fatigue

14) Principles of shifting and gear patterns

- a) Downshifting
- b) Up shifting
- c) Premature shifting

15) Automatic braking systems

- a) Wet conditions
- b) Dry conditions

16) Negotiating

- a) Intersections
 - i. Be prepared to yield
 - ii. Scan for hazards
 - iii. Observe traffic
 - iv. Cover brake pedal
- b) Railroad crossings

- i. Be prepared to yield
 - ii. Scan for rail traffic
 - iii. Cover brake pedal
 - c) Bridges
 - i. Remain cognizant of weather hazards
 - ii. Recognize bridge width
- 17) Weight and height limitations for both roads and bridges (AHJ)
- 18) Identification and operation of automotive gauges
 - a) Oil pressure gauge
 - b) Coolant temperature gauge
 - c) Speedometer
 - d) Tachometer
 - e) Fuel gauge
 - f) Voltmeter
 - g) Air pressure gauge(s)
 - h) Automatic transmission temperature gauge
- 19) Operational limits
 - a) Operational limits including, but not limited to the following:
 - i. Acceleration
 - ii. Braking
 - iii. Turning radius
 - iv. Steering wheel play
 - v. Tilt test
 - vi. Air pressures
 - vii. Weight and height limitations
 - viii. Normal operating ranges for automotive gauges
 - b) Manufacturer's specified operating limits
 - i. Gross Vehicle Weight (GVW)
 - ii. Operating curb weight
 - c) NFPA 1901, as applicable to operational limits
- 20) Psychological effects of emergency warning devices
 - a) Driver/Operator
 - b) General public

Requisite Skills: The ability to operate passenger restraint devices; maintain safe following distances; maintain control of the vehicle while accelerating, decelerating, and turning, given road, weather, and traffic conditions; operate under adverse environmental or driving surface conditions; and use automotive gauges and controls.

700-4.3.7 Operate all fixed systems and equipment on the vehicle not specifically addressed elsewhere in this standard, given systems and equipment, manufacturer's specifications and instructions, and departmental policies and procedures for the systems and equipment, so that each system or piece of equipment is operated in accordance with the applicable instructions and policies.

700-A.4.3.7 The NFPA committee's intent for this job performance requirement is for the driver/operator to be able to operate all major equipment and mechanical systems that are attached to the apparatus, other than those specifically covered in Chapters 5 through 10 of this standard. These types of equipment and systems include, but are not limited to, electric generation equipment, floodlighting systems, air compressors, air cascade systems, hydraulic rescue tool systems, power reels for air or hydraulic hose, cranes and stabilizers, and A-frames or other lifting equipment.

Requisite Knowledge: Manufacturer's specifications and operating procedures, and policies and procedures of the jurisdiction.

- 1) Manufacturer's specifications and operating procedures (AHJ)
- 2) Policies and procedures of the jurisdiction (AHJ)

Requisite Skills: The ability to deploy, energize, and monitor the system or equipment and to recognize and correct system problems.

700-5.1 **General**

The requirements of Fire Fighter I as specified in NFPA 1001 (or the requirements of Advanced Exterior Industrial Fire Brigade Member or Interior Structural Fire Brigade Member as specified in NFPA 1081) and the job performance requirements defined in Sections 5.1 and 5.2 shall be met prior to qualifying as a fire department driver/operator — pumper.

700-5.1.1 Perform the routine tests, inspections, and servicing functions specified in the following list in addition to those in 700-4.2.1, given a fire department pumper, its manufacturer's specifications, and policies and procedures of the jurisdiction, so that the operational status of the pumper is verified:

- 1) Water tank
 - a) Direct visual
 - b) Remote sensor level
- 2) Other extinguishing agent levels (if applicable)

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- a) Direct visual
 - b) Remote sensor level
- 3) Pumping systems
- a) Positive displacement
 - i. Piston pumps
 - ii. Rotary pumps
 - a. Rotary gear
 - b. Rotary vane
 - b) Centrifugal
 - i. Single stage
 - ii. Two stage
 - a. Series (Pressure)
 - b. Parallel (Volume)
- 4) Foam systems
- a) Induction
 - b) Injection
 - c) Batch mix
 - d) Premix
 - e) Compressed Air Foam System (CAFS)

Requisite Knowledge: Manufacturer's specifications and requirements, and policies and procedures of the jurisdiction.

- 1) Manufacturer's specifications and requirements
- 2) Policies and procedures of the jurisdiction

Requisite Skills: The ability to use hand tools, recognize system problems, and correct any deficiency noted according to policies and procedures.

700-5.2 **Operations**

700-5.2.1 Produce effective hand or master streams, given the sources specified in the following list, so that the pump is engaged, all pressure control and vehicle safety devices are set, the rated flow of the nozzle is achieved and maintained, and the apparatus is continuously monitored for potential problems:

- 1) Internal tank
- 2) Pressurized source

- a) Connection to a hydrant
 - b) Supply line from another pumping source
- 3) Static source
- 4) Transfer from internal tank to external source

Requisite Knowledge: Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, problems related to small-diameter or dead-end mains, low-pressure and private water supply systems, hydrant coding systems, and reliability of static sources.

- 1) Hydraulic calculations for friction loss and flow using both written formulas and estimation methods
- a) Theoretical written formulas
 - i. Friction loss
 - ii. Gallons per minute (flow)
 - iii. Nozzle reaction
 - iv. Pump discharge pressure
 - v. Elevation
 - b) Fire ground estimation methods
 - i. Friction loss
 - ii. Gallons per minute (flow)
 - iii. Pump discharge pressure
 - iv. Elevation
 - c) Elements of hydraulic calculations
 - i. Appliances
 - ii. Hose
 - a. Diameter
 - b. Length
 - c. Construction
 - d. Layouts
 - (1) Simple
 - (2) Complex
 - iii. Master streams
 - iv. Sprinklers
 - v. Standpipes
- 2) Safe operation of the pump
- a) Relief valves
 - i. Discharge
 - a. Governor
 - (1) Electronic

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- (2) Mechanical
 - b. Spring-actuated pressure relief
 - ii. Intake
 - a. Manufacturer pressure relief
 - b. Add-on pressure relief
 - b) Transfer valve
 - i. Electronic (to include override procedures)
 - ii. Manual
 - iii. Manufacturer's recommendations
 - c) Cavitation
 - i. Indicators
 - a. Auditory signals (e.g. gravel sounds)
 - b. Gauge readings
 - c. Throttle increase with no pressure increase
 - ii. Prevention
 - a. Bleeder valve
 - b. Maintain adequate residual
 - d) Priming
 - i. Positive displacement primers
 - a. Rotary vane
 - (1) Mechanical
 - (2) Electric
 - b. Rotary gear
 - (1) Mechanical
 - (2) Electric
 - ii. Exhaust primers
 - iii. Vacuum primers
 - e) Opening/closing valves
 - i. Water hammer
 - ii. Cavitation
 - iii. Pressure fluctuation
- 3) Problems related to small-diameter or dead-end mains
 - a) Limited flow
 - i. Encrustation
 - ii. Sedimentation
 - iii. Silt and debris
 - b) Greater susceptibility to water hammer damage
- 4) Low-pressure water supply systems
 - a) Access
 - b) Limited flow
 - c) Relay pumping

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- 5) Private water supply systems
 - a) Industrial
 - b) Non-potable water
 - c) Static pressure
 - d) Access
 - i. Thread compatibility
 - ii. Locked/covered hydrants

- 6) Hydrant coding systems
 - a) NFPA
 - b) American Water Works Association
 - c) Local jurisdiction

- 7) Reliability of static sources
 - a) Principles of lift
 - i. Theoretical
 - ii. Practical
 - b) Natural
 - i. Types
 - ii. Adequacy
 - a. $Q=A(V)(7.5)$
 - b. Capacity
 - iii. Accessibility
 - c) Man-made
 - i. Types
 - ii. Adequacy
 - a. $Q=A(V)(7.5)$
 - b. Capacity
 - iii. Accessibility

Requisite Skills: The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

- 700-5.2.2 Pump a supply line of 2 1/2 in. (65 mm) or larger, given a relay pumping evolution, the length and size of the line and the desired flow and intake pressure, so that the correct pressure and flow are provided to the next pumper in the relay.

Requisite Knowledge: Hydraulic calculations for friction loss and flow using both written formulas and estimation methods, safe operation of the pump, problems related to small-diameter or dead-end mains, low-pressure and private water supply systems, hydrant coding systems, and reliability of static sources. (Reference requisite knowledge in 700-5.2.1)

Requisite Skills: The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose lines, nozzles, valves, and appliances.

700-5.2.3 Produce a foam fire stream, given foam-producing equipment, so that properly proportioned foam is provided.

Requisite Knowledge: Proportioning rates and concentrations, equipment assembly procedures, foam system limitations, and manufacturer's specifications.

- 1) Proportioning rates and concentrations
- 2) Equipment assembly procedures (if applicable)
- 3) Foam system operations
- 4) Foam system limitations
- 5) Manufacturer's specifications

Requisite Skills: The ability to operate foam proportioning equipment and connect foam stream equipment.

700-5.2.4 Supply water to fire sprinkler and standpipe systems, given specific system information and a fire department pumper, so that water is supplied to the system at the correct volume and pressure.

Requisite Knowledge: Calculation of pump discharge pressure; hose layouts; location of fire department connection; alternative supply procedures if fire department connection is not usable; operating principles of sprinkler systems as defined in NFPA 13, NFPA 13D, and NFPA 13R; fire department operations in sprinklered properties as defined

in NFPA 13E; and operating principles of standpipe systems as defined in NFPA 14.

- 1) Calculation of pump discharge pressure
- 2) Hose layouts
- 3) Location of fire department connection
- 4) Alternative supply procedures if fire department connection is not usable
- 5) Operating principles of sprinkler systems as defined in NFPA 13, NFPA 13D, and NFPA 13R
- 6) Fire department operations in sprinklered properties as defined in NFPA 13E
- 7) Operating principles of standpipe systems as defined in NFPA 14

Requisite Skills: The ability to position a fire department pumper to operate at a fire hydrant and at a static water source, power transfer from vehicle engine to pump, draft, operate pumper pressure control systems, operate the volume/pressure transfer valve (multistage pumps only), operate auxiliary cooling systems, make the transition between internal and external water sources, and assemble hose line, nozzles, valves, and appliances.

**CHAPTER FIVE
FIRE INVESTIGATOR
COURSE OUTLINE**

SECTION	SUBJECT	RECOMMENDED HOURS
501-1	Commission on Fire Protection Rules and Regulations	0
501-2	INTENTIONALLY LEFT BLANK	0
501-3	Definitions	0
501-4	Basic Methodology	2
501-5	Basic Fire Science	8
501-6	Fire Patterns	12
501-7	Building Systems	2
501-8	Fire Protection Systems	2
501-9	Electricity and Fire	8
501-10	Building Fuel Gas Systems	4
501-11	Fire-Related Human Behavior	2
501-12	Legal Considerations	8
501-13	Safety	4
501-14	Sources of Information	8
501-15	Planning the Investigation	2
501-16	Documentation of the Investigation	8
501-17	Physical Evidence	8
501-18	Origin Determination	8
501-19	Fire Cause Determination	3
501-20	Classification of Fire Cause	1
501-21	Analyzing the Incident for Cause and Responsibility	4
501-22	Failure Analysis and Analytical Tools	4
501-23	Explosions	4
501-24	Incendiary Fires	8
501-25	Fire and Explosion Deaths and Injuries	4
501-26	Appliances	2
501-27	Motor Vehicle Fires	8
501-28	Wildfire Investigations	8
501-29	Management of Complex Investigations	2
501-30	Marine Fire Investigations	2
501-31	Practical Exercises	24
	TOTAL HOURS RECOMMENDED	160

* The recommended hours for skills evaluation is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

**CHAPTER FIVE
FIRE INVESTIGATOR
COURSE PHASE OUTLINE**

SECTION	SUBJECT	RECOMMENDED HOURS
FIRE INVESTIGATOR I – PHASE I		
501-4	Basic Methodology	2
501-15	Planning the Investigation	2
501-13	Safety	4
501-5	Basic Fire Science	8
501-6	Fire Patterns	12
501-7	Building Systems	2
501-18	Origin Determination	8
501-16	Documentation of the Investigation	8
501-17	Physical Evidence	8
	Total Recommended Hours	54
FIRE INVESTIGATOR II – PHASE II		
501-14	Sources of Information	8
501-12	Legal Considerations	8
501-10	Building Fuel Gas Systems	4
501-19	Fire Cause Determination	3
501-20	Classification of Fire Cause	1
501-11	Fire-Related Human Behavior	2
501-23	Explosions	4
501-25	Fire and Explosion Deaths and Injuries	4
501-9	Electricity and Fire	8
501-24	Incendiary Fires	8
501-21	Analyzing the Incident for Cause and Responsibility	4
501-26	Appliances	2
	Total Recommended Hours	56
COMPLETER – PHASE III		
501-8	Fire Protection Systems	2
501-27	Motor Vehicle Fires	8
501-30	Marine Fire Investigations	2
501-28	Wildfire Investigations	8
501-29	Management of Complex Investigations	2
501-22	Failure Analysis and Analytical Tools	4
501-31	Practical Exercises*	24
	Total Recommended Hours	50
TOTAL HOURS RECOMMENDED		160

*The recommended hours for skills evaluation is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

RECOMMENDED REFERENCE LIST FOR THE FIRE INVESTIGATOR CURRICULUM

This Reference List is provided as a general guide for both instructors and students to locate information pertaining to the specific objectives in the TCFP Curriculum. This list is **not** all-inclusive and does not in any way limit TCFP development and use of questions to test the objectives of the curriculum:

Required References

DeHaan, John D., *Kirk's Fire Investigation*, (7th ed.) (2012). Upper Saddle River, NJ: Brady/Prentice Hall.

Emergency Response Guidebook, (Current ed.) U.S. Department of Transportation Research and Special Programs Administration, Office of Hazardous Materials Initiatives and Training.

Fire Inspection and Code Enforcement (8th ed.) (2014). Stillwater, OK: Fire Protection Publications. International Fire Service Training Association.

Fire Investigator (2nd ed.) (2010). Stillwater OK: Fire Protection Publications. International Fire Service Training Association (IFSTA).

Fire Investigator: Principles and Practices (3rd ed.) (2012). Burlington, MA: Jones and Bartlett Learning.

NFPA 921: Guide for Fire and Explosion Investigations (2014 ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

NFPA 1033: Standard for Professional Qualifications for Fire Investigator (2014 ed.) Quincy, MA: National Fire Protection Association. NFPA Publications.

Rules of Criminal Evidence, latest edition. (On 04/03/14, this information was available online at <http://www.courts.state.tx.us/rules/tre-toc.asp>).

Texas Code of Criminal Procedure, latest edition. (On 04/03/14, this information was available online at <http://www.statutes.legis.state.tx.us/>).

Texas Commission on Fire Protection, *Fire Investigator Curriculum*.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

Texas Family Code, latest edition. (On 04/03/14, this information was available online at <http://www.statutes.legis.state.tx.us/>).

Texas Insurance Code, latest edition. (On 04/03/14, this information was available online at <http://www.statutes.legis.state.tx.us/>).

Texas Penal Code, latest edition. (On 04/03/14, this information was available online at <http://www.statutes.legis.state.tx.us/>).

Texas Public Information Act Handbook, latest edition. (On 04/03/14, this information was available online at http://www.oag.state.tx.us/AG_publications/pdfs/publicinfo_hb.pdf. It is available through the Texas Attorney General's office.)

United States Constitution. (On 04/03/14, this information was available online at <http://www.archives.gov/exhibits/charters/charters.html>).

Recommended References

The most current edition of the following publications and media are recommended (not required) supplemental material for program use.

Texts

Cole, Lee S., *Investigation of Motor Vehicles*, (4th ed.) (2001). Lee Books.

Fire in Texas, Texas State Fire Marshals Office. Department of Insurance, TEXFIRS section.

Icove, David J., DeHaan, John D, and Haynes, Gerald A., *Forensic Fire Scene Reconstruction*, (3rd ed.) (2012). Upper Saddle River, NJ: Brady/Prentice Hall.

NFPA 472: Standard for Professional Competence of Responders to Hazardous Materials Incidents (2013 ed.). Quincy, MA: National Fire Protection Association. NFPA Publications.

Factory Mutual Insurance – *Fire Investigators Handbook*

The VIN number book - Passenger Vehicle Identification Manual (2013, 84th edition)
National Insurance Crime Bureau, 1111 E. Touhy Avenue, Suite 400, Des Plaines, IL 60018-2805

TX State FMO Lab submittal guide (Forensic Arson Laboratory Guidelines for Evidence)
(<http://www.tdi.state.tx.us/fire/documents/fmlabguideline.pdf>)

US DOJ (Fire and Arson Scene Evidence)
(<http://www.ncjrs.gov/pdffiles1/nij/181584.pdf>)

Fire Investigator

A Fire Investigator is an individual who has demonstrated the knowledge, skills and abilities necessary to conduct, coordinate, and complete a fire investigation employing all the elements of the scientific method as the operating analytical process throughout the investigation. A Fire Investigator can competently determine the origin and cause of a fire and has mastered all the job performance requirements of NFPA 1033: *Standard for Professional Qualifications for Fire Investigator*.

SECTION 1

COMMISSION ON FIRE PROTECTION

RULES AND REGULATIONS

4.1 General

NFPA 1033 4.1.1 The fire investigator shall meet the job performance requirements defined in Sections 4.2 through 4.7.

501-1.1 **The Investigator candidate shall describe the purpose of the NFPA standard and guide applicable to Fire Investigators.**

- 1.1.1 NFPA 1033 *Standard for Professional Qualifications for Fire Investigator*, 2014 edition.
- 1.1.2 NFPA 921 *Guide for Fire and Explosion Investigations*, 2014 edition.

501-1.2 **The Investigator candidate shall identify rules applicable to the Fire/Arson Investigator certification adopted by the Texas Commission on Fire Protection.**

- 1.2.1 The Investigator candidate shall identify the requirements for certification as a Fire Investigator as stated in the *Standards Manual for Fire Protection Personnel*, Chapter 431.
- 1.2.2 The Investigator candidate shall identify the requirements for certification as an Arson Investigator as stated in the *Standards Manual for Fire Protection Personnel*, Chapter 431.
- 1.2.3 The Investigator candidate shall identify the various levels of certification for Fire and/or Arson Investigator,

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as stated in the *Standards Manual for Fire Protection Personnel*, Chapter 431.

- 1.2.3.1 Basic
- 1.2.3.2 Intermediate
- 1.2.3.3 Advanced
- 1.2.3.4 Master

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SECTION 2

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SECTION 3

DEFINITIONS

501-3.1 ***The Investigator candidate shall define the terms used in Chapter 3 of NFPA 921, Guide for Fire and Explosion Investigation (2014 Edition).***

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SECTION 4

BASIC METHODOLOGY

4.1 General

NFPA 1033 4.1.2 The fire investigator shall employ all elements of the scientific method as the operating analytical process throughout the investigation and for the drawing of conclusions.

501-4.1 ***The Investigator candidate shall describe the nature of fire investigations.***

501-4.2 ***The Investigator candidate shall apply the principles of the systematic approach of the scientific method.***

501-4.3 ***The Investigator candidate shall describe the steps of the scientific method relating to fire investigations.***

- 4.3.1 Recognize the need
- 4.3.2 Define the problem
- 4.3.3 Collect data
- 4.3.4 Analyze the data
- 4.3.5 Developing a hypothesis (inductive reasoning)
- 4.3.6 Test the hypothesis (deductive reasoning)
- 4.3.7 Avoid presumption
- 4.3.8 Expectation bias
- 4.3.9 Confirmation bias

501-4.4 ***The Investigator candidate shall describe the basic method of fire investigation.***

- 4.4.1 Receiving the assignment
- 4.4.2 Preparing for the investigation
- 4.4.3 Conducting the investigation
- 4.4.4 Collecting and preserving evidence

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4.4.5 Analyzing the incident

4.4.6 Conclusions

501-4.5 ***The Investigator candidate shall properly distinguish between the different levels of certainty.***

4.5.1 Probable versus possible

4.5.2 Suspected

4.5.3 Expert opinions

501-4.6 ***The Investigator candidate shall develop “review procedures.”***

4.6.1 Administrative review

4.6.2 Technical review

4.6.3 Peer review

501-4.7 ***The Investigator candidate shall describe different reporting procedures.***

SECTION 5

BASIC FIRE SCIENCE

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.4 Interpret fire patterns, given standard equipment and tools and some structural or content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved and in context and relationship with all patterns observed and the mechanisms of heat transfer that led to the formation of the pattern..

(A) Requisite Knowledge. Fire dynamics, fire development, and the interrelationship of heat release rate, form, and ignitability of materials.

(B) Requisite Skills. Ability to interpret the effects of burning characteristics on different types of materials.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.

(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.

(B) Requisite Skills. Ability to interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitability; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

NFPA 1033 4.2.6 Examine and remove fire debris, given standard equipment and tools, so that all debris is checked for fire cause evidence, potential ignition source(s) is identified, and evidence is preserved without investigator-inflicted damage or contamination.

(A) Requisite Knowledge. Basic understanding of ignition processes, characteristics of ignition sources, and ease of ignition of fuels; debris-layering techniques; use of tools and equipment during the debris search; types of fire cause evidence commonly found in various degrees of damage; and evidence-gathering methods and documentation.

(B) Requisite Skills. Ability to employ search techniques that further the discovery of fire cause evidence and ignition sources, use search techniques that incorporate documentation, and collect and preserve evidence.

501-5.1 **The Investigator candidate shall define and describe fire science.**

5.1.1 General

5.1.2 Identify and describe the elements of the fire tetrahedron.

5.1.2.1 Define fuel and describe the three states in which fuel exists.

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- 5.1.2.2 Describe the action of oxidizing agents.
- 5.1.2.3 Describe the relationship of heat in the combustion process.
- 5.1.2.4 Describe the uninhibited chemical chain reaction of combustion.

501-5.2 ***The Investigator candidate shall be able to discuss fire chemistry as the study of chemical processes that occur in fires, including changes of state, decomposition, and combustion.***

- 5.2.1 General
- 5.2.2 The Investigator candidate shall define and describe phase changes and thermal decomposition.
- 5.2.3 The Investigator candidate shall describe combustion reactions, premixed burning, diffusion flames, and transactions from premixed burning to diffusion flame burning.

501-5.3 ***The Investigator candidate shall identify and describe products of combustion.***

501-5.4 ***The Investigator candidate shall identify and describe fluid flows generated by mechanical forces or by buoyant forces generated by temperature differences.***

- 5.4.1 General
- 5.4.2 Buoyant flows
- 5.4.3 Fire plumes
- 5.4.4 Ceiling jets
- 5.4.5 Vent flows

501-5.5 ***The Investigator candidate shall define and describe methods of heat transfer.***

- 5.5.1 General
- 5.5.2 Conduction

- 5.5.3 Convection
- 5.5.4 Radiation
- 5.5.5 Thermometry

501-5.6 ***The Investigator candidate shall define and describe the fuel load, fuel packages, and properties of flame.***

- 5.6.1 Fuel load
- 5.6.2 Fuel items and fuel package
- 5.6.3 Heat release rate
- 5.6.4 Properties of flames
- 5.6.5 Thermal structure of a flame
- 5.6.6 Heat fluxes from flames
 - 5.6.6.1 Heat fluxes from flames to contacted surfaces
 - 5.6.6.2 Heat fluxes from flames to remote surfaces

501-5.7 ***The Investigator candidate shall describe the different forms and mechanisms of ignition.***

- 5.7.1 Ignition in general
- 5.7.2 Ignition of flammable gases
- 5.7.3 Ignition of liquids
- 5.7.4 Ignition of solids

501-5.8 ***The Investigator candidate shall describe the different flame spreads and their characteristics.***

- 5.8.1 General
 - 5.8.1.1 Counterflow flame spread
 - 5.8.1.2 Concurrent flame spread
 - 5.8.1.3 Fire spread on sloped surfaces
- 5.8.2 Flame spread on liquids
- 5.8.3 Flame spread on solids

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501-5.9 **The Investigator candidate shall describe the different methods of fire spread in a compartment.**

- 5.9.1 General
- 5.9.2 Fire spread
 - 5.9.2.1 Fire spread by flame impingement
 - 5.9.2.2 Fire spread by remote ignition

501-5.10 **The Investigator candidate shall describe compartment fire development.**

- 5.10.1 General
- 5.10.2 Compartment fire phenomena
- 5.10.3 Compartment vent flows
- 5.10.4 Flashover
- 5.10.5 Fully developed compartment fires
- 5.10.6 Effects of enclosures on fire growth
 - 5.10.6.1 Room volume and ceiling height
 - 5.10.6.2 Location of the fire in the compartment

501-5.11 **The Investigator candidate shall identify fire spread between compartments.**

- 5.11.1 Fire spread via openings
- 5.11.2 Fire spread via barriers

501-5.12 **The Investigator candidate shall describe the paths of smoke spread in buildings.**

SECTION 6

FIRE PATTERNS

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.4 Interpret fire patterns, given standard equipment and tools and some structural or content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved and in context and relationship with all patterns observed and the mechanisms of heat transfer that led to the formation of the pattern.

(A) Requisite Knowledge. Fire dynamics, fire development, and the interrelationship of heat release rate, form, and ignitibility of materials.

(B) Requisite Skills. Ability to interpret the effects of burning characteristics on different types of materials.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.

(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.

(B) Requisite Skills. Interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitibility; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

NFPA 1033 4.2.7 Reconstruct the area of origin, given standard and, if needed, special equipment and tools as well as sufficient personnel, so that all protected areas and fire patterns are identified and correlated to contents or structural remains, items potentially critical to cause determination and photo documentation are returned to their prefire location, and the area(s) or point(s) of origin is discovered.

(A) Requisite Knowledge. The effects of fire on different types of material and the importance and uses of reconstruction.

(B) Requisite Skills. Ability to examine all materials to determine the effects of fire, identify and distinguish among different types of fire-damaged contents, and return materials to their original position using protected areas and fire patterns.

501-6.1 ***The Investigator candidate shall define fire patterns.***

501-6.2 ***The Investigator candidate shall be able to identify fire effects.***

6.2.1 Identify fire patterns

6.2.2 Temperature estimation using fire effects

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- 6.2.3 Mass loss of material
- 6.2.4 Char
 - 6.2.4.1 Introduction
 - 6.2.4.2 Surface effect of char
 - 6.2.4.3 Appearance of char
 - 6.2.4.4 Rate of wood charring
 - 6.2.4.5 Depth of char
 - 6.2.4.6 Nature of char
- 6.2.5 Spalling
- 6.2.6 Oxidation
- 6.2.7 Color changes
- 6.2.8 Melting of materials
- 6.2.9 Thermal expansion and deformation of materials
- 6.2.10 Deposition of smoke on surfaces
- 6.2.11 Clean burn
- 6.2.12 Calcination
- 6.2.13 Window glass
 - 6.2.13.1 Breaking of glass
 - 6.2.13.2 Tempered glass
 - 6.2.13.3 Staining of glass
- 6.2.14 Collapsed furniture springs
- 6.2.15 Distorted light bulbs
- 6.2.16 Rainbow effect
- 6.2.17 Victim injuries

501-6.3 ***The Investigator candidate shall be able to identify the following fire patterns.***

- 6.3.1 Introduction
 - 6.3.1.1 Dynamics of pattern production
 - 6.3.1.2 Lines or areas of demarcation

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- 6.3.2 Causes of fire patterns
 - 6.3.2.1 Plume-generated patterns
 - 6.3.2.2 Ventilation-generated patterns
 - 6.3.2.3 Hot gas layer-generated patterns
 - 6.3.2.4 Full room involvement-generated patterns
 - 6.3.2.5 Suppression-generated patterns
- 6.3.3 Locations of patterns
- 6.3.4 Location of objects
 - 6.3.4.1 Heat shadowing
 - 6.3.4.2 Protected areas
- 6.3.5 Penetrations of horizontal surfaces
- 6.3.6 Depth of char patterns with fuel gases
- 6.3.7 Pattern geometry
 - 6.3.7.1 V patterns on vertical surfaces
 - 6.3.7.2 Inverted cone (triangular) patterns
 - 6.3.7.3 Hourglass patterns
 - 6.3.7.4 U-shaped patterns
 - 6.3.7.5 Truncated cone patterns
 - 6.3.7.6 Pointer and arrow patterns
 - 6.3.7.7 Circular-shaped patterns
 - 6.3.7.8 Irregular patterns
 - 6.3.7.9 Doughnut-shaped patterns
 - 6.3.7.10 Linear patterns
 - 6.3.7.11 Area patterns
 - 6.3.7.12 Saddle burns

501-6.4 ***The Investigator candidate shall be able to identify and analyze fire patterns.***

- 6.4.1 Types of fire patterns
 - 6.4.1.1 Fire spread (movement) patterns
 - 6.4.1.2 Heat (intensity) patterns
 - 6.4.1.3 Combination of patterns

SECTION 7

BUILDING SYSTEMS

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.

(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.

(B) Requisite Skills. Interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitability; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

NFPA 1033 4.2.8 Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

501-7.1 **The Investigator candidate shall recognize the reaction of buildings and building assemblies to fire.**

501-7.2 **The Investigator candidate shall evaluate the features of design, construction and structural elements in evaluating fire development.**

7.2.1 General

7.2.2 Building design

7.2.2.1 General

7.2.2.2 Building loads

7.2.2.3 Room size

7.2.2.4 Compartmentation

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- 7.2.2.5 Concealed and interstitial spaces
- 7.2.2.6 Planned designs as compared to “as-built” conditions
- 7.2.3 Materials
 - 7.2.3.1 Ignitability
 - 7.2.3.2 Flammability
 - 7.2.3.3 Thermal inertia
 - 7.2.3.4 Thermal conductivity
 - 7.2.3.5 Toxicity
 - 7.2.3.6 Physical state and heat resistance
 - 7.2.3.7 Orientation, position and placement
- 7.2.4 Occupancy
- 7.2.5 Computer fire model survey of building component variations
- 7.2.6 Explosion damage

501-7.3 *The Investigator candidate shall identify the different types of building construction.*

7.3.1 General

****Note** (Only 501-7.3.1)**

The following section is not contained in NFPA 921, *Guide for Fire and Explosion Investigation*. The reference for this material is found in IFSTA, *Fire Inspection and Code Enforcement and Fire Investigator*.

- 7.3.1.1 Type I – fire resistive
- 7.3.1.2 Type II – non-combustible
- 7.3.1.3 Type III – ordinary
- 7.3.1.4 Type IV – heavy timber
- 7.3.1.5 Type V – wood frame
- 7.3.2 Wood Frame (Type V)
 - 7.3.2.1 Platform frame construction
 - 7.3.2.2 Balloon frame
 - 7.3.2.3 Plank and beam
 - 7.3.2.4 Post and frame
 - 7.3.2.5 Heavy timber
 - 7.3.2.6 Alternative residential construction
 - 7.3.2.6.1 Manufactured homes
 - 7.3.2.6.2 Modular homes

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- 7.3.2.6.3 Steel frame residential construction
- 7.3.2.7 Manufactured wood structural elements
- 7.3.3 Ordinary construction (Type III)
- 7.3.4 Mill construction (Type IV)
- 7.3.5 Non-combustible construction (Type II)
 - 7.3.5.1 General
 - 7.3.5.2 Metal construction
 - 7.3.5.3 Concrete or masonry construction

501-7.4 ***The Investigator candidate shall identify the different construction assemblies.***

- 7.4.1 General
- 7.4.2 Floor/ceiling/roof assemblies
- 7.4.3 Walls
- 7.4.4 Doors
- 7.4.5 Concealed spaces

501-7.5 ***The Investigator candidate shall describe the different construction materials.***

- 7.5.1 Structural steel
- 7.5.2 Reinforced concrete
- 7.5.3 Wood

501-7.6 ***The Investigator candidate shall analyze the impact of passive fire protection systems on the investigation.***

501-7.7 ***The Investigator candidate shall analyze the design and installation parameters of the system.***

501-7.8 ***The Investigator candidate shall produce the additional documentation and data collection.***

501-7.9 ***The Investigator candidate shall perform the required additional analysis.***

- 7.9.1 Code analysis
- 7.9.2 Design analysis
- 7.9.3 Installation analysis
- 7.9.4 System performance
- 7.9.5 Testing and maintenance analysis
- 7.9.6 Origin and cause determination

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SECTION 8

FIRE PROTECTION SYSTEMS

4.2. Scene Examination

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire

NFPA 1033 4.2.8 Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

501-8.1 **The Investigator candidate shall develop basic understanding of active fire protection systems.**

501-8.2 **The Investigator candidate shall identify the basic components and operation of a fire alarm system.**

- 8.2.1 General information
 - 8.2.1.1 Purpose of systems
 - 8.2.1.2 System components
 - 8.3.1.3 General system operation

- 8.2.2 Key components of systems
 - 8.2.2.1 Fire Alarm Control Unit (FACU)
 - 8.2.2.2 Power supply
 - 8.2.2.3 Initiating devices
 - 8.2.2.4 Smoke detection
 - 8.2.2.5 Heat detection
 - 8.2.2.6 Other types of detectors
 - 8.2.2.7 Notification appliances

- 8.2.3 Operations and installation parameters of the system
 - 8.2.3.1 FACU features
 - 8.2.3.2 Location and spacing of devices
 - 8.2.3.3 Internal system communication

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- 8.2.3.4 Means of alarm transmission
- 8.2.3.5 Systems monitored and controlled
- 8.2.4 Analysis
 - 8.2.4.1 Fire alarm system components, locations, and conditions should be documented and analyzed.
 - 8.2.4.2 Installation considerations
 - 8.2.4.3 Operability
 - 8.2.4.4 Analysis of smoke alarm response
 - 8.2.4.5 Analysis of smoke deposition

501-8.3 ***The Investigator candidate shall identify the basic components and operation of a water-based fire suppression system.***

- 8.3.1 General Information
 - 8.3.1.1 Purpose of systems
 - 8.3.1.2 General system operation
- 8.3.2 Key components of water-based systems
 - 8.3.2.1 Sprinklers/nozzles
 - 8.3.2.2 Piping
 - 8.3.2.3 Systems valves
 - 8.3.2.4 Water supply
- 8.3.3 Operations and installation parameters of the system
 - 8.3.3.1 Location and spacing of sprinklers
 - 8.3.3.2 Pipe sizing and arrangement
 - 8.3.3.3 Sprinkler coverage and distribution
 - 8.3.3.4 Water flow rate and pressure
 - 8.3.3.5 Activation mechanisms and criteria
 - 8.3.3.6 Systems monitored and controlled
- 8.3.4 Analysis
 - 8.3.4.1 Code analysis
 - 8.3.4.2 Design analysis
 - 8.3.4.3 Hazard protected

501-8.4 ***The Investigator candidate shall identify the basic components and operation of a non-water-based fire suppression system.***

- 8.4.1 General information
 - 8.4.1.1 Purpose of systems
 - 8.4.1.2 System components
 - 8.4.1.3 Suppression agents

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- 8.4.2 Key components of systems
 - 8.4.2.1 Suppression agent supply
 - 8.4.2.2 Pressure sources
 - 8.4.2.3 Distribution piping
 - 8.4.2.4 Valves, hoses and fittings
 - 8.4.2.5 Proportioners
 - 8.4.2.6 Distribution nozzles
 - 8.4.2.7 Actuation system
 - 8.4.2.8 System monitoring and control
- 8.4.3 Operations and installation parameters of the system
 - 8.4.3.1 Location and spacing of nozzles
 - 8.4.3.2 Pipe sizing and arrangement
 - 8.4.3.3 Nozzle coverage and distribution
 - 8.4.3.4 Activation mechanisms and criteria
 - 8.4.3.5 Systems monitored and controlled
- 8.4.4 Analysis
 - 8.4.4.1 General information and codes
 - 8.4.4.2 Design analysis

501-8.5 ***The Investigator candidate shall identify the key components of proper documentation of a fire suppression system.***

- 8.5.1 Design documentation
- 8.5.2 Permit history
- 8.5.3 Invoices and contracts
- 8.5.4 Installation documentation
- 8.5.5 Inspection and maintenance records
- 8.5.6 Product literature
- 8.5.7 Alarm/activation history

501-8.6 ***The Investigator candidate shall identify spoliation issues regarding the documentation of the fire protection system.***

****Note****

The following sections (501-8.7 through 501-8.12) are not contained in NFPA 921, *Guide for Fire and Explosion Investigation*. The reference for this material is found in IFSTA, *Fire Inspection and Code Enforcement*.

501-8.7 ***The Investigator candidate shall describe the types and characteristics of automatic sprinkler systems.***

- 8.7.1 Identify various types of automatic sprinkler systems
 - 8.7.1.1 Wet pipe
 - 8.7.1.2 Dry pipe
 - 8.7.1.3 Pre-action
 - 8.7.1.4 Deluge
 - 8.7.1.5 Residential
- 8.7.2 Identify reasons for unsatisfactory performance of an automatic sprinkler system.
- 8.7.3 Describe fire sprinkler components and operations.

501-8.8 ***The Investigator candidate shall describe the types, operations, capabilities and the effects of proper application of "special agent" fire extinguishing systems.***

- 8.8.1 Dry chemical
- 8.8.2 Wet chemical
- 8.8.3 Halogenated agent
- 8.8.4 Carbon dioxide
- 8.8.5 Foam
- 8.8.6 Gaseous agent

501-8.9 ***The Investigator candidate shall identify the classes and capabilities of standpipe and hose systems.***

- 8.9.1 Class I systems
- 8.9.2 Class II systems
- 8.9.3 Class III systems

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501-8.10 ***The Investigator candidate shall identify alarm-initiating devices.***

- 8.10.1 Local system
- 8.10.2 Auxiliary system
- 8.10.3 Remote station
- 8.10.4 Proprietary system
- 8.10.5 Central station system

501-8.11 ***The Investigator candidate shall identify fire detection systems.***

- 8.11.1 Smoke
- 8.11.2 Flame
- 8.11.3 Heat
- 8.11.4 Gas

501-8.12 ***The Investigator candidate shall describe Heating Ventilation and Air Conditioning (HVAC) system components and their relation to smoke and fire spread.***

- 8.12.1 Smoke dampers
- 8.12.2 Automatic shutoffs
- 8.12.3 Ductwork
- 8.12.4 Pipe and duct chases

SECTION 9

ELECTRICITY AND FIRE

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.8 Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

501-9.1 ***The Investigator candidate shall understand the basic principles of physics that relate to electricity and fire, including systems and equipment.***

501-9.2 ***The Investigator candidate shall describe basic electrical theory.***

- 9.2.1 General
- 9.2.2 Comparing electricity to hydraulics
- 9.2.3 Ampacity
- 9.2.4 Conductivity of conductors
- 9.2.5 Ohm's Law
- 9.2.6 Electrical power
- 9.2.7 Ohm's Law Wheel
- 9.2.8 Applying Ohm's Law

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501-9.3 ***The Investigator candidate shall describe the typical building electrical systems and its components.***

- 9.3.1 General
- 9.3.2 Electrical service
 - 9.3.2.1 Single phase service
 - 9.3.2.2 Three phase service
- 9.3.3 Meter and base
- 9.3.4 Significance

501-9.4 ***The Investigator candidate shall identify the functions of service equipment.***

- 9.4.1 To provide means for turning off power to the entire electrical system
- 9.4.2 To provide protection against electrical malfunctions
- 9.4.3 To divide the power distribution into several branch circuits

501-9.5 ***The Investigator candidate shall identify the principle of grounding.***

- 9.5.1 General
- 9.5.2 Floating neutral (open neutral)

501-9.6 ***The Investigator candidate shall describe the components of overcurrent protection.***

- 9.6.1 General
- 9.6.2 Fuses
 - 9.6.2.1 Operations
 - 9.6.2.2 Plug fuses
 - 9.6.2.3 Type S fuses
 - 9.6.2.4 Time-delay fuses
 - 9.6.2.5 Cartridge fuses
- 9.6.3 Circuit breakers

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- 9.6.3.1 Operations
- 9.6.3.2 Main breakers
- 9.6.3.3 Branch circuit breakers
- 9.6.3.4 Ground fault circuit interrupters (GFCI)
- 9.6.3.5 Arc fault circuit interrupters (AFCI)

9.6.4 Circuit breaker panels

501-9.7 ***The Investigator candidate shall describe a branch circuit and its components.***

- 9.7.1 Conductors
- 9.7.2 Size of conductors
- 9.7.3 Copper conductors
- 9.7.4 Aluminum conductors
- 9.7.5 Insulation

501-9.8 ***The Investigator candidate shall identify and describe the different types of outlets and devices found in a branch circuit.***

- 9.8.1 Switches
- 9.8.2 Receptacles
- 9.8.3 Other outlets, devices or equipment

501-9.9 ***The Investigator candidate shall describe how the use of improper electrical components can create sufficient heat for ignition.***

- 9.9.1 General
- 9.9.2 Resistance heating
- 9.9.3 Overcurrent and overload
- 9.9.4 Arcs
 - 9.9.4.1 General
 - 9.9.4.2 High voltage arcs
 - 9.9.4.3 Static electricity
 - 9.9.4.4 Parting arcs

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9.9.4.5 Arcing across a carbonized path

9.9.5 Sparks

9.9.6 High-resistance faults

501-9.10 ***The Investigator candidate shall identify and describe types of damage encountered in electrical systems.***

9.10.1 General

9.10.2 Short circuit and ground fault parting arcs

9.10.3 Arcing through a carbonized path due to thermal means (arcing through char)

9.10.4 Overheating connections

9.10.5 Overload

9.10.6 Effects not caused by electricity

9.10.6.1 Conductor surface colors

9.10.6.2 Melting by fire

9.10.6.3 Alloying

9.10.6.4 Mechanical gouges

501-9.11 ***The Investigator candidate shall identify arc melting of electrical conductors.***

9.11.1 Melting caused by electrical arcing

9.11.2 Melting caused by fire

9.11.3 Eutectic melting

9.11.4 Extraneous melting

9.11.5 Undersized conductors

9.11.6 Nicked or stretched conductors

9.11.7 Arc mapping procedure

9.11.8 Deteriorated insulation

- 9.11.9 Over driven or misdriven staple
- 9.11.10 Short circuit
- 9.11.11 Beaded conductor

501-9.12 ***The Investigator candidate shall describe the role of static electricity in an ignition sequence.***

- 9.12.1 Introduction to static electricity
- 9.12.2 Generation of static electricity
 - 9.12.2.1 General
 - 9.12.2.2 Ignitable liquids
 - 9.12.2.3 Charges on the surface of a liquid
 - 9.12.2.4 Switch loading
 - 9.12.2.5 Spraying operations
 - 9.12.2.6 Gases
 - 9.12.2.7 Dusts and fibers
 - 9.12.2.8 Static electric discharge from the human body
 - 9.12.2.9 Clothing
- 9.12.3 Incendive arc
- 9.12.4 Ignition energy
- 9.12.5 Controlling accumulations of static electricity
 - 9.12.5.1 Humidification
 - 9.12.5.2 Bonding and grounding
- 9.12.6 Conditions necessary for static arc ignition
- 9.12.7 Investigating static electric ignitions
- 9.12.8 Lightning
 - 9.12.8.1 General
 - 9.12.8.2 Lightning bolt characteristics
 - 9.12.8.3 Lightning strikes
 - 9.12.8.4 Lightning damage
 - 9.12.8.5 Lightning detection networks

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SECTION 10

BUILDING FUEL GAS SYSTEMS

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.8 Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Ability to determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

501-10.1 The Investigator candidate shall describe building fuel gas systems.

10.1.1 Impact of fuel gases on fire and explosions investigations.

10.1.2 Additional fire spread.

501-10.2 The Investigator candidate shall identify the different fuel gases.

10.2.1 Natural gas

10.2.2 Commercial propane

10.2.3 Other fuel gases
10.2.3.1 Commercial butane
10.2.3.2 Propane HD5
10.2.3.3 Manufactured gases

10.2.4 Odorization

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501-10.3 ***The Investigator candidate shall identify different natural gas systems.***

- 10.3.1 Transmission pipelines
- 10.3.2 Main pipelines (mains)
- 10.3.3 Service lines
- 10.3.4 Metering

501-10.4 ***The Investigator candidate shall identify different LP-Gas Systems.***

- 10.4.1 LP-Gas storage containers
 - 10.4.1.1 Tanks
 - 10.4.1.2 Cylinders
- 10.4.2 Container appurtenances
 - 10.4.2.1 Pressure relief devices
 - 10.4.2.2 Connections for flow control
 - 10.4.2.3 Liquid level gauging devices
 - 10.4.2.4 Pressure gauges
- 10.4.3 Pressure regulation
- 10.4.4 Vaporizers

501-10.5 ***The Investigator candidate shall identify common fuel gas system components.***

- 10.5.1 Pressure regulations (reduction)
- 10.5.2 Service piping systems
- 10.5.3 Valves
- 10.5.4 Gas burners
 - 10.5.4.1 Manual ignition
 - 10.5.4.2 Pilot lights
 - 10.5.4.3 Pilotless igniters

501-10.6 ***The Investigator candidate shall identify the common piping in buildings.***

- 10.6.1 Size of piping
- 10.6.2 Piping materials
- 10.6.3 Joints and fittings
- 10.6.4 Piping installation
- 10.6.5 Main shut-off valves
- 10.6.6 Prohibited locations
- 10.6.7 Electrical bonding and grounding

501-10.7 ***The Investigator candidate shall identify common appliance and equipment requirements.***

- 10.7.1 Installation
- 10.7.2 Venting and air supply
- 10.7.3 Appliance controls

501-10.8 ***The Investigator candidate shall identify common fuel gas utilization equipment.***

- 10.8.1 Air heating
- 10.8.2 Water heating
- 10.8.3 Cooking
- 10.8.4 Refrigeration and cooling
- 10.8.5 Engines
- 10.8.6 Illumination
- 10.8.7 Incinerators, toilets, and exhaust afterburners

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501-10.9 ***The Investigator candidate shall explain investigating fuel gas systems.***

- 10.9.1 Recognize limitations
- 10.9.2 Fuel gas system analysis
- 10.9.3 Compliance with codes and standards
- 10.9.4 Leakage
- 10.9.5 Pressure testing
- 10.9.6 Locating leaks
- 10.9.7 Testing flow rates and pressures
- 10.9.8 Collection of gas piping
- 10.9.9 Underground migration of fuel gases

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SECTION 11

FIRE-RELATED HUMAN BEHAVIOR

4.4 Evidence Collection/Preservation

Duties shall include using proper physical and legal procedures to identify, document, collect, and preserve evidence required within the investigation.

NFPA 1033 4.4.1 Utilize proper procedures for managing victims and fatalities, given a protocol and appropriate personnel, so that all evidence is discovered and preserved and the protocol procedures are followed.

(A) Requisite Knowledge: Types of evidence associated with fire victims and fatalities and evidence preservation methods.

(B) Requisite Skills: Observational skills and the ability to apply protocols to given situations.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.4: Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.

(A) Requisite Knowledge: Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting.

(B) Requisite Skills: Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge: Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills: Analytical and assimilation skills.

501-11.1 ***The Investigator candidate shall recognize that the analysis of fire related human behavior will often be an integral part of the investigation.***

501-11.2 ***The Investigator candidate shall recall the history of research as related to fire related human behavior.***

501-11.3 ***The Investigator candidate shall identify and describe general considerations of human response to fires.***

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- 11.3.1 Individual
 - 11.3.1.1 Physical limitations
 - 11.3.1.2 Cognitive comprehension limitations
 - 11.3.1.3 Familiarity and physical setting
- 11.3.2 Groups
 - 11.3.2.1 Group size
 - 11.3.2.2 Group structure
 - 11.3.2.3 Group permanence
 - 11.3.2.4 Roles and norms
- 11.3.3 Characteristics of the physical setting
 - 11.3.3.1 Location of exits
 - 11.3.3.2 Number of exits
 - 11.3.3.3 Height of the structure
 - 11.3.3.4 Fire alarm systems
 - 11.3.3.5 Fire suppression systems
- 11.3.4 Characteristics of the fire
 - 11.3.4.1 Presence of flames
 - 11.3.4.2 Presence of smoke
 - 11.3.4.3 Effects of toxic gases and oxygen depletion

501-11.4 ***The Investigator candidate shall identify and describe the factors related to fire initiation.***

- 11.4.1 Factors involved in accidental fires
 - 11.4.1.1 Improper maintenance and operations
 - 11.4.1.2 Housekeeping
 - 11.4.1.3 Product labels, instructions and warnings
 - 11.4.1.4 Purpose of labels
 - 11.4.1.5 Purpose of instructions
 - 11.4.1.6 Purpose of warnings
 - 11.4.1.7 Key elements of a proper warning
 - 11.4.1.8 Standards on labels, instructions and warnings
- 11.4.2 Recalls
- 11.4.3 Other considerations
- 11.4.4 Violations of fire safety codes and standards

501-11.5 ***The Investigator candidate shall identify and describe the factors related to children and fire.***

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- 11.5.1 Child firesetters (ages 2 to 6)
- 11.5.2 Juvenile firesetters (ages 7 to 13)
- 11.5.3 Adolescent firesetters (ages 14 to 16)

501-11.6 ***Incendiary fires – see SECTION 501-24.4 for additional information.***

501-11.7 ***The Investigator candidate shall identify and describe human factors related to fire spread.***

501-11.8 ***The Investigator candidate shall identify the basic concepts in recognition and response to fires.***

- 11.8.1 Perception of the danger (sensory cues)
- 11.8.2 Decision to act (response)
- 11.8.3 Action taken
- 11.8.4 Escape factors
- 11.8.5 Information received from survivors

SECTION 12

LEGAL CONSIDERATIONS

4.1 General

NFPA 1033 4.1.5* The fire investigator shall adhere to all applicable legal and regulatory requirements.

4.3 Documenting the Scene

Duties shall include diagramming the scene, photographing, and taking field notes to be used to compile a final report.

NFPA 1033 4.3.3 Construct investigative notes, given a fire scene, available documents (e.g., prefire plans and inspection reports), and interview information, so that the notes are accurate, provide further documentation of the scene, and represent complete documentation of the scene findings.

(A) Requisite Knowledge. Relationship between notes, diagrams, and photos, how to reduce scene information into concise notes, and the use of notes during report writing and legal proceedings.

(B) Requisite Skills. Data-reduction skills, note-taking skills, and observational and correlating skills.

4.4 Evidence Collection/Preservation.

Duties shall include using proper physical and legal procedures to identify, document, collect and preserve evidence required within the investigation.

NFPA 1033 4.4.2 Locate, document, collect, label, package and store evidence, given standard or special tools and equipment and evidence collection materials, so that evidence is identified, preserved, collected, packaged and stored for use in testing, legal, or other proceedings and examinations, ensuring cross-contamination and investigator-inflicted damage and the chain of custody is established.

(A) Requisite Knowledge. Types of evidence, authority requirements, impact of removing evidentiary items on civil or criminal proceedings (exclusionary or fire-cause supportive evidence), types, capabilities, and limitations of standard and special tools used to locate evidence, types of laboratory tests available, packaging techniques and materials, and impact of evidence collection on the investigation.

(B) Requisite Skills. Ability to recognize different types of evidence and determine whether evidence is critical to the investigation.

NFPA 1033 4.4.4 Maintain a chain of custody, given standard investigative tools, marking tools, and evidence tags or logs, so that written documentation exists for each piece of evidence and evidence is secured.

(A) Requisite Knowledge. Rules of custody and transfer procedures, types of evidence (e.g., physical evidence obtained at the scene, photos, and documents), and methods of recording the chain of custody.

(B) Requisite Skills. Ability to execute the chain of custody procedures and accurately complete necessary documents.

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4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge. How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.

(B) Requisite Skills. Ability to apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

4.7 Presentations.

Duties shall include the presentation of findings to those individuals not involved in the actual investigations.

NFPA 1033 4.7.3 Testify during legal proceedings, given investigative findings, contents of reports, and consultation with legal counsel, so that all pertinent investigative information and evidence are presented clearly and accurately and the investigator's demeanor and attire are appropriate to the proceedings.

(A) Requisite Knowledge. Types of investigative findings, types of legal proceedings, professional demeanor requirements, and an understanding of due process and legal proceedings.

(B) Requisite Skills. Communication and listening skills and ability to differentiate facts from opinion and determine accepted procedures, practices, and etiquette during legal proceedings.

501-12.1 ***The Investigator candidate shall recognize the legal consideration impact on every phase of the fire investigation.***

501-12.2 ***The Investigator candidate shall ensure that constitutional considerations are observed.***

12.2.1 Amendment Four

12.2.2 Amendment Five

12.2.3 Amendment Six

501-12.3 ***The Investigator candidate shall observe all legal considerations during the investigation.***

12.3.1 Authority to conduct the investigation

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- 12.3.2 Right of entry
- 12.3.3 Method of entry
 - 12.3.3.1 Consent
 - 12.3.3.2 Exigent circumstance
 - 12.3.3.3 Administrative search warrant
 - 12.3.3.4 Criminal search warrant
- 12.3.4 The questioning of suspects
- 12.3.5 Spoliation of evidence
 - 12.3.5.1 Responsibility
 - 12.3.5.2 Documentation
 - 12.3.5.3 Remedies for spoliation
 - 12.3.5.4 Notification to interested parties
 - 12.3.5.5 Documentation prior to alteration
 - 12.3.5.6 Alteration and movement of evidence
 - 12.3.5.7 Notification prior to destructive testing

501-12.4 ***The Investigator candidate shall recognize pretrial legal considerations.***

- 12.4.1 Introduction
- 12.4.2 Forms of discovery
 - 12.4.2.1 Request to produce
 - 12.4.2.2 Interrogatories
 - 12.4.2.3 Depositions
 - 12.4.2.3.1 Procedure
 - 12.4.2.3.2 Discovery depositions
 - 12.4.2.3.3 Trial depositions
 - 12.4.2.4 Reports
- 12.4.3 Motions

501-12.5 ***The Investigator candidate shall identify the trial procedures in criminal and civil cases.***

- 12.5.1 Rules of evidence
- 12.5.2 Types of evidence
 - 12.5.2.1 Demonstrative evidence
 - 12.5.2.1.1 Photographs/illustrative forms of evidence
 - 12.5.2.1.2 Samples

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- 12.5.2.2 Documentary evidence
- 12.5.2.3 Testimonial evidence
 - 12.5.2.3.1 Fact witness
 - 12.5.2.3.2 Expert witness
 - 12.5.2.3.3 Admissibility of expert testimony
 - 12.5.2.3.4 Relevance
 - 12.5.2.3.5 Qualifications of expert
 - 12.5.2.3.6 Reliability of opinion
- 12.5.3 Forms of examination
 - 12.5.3.1 Direct examination
 - 12.5.3.2 Cross-examination
- 12.5.4 Forms of testimony
 - 12.5.4.1 Affidavits
 - 12.5.4.2 Answers to interrogatories
 - 12.5.4.3 Depositions and trial testimony
- 12.5.5 Burden of proof
- 12.5.6 Criminal prosecution
 - 12.5.6.1 Arson
 - 12.5.6.2 Arson statutes
 - 12.5.6.3 Factors to be considered
 - 12.5.6.4 Other fire related criminal acts
 - 12.5.6.5 Arson reporting/immunity statutes
- 12.5.7 Civil litigation
 - 12.5.7.1 Negligence
 - 12.5.7.2 Codes, regulations, and standards
 - 12.5.7.3 Product liability
 - 12.5.7.4 Strict liability

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SECTION 13

SAFETY

4.1 General

NFPA 1033 4.1.3* Because fire investigators are required to perform activities in adverse conditions, site safety assessments shall be completed on all scenes and regional and national safety standards shall be followed and included in organizational policies and procedures.

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.2* Conduct an exterior survey, given standard equipment and tools, so that evidence is identified and preserved, fire damage is interpreted, hazards are identified to avoid injuries, accessibility to the property is determined, and all potential means of ingress and egress are discovered.

(A) Requisite Knowledge. The types of building construction and the effects of fire on construction materials, types of evidence commonly found in the perimeter, evidence preservation methods, the effects of fire suppression, fire behavior and spread, fire patterns, and a basic awareness of the dangers of hazardous materials.

(B) Requisite Skills. Ability to assess fire ground and structural condition, observe the damage from and effects of the fire, and interpret fire patterns.

501-13.1 **The Investigator candidate shall describe the safety issues as they relate to the fire investigation.**

13.1.1 General injury/health statistics

13.1.2 Health and safety programs

13.1.2.1 Five critical elements of safety and health programs

13.1.2.1.1 Management commitment and employee participation

13.1.2.1.2 Hazard and risk assessment

13.1.2.1.3 Hazard prevention and control

13.1.2.1.4 Safety and health training and education

13.1.2.1.5 Long-term commitment

501-13.2 **The Investigator candidate shall describe factors that have an influence on general fire scene safety.**

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- 13.2.1 Investigating the scene alone
- 13.2.2 Investigator fatigue
- 13.2.3 Working above or below grade level
- 13.2.4 Working around mechanized equipment
- 13.2.5 Safety of bystanders
- 13.2.6 Status of suppression
- 13.2.7 First aid kit and emergency notification numbers
- 13.2.8 Emergency notification signal

501-13.3 ***The Investigator candidate shall describe general and particular dangers of the fire scene.***

- 13.3.1 Physical hazards
- 13.3.2 Structural stability hazards
- 13.3.3 Electrical hazards
- 13.3.4 Chemical hazards
- 13.3.5 Biological hazards
- 13.3.6 Mechanical hazards
- 13.3.7 Miscellaneous hazards
 - 13.3.7.1 Radiological hazards
 - 13.3.7.2 Utilities
 - 13.3.7.3 Mechanized equipment hazards

501-13.4 ***The Investigator candidate shall describe safety plans that may be part of the investigative process.***

- 13.4.1 Hazard and risk assessment
 - 13.4.1.1 Identify the hazards
 - 13.4.1.2 Determine the risk of the hazard
 - 13.4.1.3 Control the hazard
 - 13.4.1.3.1 Engineering controls

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- 13.4.1.3.2 Administrative controls
- 13.4.1.3.3 Proper selection and use of PPE

- 13.4.2 Site-specific safety plans
 - 13.4.2.1 Hazard communication site plan (HazCom Plan)
 - 13.4.2.2 Confined space program
- 13.4.3 Management of plans and site safety
- 13.4.4 Safety meetings and briefings

501-13.5 ***The Investigator candidate shall describe factors associated with chemical and contaminant exposure.***

- 13.5.1 Types of exposure effects
 - 13.5.1.1 Local effects
 - 13.5.1.2 Systemic effects
- 13.5.2 Routes of exposure
 - 13.5.2.1 Inhalation
 - 13.5.2.2 Cutaneous
 - 13.5.2.3 Ingestion
 - 13.5.2.4 Injection
 - 13.5.2.5 Ocular exposure route
- 13.5.3 Toxicity exposure levels
 - 13.5.3.1 Acute exposure
 - 13.5.3.2 Chronic exposure
 - 13.5.3.3 Cumulative exposure
 - 13.5.3.4 Latency period

501-13.6 ***The Investigator candidate shall understand the utilization of personal protective equipment on fire and explosion scenes.***

- 13.6.1 Proper selection and use of personal protective equipment (PPE)
 - 13.6.1.1 Safety clothing and equipment
 - 13.6.1.2 PPE use
 - 13.6.1.3 Decontamination
- 13.6.2 Examples of personal protective equipment (PPE)
 - 13.6.2.1 Respiratory protection
 - 13.6.2.2 Hand protection
 - 13.6.2.3 Other specialized equipment

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501-13.7 ***The Investigator candidate shall describe the potential emergency situations that could occur while processing a fire scene and the different types of emergency action plans needed.***

- 13.7.1 Emergency evacuation plans
- 13.7.2 Medical emergency plans
- 13.7.3 Severe weather plans
- 13.7.4 Fire emergency plan
- 13.7.5 Additional emergency action plans

501-13.8 ***The Investigator candidate shall describe post-scene safety activities.***

- 13.8.1 Decontamination
- 13.8.2 Medical screening

501-13.9 ***The Investigator candidate shall describe safety considerations in off-scene investigation activities.***

501-13.10 ***The Investigator candidate shall identify the special hazards associated with investigating the fire scene.***

- 13.10.1 Criminal acts or acts of terrorism
 - 13.10.1.1 Secondary devices
- 13.10.2 Residue chemicals
- 13.10.3 Biological and radiological terrorism
- 13.10.4 Drug labs

****Note****

The following part of Section 13 (501-13.11 through 501-13.15) is not contained in NFPA 921, *Guide for Fire and Explosion Investigation*. The reference for this material is found in IFSTA, *Fire Inspection and Code Enforcement*. See also the *Emergency Response Guidebook (ERG)*.

501-13.11 **The Investigator candidate shall demonstrate knowledge of safety principles applicable to hazardous materials response.**

501-13.12 **The Investigator candidate shall identify the difference between hazardous materials incidents and other emergencies.**

501-13.13 **The Investigator candidate, utilizing the Emergency Response Guidebook, shall:**

- 1) Identify the three methods for determining the appropriate guide page for a specific hazardous material.
 - a) Locate UN number in the yellow-bordered pages.
 - b) Locate name of material in the alphabetic listing in the blue-bordered pages.
 - c) Locate a matching placard in the table of placards and consult the two-digit guide number located next to the similar placard.
- 2) Identify two general types of hazards found on each guide page.
 - a) Fire/Explosive
 - b) Health

501-13.14 **The Investigator candidate, given an example of an NFPA 704 marking, shall identify the significance of the following components.**

- 1) Three categories of hazard
 - a) Health - Blue color
 - b) Flammability - Red color
 - c) Instability - Yellow color
- 2) Special hazards that may be indicated
 - a) W
 - b) OX (or OXY)
 - c) COR
 - d) ALK
 - e) ACID

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- 3) Numerical rating system of hazards

501-13.15 ***The Investigator candidate shall identify the following information from safety data sheets (SDS).***

- 1) The Investigator candidate shall list four organizations from which to obtain a safety data sheet (SDS)
 - a) Manufacturer of the material
 - b) Supplier
 - c) Facility hazard and communication plan
 - d) Local emergency planning committee (LEPC)
- 2) The Investigator candidate shall be familiar with the different SDS chapters

SECTION 14

SOURCES OF INFORMATION

4.1 General

NFPA 1033 4.1.4 The fire investigator shall maintain necessary liaison with other interested professionals and entities.

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.8 Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

4.4 Evidence Collection/Preservation.

Duties shall include using proper physical and legal procedures to identify, document, collect, and preserve evidence required within the investigation.

NFPA 1033 4.4.3 Select evidence for analysis given all information from the investigation, so that items for analysis support specific investigation needs.

(A) Requisite Knowledge. Purposes for submitting items for analysis, types of analytical services available, and capabilities and limitations of the services performing the analysis.

(B) Requisite Skills. Evaluate the fire incident to determine forensic, engineering, or laboratory needs.

4.5 Interview.

Duties shall include obtaining information regarding the overall fire investigation from others through verbal communication.

NFPA 1033 4.5.1 Develop an interview plan, given no special tools or equipment, so that the plan reflects a strategy to further determine the fire cause and affix responsibility and includes a relevant questioning strategy for each individual to be interviewed that promotes the efficient use of the investigator's time.

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(A) Requisite Knowledge. Persons who can provide information that furthers the fire cause determination or the affixing of responsibility, types of questions that are pertinent and efficient to ask of different information sources (first responders, neighbors, witnesses, suspects, and so forth), and pros and cons of interviews versus document gathering.

(B) Requisite Skills. Planning skills, development of focused questions for specific individuals, and evaluation of existing file data to help develop questions and fill investigative gaps

NFPA 1033 4.5.2 Conduct interviews, given incident information, so that pertinent information is obtained, follow-up questions are asked, responses to all questions are elicited, and the response to each question is documented accurately.

(A) Requisite Knowledge. Types of interviews, personal information needed for proper documentation or follow-up, documenting methods and tools, and types of nonverbal communications and their meaning.

(B) Requisite Skills. Adjust interviewing strategies based on deductive reasoning, interpret verbal and nonverbal communications, apply legal requirements applicable, and exhibit strong listening skills.

NFPA 1033 4.5.3 Evaluate interview information, given interview transcripts or notes and incident data, so that all interview data is individually analyzed and correlated with all other interviews, corroborative and conflictive information is documented, and new leads are developed.

(A) Requisite Knowledge. Types of interviews, report evaluation methods, and data correlation methods.

(B) Requisite Skills. Data correlation skills and the ability to evaluate source information (e.g., first responders and other witnesses).

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge: Types of reports needed that facilitate determining responsibility for the fire (e.g. police reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills: Identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge: How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.

(B) Requisite Skills: Apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

501-14.1 ***The Investigator candidate shall identify sources of information and assistance available to the Investigator during a fire investigation.***

14.1.1 Purpose of obtaining information.

14.1.2 Reliability of information obtained.

501-14.2 ***The Investigator candidate shall describe the legal considerations on sources of information.***

14.2.1 Freedom of Information Act

14.2.2 Privileged communications

14.2.3 Confidential communications

501-14.3 ***The Investigator candidate shall describe the different forms of information.***

14.3.1 Verbal information

14.3.2 Written information

14.3.3 Visual information

14.3.4 Electronic information

501-14.4 ***The Investigator candidate shall be able to gather both useful and accurate information through the process of interviewing.***

14.4.1 Purpose of interviews

14.4.2 Preparation for the interview

14.4.3 Documenting the interview

501-14.5 ***The Investigator candidate shall identify governmental sources of information useful during a fire investigation.***

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- 14.5.1 Municipal government
- 14.5.2 County government
- 14.5.3 State government
- 14.5.4 Federal government

501-14.6 ***The Investigator candidate shall identify private sources of information useful during a fire investigation.***

- 14.6.1 National Fire Protection Association (NFPA)
- 14.6.2 Society of Fire Protection Engineers (SFPE)
- 14.6.3 American Society for Testing and Materials (ASTM)
- 14.6.4 American National Standards Institute (ANSI)
- 14.6.5 National Association of Fire Investigators (NAFI)
- 14.6.6 International Association of Arson Investigators (IAAI)
- 14.6.7 Regional fire investigation organizations
- 14.6.8 Real estate industry
- 14.6.9 Abstract and title companies
- 14.6.10 Financial institutions
- 14.6.11 Insurance industry
- 14.6.12 Educational institutions
- 14.6.13 Utility companies
- 14.6.14 Trade organizations
- 14.6.15 Local television stations
- 14.6.16 Lightning detection networks
- 14.6.17 Other private sources

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SECTION 15

PLANNING THE INVESTIGATION

4.1 General

NFPA 1033 4.1.3 Because fire investigators are required to perform activities in adverse conditions, site safety assessments shall be completed on all scenes and regional and national safety standards shall be followed and included in organizational policies and procedures.

NFPA 1033 4.1.4 The fire investigator shall maintain necessary liaison with other interested professionals and entities.

NFPA 1033 4.1.6 The fire investigator shall understand the organization and operation of the investigative team within an incident management system.

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.1 Secure the fire ground, given marking devices, sufficient personnel, and special tools and equipment, so that unauthorized persons can recognize the perimeters of the investigative scene and are kept from restricted areas and all evidence or potential evidence is protected from damage or destruction.

(A) Requisite Knowledge. Fire ground hazards, types of evidence, and the importance of fire scene security, evidence preservation, and issues relating to spoliation.

(B) Requisite Skills. Use of marking devices.

4.6 Post-Incident Investigation

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge. How to assess one's own expertise, qualifications to be called for expert testimony, types of expert resources (e.g. forensic, CPA, polygraph, financial, human behavior disorders, an engineering), and methods to identify expert resources.

(B) Requisite Skills. Apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

501-15.1 ***The Investigator candidate shall identify basic considerations of concern prior to beginning the incident scene investigation.***

- 15.1.1 Number of investigators
- 15.1.2 Resources
- 15.1.3 “Team concept”

501-15.2 ***The Investigator candidate shall identify basic incident information necessary to plan and conduct an investigation.***

- 15.2.1 Location
- 15.2.2 Date and time of incident
- 15.2.3 Weather conditions
- 15.2.4 Size and complexity of the incident
- 15.2.5 Type and use of structure
- 15.2.6 Nature and extent of damage
- 15.2.7 Security of the scene
- 15.2.8 Purpose of the investigation

501-15.3 ***The Investigator candidate shall be able to organize the basic investigation functions that are commonly performed in each investigation.***

501-15.4 ***The Investigator candidate shall identify the goals of a pre-investigation team meeting.***

- 15.4.1 Equipment and facilities
- 15.4.2 Personal safety equipment
- 15.4.3 Tools and equipment

501-15.5 ***The Investigator candidate shall identify the specialized personnel and technical consultants that may be needed to provide technical assistance.***

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501-15.6 ***The Investigator candidate shall identify a method to organize information generated throughout the investigation and coordinate the efforts of the various people involved.***

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SECTION 16

DOCUMENTATION OF THE INVESTIGATION

4.3 Documenting the Scene.

Duties shall include diagramming the scene, photographing, and taking field notes to be used to compile a final report.

NFPA 1033 4.3.1 Diagram the scene, given standard tools and equipment, so that the scene is accurately represented and evidence, pertinent contents, significant patterns, and area(s) or point(s) of origin are identified.

(A) Requisite Knowledge. Commonly used symbols and legends that clarify the diagram, types of evidence and patterns that need to be documented, and formats for diagramming the scene.

(B) Requisite Skills. Ability to sketch the scene, basic drafting skills, and evidence recognition and observational skills.

NFPA 1033 4.3.2 Photographically document the scene, given standard tools and equipment, so that the scene is accurately depicted and the photographs support scene findings.

(A) Requisite Knowledge. Working knowledge of high-resolution camera and flash, the types of film, media, and flash available, and the strengths and limitations of each.

(B) Requisite Skills. Ability to use a high-resolution camera, flash, and accessories.

NFPA 1033 4.3.3 Construct investigative notes, given a fire scene, available documents (e.g., prefire plans and inspection reports), and interview information, so that the notes are accurate, provide further documentation of the scene, and represent complete documentation of the scene findings.

(A) Requisite Knowledge. Relationship between notes, diagrams, and photos, how to reduce scene information into concise notes, and the use of notes during report writing and legal proceedings.

(B) Requisite Skills. Data-reduction skills, note-taking skills, and observational and correlating skills.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge. Types of reports needed that facilitate determining responsibility for the fire (e.g., police reports, fire reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills. Ability to identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.2 Evaluate the investigative file, given all available file information, so that areas for further investigation are identified, the relationship between gathered documents and information is interpreted, and corroborative evidence and information discrepancies are discovered.

(A) Requisite Knowledge. File assessment and/or evaluation methods, including accurate documentation practices, and requisite investigative elements.

(B) Requisite Skills. Information assessment, correlation, and organizational skills.

4.7 Presentations

Duties shall include the presentation of findings to those individuals not involved in the actual investigations.

NFPA 1033 4.7.1 Prepare a written report, given investigative findings, documentation, and a specific audience, so that the report accurately reflects the investigative findings, is concise, expresses the investigator's opinion, contains facts and data that the investigator relies on in rendering an opinion, contains the reasoning of the investigator by which each opinion was reached, and meets the needs or requirements of the intended audience(s).

(A) Requisite Knowledge. Elements of writing, typical components of a written report, and types of audiences and their respective needs or requirements.

(B) Requisite Skills. Writing skills, ability to analyze information and determine the reader's needs or requirements.

501-16.1 **The Investigator candidate shall describe the purpose of recording the fire scene.**

501-16.2 **The Investigator candidate shall describe the purpose of fire scene photography and the importance of timing.**

16.2.1 General

16.2.2 Timing

16.2.3 Basics

16.2.3.1 General

16.2.3.2 Types of cameras

16.2.3.3 Image authentication

16.2.3.4 Lenses

16.2.3.5 Filters

16.2.3.6 Shutter speed

16.2.3.7 Lighting

16.2.3.8 Special types of photography

16.2.4 Composition and technique

16.2.4.1 General

16.2.4.2 Sequential photos

16.2.4.3 Mosaics

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- 16.2.4.4 Photo diagram
- 16.2.4.5 Assisting photographer
- 16.2.4.6 Photography and the courts

- 16.2.5 Video

- 16.2.6 Suggested activities to be documented
 - 16.2.6.1 During the fire
 - 16.2.6.2 Overhaul phase
 - 16.2.6.3 Bystander photographs
 - 16.2.6.4 Exterior photographs
 - 16.2.6.5 Structural photographs
 - 16.2.6.6 Interior photographs
 - 16.2.6.7 Utility and appliance photographs
 - 16.2.6.8 Evidence photographs
 - 16.2.6.9 Victim photographs
 - 16.2.6.10 Witness viewpoint photographs
 - 16.2.6.11 Aerial photographs
 - 16.2.6.12 Satellite photography

- 16.2.7 Photography tips

- 16.2.8 Presentation of photographs
 - 16.2.8.1 Computer-based presentations
 - 16.2.8.2 Hard copy

501-16.3 ***The Investigator candidate shall describe the importance of note taking.***

- 16.3.1 Forms of incident field notes

- 16.3.2 Forms for collecting data

- 16.3.3 Dictation of field notes

501-16.4 ***The Investigator candidate shall explain the importance of diagrams and drawings.***

- 16.4.1 Types of drawings
 - 16.4.1.1 Sketches
 - 16.4.1.2 Diagrams

- 16.4.2 Selection of drawings

- 16.4.3 Drawing tools and equipment

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- 16.4.4 Diagram elements
 - 16.4.4.1 General information
 - 16.4.4.2 Identification of compass orientation
 - 16.4.4.3 Scale
 - 16.4.4.4 Symbols
 - 16.4.4.5 Legend

- 16.4.5 Drawings
 - 16.4.5.1 Site or area plan
 - 16.4.5.2 Floor plans
 - 16.4.5.3 Elevations
 - 16.4.5.4 Details and sections
 - 16.4.5.5 Exploded view diagrams
 - 16.4.5.6 Three-dimensional representations
 - 16.4.5.7 Specialized fire investigation diagrams

- 16.4.6 Prepared design and construction drawings
 - 16.4.6.1 General
 - 16.4.6.2 Architectural and engineering drawings
 - 16.4.6.3 Architectural and engineering schedules
 - 16.4.6.4 Specifications
 - 16.4.6.5 Appliance and building equipment

501-16.5 ***The Investigator candidate must understand the purpose of the report to effectively communicate the observations analyses and conclusions made during an investigation.***

- 16.5.1 Descriptive information
- 16.5.2 Pertinent facts
- 16.5.3 Opinions and conclusions

****Note: The following part of Section 16 does not come from NFPA 921****

501-16.6 ***The Investigator candidate shall identify and describe the process of preparing and completing a final, accurate and concise report.***

- 1) National Fire Incident Reporting System (NFIRS) forms
- 2) Fire reports required by the AHJ

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SECTION 17

PHYSICAL EVIDENCE

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene, and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.1 Secure the fire ground, given marking devices, sufficient personnel, and special tools and equipment, so that unauthorized persons can recognize the perimeters of the investigative scene and are kept from restricted areas and all evidence or potential evidence is protected from damage or destruction.

(A) Requisite Knowledge. Fire ground hazards, types of evidence, and the importance of fire scene security, evidence preservation, and issues relating to spoliation.

(B) Requisite Skills. Use of marking devices.

NFPA 1033 4.2.6 Examine and remove fire debris, given standard equipment and tools, so that all debris is checked for fire cause evidence, potential ignition source(s) is identified, and evidence is preserved without investigator-inflicted damage or contamination.

(A) Requisite Knowledge. Basic understanding of ignition processes, characteristics of ignition sources, and ease of ignition of fuels; debris-layering techniques; use of tools and equipment during the debris search; types of fire cause evidence commonly found in various degrees of damage; and evidence-gathering methods and documentation.

(B) Requisite Skills. Employ search techniques that further the discovery of fire cause evidence and ignition sources, use search techniques that incorporate documentation, and collect and preserve evidence.

4.3 Documenting the Scene.

Duties shall include diagramming the scene, photographing, and taking field notes to be used to compile a final report.

NFPA 1033 4.3.1 Diagram the scene, given standard tools and equipment, so that the scene is accurately represented and evidence, pertinent contents, significant patterns, and area(s) or point(s) of origin are identified.

(A) Requisite Knowledge. Commonly used symbols and legends that clarify the diagram, types of evidence and patterns that need to be documented, and formats for diagramming the scene.

(B) Requisite Skills. Ability to sketch the scene, basic drafting skills, and evidence recognition and observational skills.

4.4 Evidence Collection/Preservation.

Duties shall include using proper physical and legal procedures to retain evidence required within the investigation.

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NFPA 1033 4.4.1 Utilize proper procedures for managing victims and fatalities, given a protocol and appropriate personnel, so that all evidence is discovered and preserved and the protocol procedures are followed.

(A) Requisite Knowledge. Types of evidence associated with fire victims and fatalities and evidence preservation methods.

(B) Requisite Skills. Observational skills and the ability to apply protocols to given situations.

NFPA 1033 4.4.2* Locate, collect, and package evidence, given standard or special tools and equipment and evidence collection materials, so that evidence is identified, preserved, collected, and packaged to avoid contamination and investigator-inflicted damage and the chain of custody is established.

(A) Requisite Knowledge. Types of evidence, authority requirements, impact of removing evidentiary items on civil or criminal proceedings (exclusionary or fire-cause supportive evidence), types, capabilities, and limitations of standard and special tools used to locate evidence, types of laboratory tests available, packaging techniques and materials, and impact of evidence collection on the investigation.

(B) Requisite Skills. Ability to recognize different types of evidence and determine whether evidence is critical to the investigation.

NFPA 1033 4.4.3 Select evidence for analysis given all information from the investigation, so that items for analysis support specific investigation needs.

(A) Requisite Knowledge. Purposes for submitting items for analysis, types of analytical services available, and capabilities and limitations of the services performing the analysis.

(B) Requisite Skills. Evaluate the fire incident to determine forensic, engineering, or laboratory needs.

NFPA 1033 4.4.4 Maintain a chain of custody, given standard investigative tools, marking tools, and evidence tags or logs, so that written documentation exists for each piece of evidence and evidence is secured.

(A) Requisite Knowledge. Rules of custody and transfer procedures, types of evidence (e.g., physical evidence obtained at the scene, photos, and documents), and methods of recording the chain of custody.

(B) Requisite Skills. Ability to execute the chain of custody procedures and accurately complete necessary documents.

NFPA 1033 4.4.5 Dispose of evidence, given jurisdictional or agency regulations and file information, so that the disposal is timely, safely conducted, and in compliance with jurisdictional or agency requirements.

(A) Requisite Knowledge. Disposal services available and common disposal procedures and problems.

(B) Requisite Skills. Documentation skills.

501-17.1 ***The Investigator candidate shall describe the recommended and accepted methods of processing physical evidence.***

501-17.2 ***The Investigator candidate shall define physical evidence.***

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501-17.3 ***The Investigator candidate shall describe the importance of preservation of the fire scene and physical evidence.***

- 17.3.1 General
- 17.3.2 Fire patterns as physical evidence
- 17.3.3 Artifact evidence
- 17.3.4 Protecting evidence
- 17.3.5 Role and responsibility of fire suppression personnel in preserving the fire scene
 - 17.3.5.1 General
 - 17.3.5.2 Preservation
 - 17.3.5.3 Caution in fire suppression operations
 - 17.3.5.3.1 Use of water lines and hose streams
 - 17.3.5.3.2 Overhaul
 - 17.3.5.3.3 Salvage
 - 17.3.5.3.4 Movement of knobs and switches
 - 17.3.5.3.5 Use of power tools
 - 17.3.5.3.6 Limiting access of firefighters and other emergency personnel
- 17.3.6 Roles and responsibilities of the fire investigator
- 17.3.7 Practical considerations

501-17.4 ***The Investigator candidate shall describe contamination of physical evidence.***

- 17.4.1 Contamination of evidence containers
- 17.4.2 Contamination during collection
- 17.4.3 Contamination by fire fighters

501-17.5 ***The Investigator candidate shall describe methods of collection.***

- 17.5.1 General
- 17.5.2 Documenting the collection of physical evidence

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- 17.5.3 Collection of traditional forensic physical evidence
- 17.5.4 Collection of evidence for accelerant testing
 - 17.5.4.1 Liquid accelerant characteristics
 - 17.5.4.2 Canine/handler teams
 - 17.5.4.3 Collection of liquid samples for ignitable liquid testing
 - 17.5.4.4 Collection of liquid evidence absorbed by solid materials
 - 17.5.4.5 Collection of solid samples for accelerant testing
 - 17.5.4.6 Comparison samples
 - 17.5.4.7 Canine teams
- 17.5.5 Collection of gaseous samples
- 17.5.6 Collection of electrical equipment and system components
- 17.5.7 Collection of appliances or small electrical equipment

501-17.6 ***The Investigator candidate shall identify and describe different types of evidence containers.***

- 17.6.1 General
- 17.6.2 Liquid and solid accelerant evidence containers
 - 17.6.2.1 Metal cans
 - 17.6.2.2 Glass jars
 - 17.6.2.3 Special evidence bags
 - 17.6.2.4 Common plastic bags

501-17.7 ***The Investigator candidate shall describe the methods of identifying physical evidence.***

501-17.8 ***The Investigator candidate shall describe the proper methods of transportation and storage of physical evidence.***

- 17.8.1 Hand delivery
- 17.8.2 Shipment
- 17.8.3 Storage of evidence

501-17.9 ***The Investigator candidate shall identify and describe the evidence chain of custody of physical evidence.***

501-17.10 ***The Investigator candidate shall identify types of analytical methods and tests applicable to certain fire investigations, and the capabilities and limitations of the services that perform the analysis.***

17.10.1 Evidence collection or inspections involving alteration without changes to the evidentiary value of the artifacts

17.10.2 Test methods

17.10.3 Sufficiency of samples

17.10.4 Comparative examination and testing

501-17.11 ***The Investigator candidate shall describe the proper procedure for evidence disposition.***

SECTION 18

ORIGIN DETERMINATION

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.2* Conduct an exterior survey, given standard equipment and tools, so that evidence is identified and preserved, fire damage is interpreted, hazards are identified to avoid injuries, accessibility to the property is determined, and all potential means of ingress and egress are discovered.

(A) Requisite Knowledge. The types of building construction and the effects of fire on construction materials, types of evidence commonly found in the perimeter, evidence preservation methods, the effects of fire suppression, fire behavior and spread, fire patterns, and a basic awareness of the dangers of hazardous materials.

(B) Requisite Skills. Assess fire ground and structural condition, observe the damage from and effects of the fire, and interpret fire patterns.

NFPA 1033 4.2.3 Conduct an interior survey, given standard equipment and tools, so that areas of potential evidentiary value requiring further examination are identified and preserved, the evidentiary value of contents is determined, and hazards are identified in order to avoid injuries.

(A) Requisite Knowledge. The types of building construction and interior finish and the effects of fire on those materials, the effects of fire suppression, fire behavior and spread, evidence preservation methods, fire patterns, effects of building contents on fire growth, the relationship of building contents to the overall investigation, weather conditions at the time of the fire, and fuel moisture.

(B) Requisite Skills. Assess structural conditions, observe the damage and effects of the fire, discover the impact of fire suppression efforts on fire flow and heat propagation, and evaluate protected areas to determine the presence and/or absence of contents.

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.5* Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge: Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills: Analytical and assimilation skills.

501-18.1 ***The Investigator candidate shall identify the following sources used in origin determination.***

- 18.1.1 Witness information
- 18.1.2 Fire patterns
- 18.1.3 Arc mapping
- 18.1.4 Fire dynamics

501-18.2 ***The Investigator candidate shall identify and describe the overall methodology of conducting a scene assessment.***

- 18.2.1 Scientific method
- 18.2.2 Sequence of activities
- 18.2.3 Sequential pattern analysis
- 18.2.4 Systematic procedure
- 18.2.5 Recommended methodology

501-18.3 ***The Investigator candidate shall identify the data collection process for origin determination.***

- 18.3.1 Initial scene assessment
 - 18.3.1.1 Safety assessment
 - 18.3.1.2 Scope of the examination
 - 18.3.1.3 Order of the examination
 - 18.3.1.4 Surrounding areas
 - 18.3.1.5 Structure exterior
 - 18.3.1.6 Structure interior
 - 18.3.1.7 Post-fire alterations
- 18.3.2 Excavation and reconstruction
 - 18.3.2.1 Scope of excavation and reconstruction
 - 18.3.2.2 Safety
 - 18.3.2.3 Excavation
 - 18.3.2.4 Heavy equipment
 - 18.3.2.5 Avoiding spoliation
 - 18.3.2.6 Avoiding contamination
 - 18.3.2.7 Washing floors
 - 18.3.2.8 Contents

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- 18.3.3 Additional data collection activities for origin determination
 - 18.3.3.1 Pre-fire conditions
 - 18.3.3.2 Description of fuels
 - 18.3.3.3 Structure dimensions
 - 18.3.3.4 Building systems and ventilation
 - 18.3.3.5 Weather conditions
 - 18.3.3.6 Electrical systems
 - 18.3.3.7 Electrical loads
 - 18.3.3.8 HVAC systems
 - 18.3.3.9 Fuel gas systems
 - 18.3.3.10 Liquid fuel systems
 - 18.3.3.11 Fire protection systems
 - 18.3.3.12 Fire protection systems data
 - 18.3.3.13 Security cameras
 - 18.3.3.14 Intrusion alarm systems
 - 18.3.3.15 Witness observations

501-18.4 ***The Investigator candidate shall recognize the importance of analyzing the following data.***

- 18.4.1 Fire patterns analysis
 - 18.4.1.1 Consideration of all patterns
 - 18.4.1.2 Sequence of patterns
 - 18.4.1.3 Pattern generation
 - 18.4.1.4 Ventilation
 - 18.4.1.5 Movement and intensity patterns
- 18.4.2 Heat and flame vector analysis
 - 18.4.2.1 Complementary vectors
 - 18.4.2.2 Heat source
 - 18.4.2.3 Additional tools for pattern visualization
- 18.4.3 Depth of char analysis
 - 18.4.3.1 Depth of char diagram
 - 18.4.3.2 Measuring depth of char
 - 18.4.3.3 Location of measurements
 - 18.4.3.4 Missing wood
 - 18.4.3.5 Depth of char surveys with fuel gases
- 18.4.4 Depth of calcination survey
 - 18.4.4.1 Depth of calcination diagram
 - 18.4.4.2 Measuring depth of calcination

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- 18.4.5 Arc surveys or arc mapping
 - 18.4.5.1 Suggested procedure
 - 18.4.5.2 Arc survey diagrams
 - 18.4.5.3 Documenting arc sites
 - 18.4.5.4 Arc survey evidence collection
 - 18.4.5.5 Arc survey utilization
 - 18.4.5.6 Arc survey limitations
- 18.4.6 Analysis of sequential events
- 18.4.7 Fire dynamics

501-18.5 ***The Investigator candidate shall identify the process of developing an origin hypothesis.***

- 18.5.1 Initial hypothesis
- 18.5.2 Modifying the initial hypothesis

501-18.6 ***The Investigator candidate shall identify the proper scientific method of testing of origin hypotheses.***

- 18.6.1 Means of hypothesis testing
- 18.6.2 Analytical techniques and tools
 - 18.6.2.1 Time line analysis
 - 18.6.2.2 Fire modeling
 - 18.6.2.3 Experimental testing

501-18.7 ***The Investigator candidate shall select a final hypothesis.***

- 18.7.1 Defining the area of origin
- 18.7.2 Inconsistent data
- 18.7.3 Case file review

501-18.8 ***The Investigator candidate shall identify when there is insufficient data to define the origin.***

- 18.8.1 Large area adequate for determination
- 18.8.2 Justification of a large area of origin
- 18.8.3 Eyewitness evidence of origin area

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SECTION 19

FIRE CAUSE DETERMINATION

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.5* Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge. Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills. Analytical and assimilation skills.

501-19.1 *The Investigator candidate shall define fire cause and identify fire cause factors.*

- 19.1.1 Fire cause factors
- 19.1.2 First fuel ignited
- 19.1.3 Ignition source
- 19.1.4 Oxidant
- 19.1.5 Ignition sequence

501-19.2 *The Investigator candidate shall utilize the scientific method as the overall methodology.*

- 19.2.1 Consideration of data
- 19.2.2 Sequence of activities
- 19.2.3 Point and area of origin

501-19.3 *The Investigator candidate shall identify the data that needs to be collected for fire cause determination.*

- 19.3.1 Identify fuels in the area of origin
- 19.3.2 Identify source and form of the heat of ignition

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19.3.3 Identify items and activities in area of origin

19.3.4 Identify the oxidant

19.3.5 Identify ignition sequence data

501-19.4 ***The Investigator candidate shall demonstrate the proper use of the scientific method to analyze the data.***

19.4.1 Fuel analysis

19.4.2 Ignition source analysis

19.4.3 Oxidant

19.4.4 Ignition sequence

501-19.5 ***The Investigator candidate shall develop a cause hypothesis.***

501-19.6 ***The Investigator candidate shall test the cause hypothesis.***

19.6.1 Using the scientific method

19.6.2 Deductive reasoning

19.6.3 Hypothesis testing questions

19.6.4 Means of hypothesis testing

19.6.4.1 Scientific literature

19.6.4.2 Fundamental principles of science

19.6.4.3 Physical experiments of testing

19.6.4.4 Cognitive experiments

19.6.4.5 Time lines

19.6.4.6 Fault trees

19.6.4.7 Additional techniques

19.6.5 Appropriate use of the process of elimination

19.6.5.1 Cause undetermined

19.6.5.2 Ignition source vs. fire cause

501-19.7 ***The Investigator candidate shall demonstrate the proper selection of a final hypothesis.***

19.7.1 Establishing the cause

- 19.7.2 Inconsistent data
- 19.7.3 Safety devices and features
- 19.7.4 Undetermined fire cause

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SECTION 20

CLASSIFICATION OF FIRE CAUSE

4.2. Scene Examination

NFPA 1033 4.2.6 Examine and remove fire debris, given standard equipment and tools, so that all debris is checked for fire cause evidence, potential ignition source(s) is identified, and evidence is preserved without investigator-inflicted damage or contamination.

(A) Requisite Knowledge. Basic understanding of ignition processes, characteristics of ignition sources, and ease of ignition of fuels; debris-layering techniques; use of tools and equipment during the debris search; types of fire cause evidence commonly found in various degrees of damage; and evidence-gathering methods and documentation.

(B) Requisite Skills. Employ search techniques that further the discovery of fire cause evidence and ignition sources, use search techniques that incorporate documentation, and collect and preserve evidence.

501-20.1 **The Investigator candidate shall describe the classifications of fire cause.**

- 20.1.1 Accidental fire cause classification
- 20.1.2 Natural fire cause classification
- 20.1.3 Incendiary fire cause classification
- 20.1.4 Undetermined fire cause classification

SECTION 21

ANALYZING THE INCIDENT FOR CAUSE AND RESPONSIBILITY

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge. Types of reports needed that facilitate determining responsibility for the fire (e.g., police reports, fire reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills. Ability to identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.2 Evaluate the investigative file, given all available file information, so that areas for further investigation are identified, the relationship between gathered documents and information is interpreted, and corroborative evidence and information discrepancies are discovered.

(A) Requisite Knowledge. File assessment and/or evaluation methods, including accurate documentation practices, and requisite investigative elements.

(B) Requisite Skills. Information assessment, correlation, and organizational skills.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge. How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.

(B) Requisite Skills. Ability to apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

NFPA 1033 4.6.4 Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.

(A) Requisite Knowledge. Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting

(B) Requisite Skills. Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge. Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills. Analytical and assimilation skills.

501-21.1 ***The Investigator candidate shall describe methods for analyzing the incident for cause and responsibility.***

- 21.1.1 (1) The cause of the fire or explosion.
- (2) The cause of damage to property resulting from the incident.
- (3) The cause of bodily injury or loss of life.
- (4) The degree to which human fault contributed to any one or more of the causal issues described in (1), (2), and (3).
- 21.1.2 The cause of a fire or the causes of damage or casualties may be grouped in broad categories for general discussion, for assignment of legal responsibility or culpability, or for reporting purposes.

501-21.2 ***See Chapter 20.***

501-21.3 ***The Investigator candidate shall describe the causes of damage to property resulting from the Incident.***

- 21.3.1 Considerations
- 21.3.2 Fire / smoke spread
 - 21.3.2.1 Compartmentation
 - 21.3.2.2 Change of occupancy/hazard
 - 21.3.2.3 Detection/alarm systems
 - 21.3.2.4 Human behavior
 - 21.3.2.5 Fire suppression
 - 21.3.2.6 Fuel loads
 - 21.3.2.7 Housekeeping
 - 21.3.2.8 Ventilation
 - 21.3.2.9 Code violations
 - 21.3.2.10 Structural failure
- 21.3.3 Other consequential damage

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501-21.4 ***The Investigator candidate shall describe the causes of bodily injury or loss of life. See Chapters 11 and 25.***

- 21.4.1 Fire/smoke spread
 - 21.4.1.1 Toxicity
 - 21.4.1.2 Hazardous materials
 - 21.4.1.3 Compartmentation
 - 21.4.1.4 Change of occupancy/hazard
 - 21.4.1.5 Detection/alarm systems
 - 21.4.1.6 Human behavior
 - 21.4.1.7 Fire suppression
 - 21.4.1.8 Housekeeping
 - 21.4.1.9 Fuel loads
 - 21.4.1.10 Ventilation
 - 21.4.1.11 Code violations
 - 21.4.1.12 Means of egress/refuge
 - 21.4.1.13 Structural failure
 - 21.4.1.14 Intentional acts

- 21.4.2 Emergency preparedness

501-21.5 ***The Investigator candidate shall describe the determination of responsibility.***

- 21.5.1 Nature of responsibility

- 21.5.2 Definition of responsibility

- 21.5.3 Assessing of responsibility

- 21.5.4 Degrees of responsibility

SECTION 22

FAILURE ANALYSIS AND ANALYTICAL TOOLS

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.1 Gather reports and records, given no special tools, equipment, or materials, so that all gathered documents are applicable to the investigation, complete, and authentic; the chain of custody is maintained; and the material is admissible in a legal proceeding.

(A) Requisite Knowledge. Types of reports needed that facilitate determining responsibility for the fire (e.g., police reports, fire reports, insurance policies, financial records, deeds, private investigator reports, outside photos, and videos) and location of these reports.

(B) Requisite Skills. Ability to identify the reports and documents necessary for the investigation, implement the chain of custody, and organizational skills.

NFPA 1033 4.6.2 Evaluate the investigative file, given all available file information, so that areas for further investigation are identified, the relationship between gathered documents and information is interpreted, and corroborative evidence and information discrepancies are discovered.

(A) Requisite Knowledge. File assessment and/or evaluation methods, including accurate documentation practices, and requisite investigative elements.

(B) Requisite Skills. Information assessment, correlation, and organizational skills.

NFPA 1033 4.6.3 Coordinate expert resources, given the investigative file, reports, and documents, so that the expert's competencies are matched to the specific investigation needs, financial expenditures are justified, and utilization clearly furthers the investigative goals of determining cause or affixing responsibility.

(A) Requisite Knowledge. How to assess one's own expertise, qualification to be called for expert testimony, types of expert resources (e.g., forensic, CPA, polygraph, financial, human behavior disorders, and engineering), and methods to identify expert resources.

(B) Requisite Skills. Ability to apply expert resources to further the investigation by networking with other investigators to identify experts, questioning experts relative to their qualifications, and developing a utilization plan for use of expert resources.

NFPA 1033 4.6.4 Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.

(A) Requisite Knowledge. Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting.

(B) Requisite Skills. Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge. Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills. Analytical and assimilation skills.

501-22.1 ***The Investigator candidate shall describe failure analysis and the use of analytical tools.***

501-22.2 ***The Investigator candidate shall describe time lines available for use in analyzing fire cause.***

- 22.2.1 General
- 22.2.2 Hard time (actual)
- 22.2.3 Soft time (estimated)
- 22.2.4 Benchmark events
- 22.2.5 Multiple time lines

501-22.3 ***The Investigator candidate shall describe system analysis techniques.***

- 22.3.1 Fault trees
- 22.3.2 Failure mode and effects analysis (FMEA)

501-22.4 ***The Investigator candidate shall describe the purpose for mathematical modeling.***

- 22.4.1 General and limitations of mathematical modeling
- 22.4.2 Heat transfer analysis
- 22.4.3 Flammable gas concentrations
- 22.4.4 Hydraulic analysis
- 22.4.5 Thermodynamic chemical equilibrium analysis
- 22.4.6 Structural analysis
- 22.4.7 Egress analysis

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22.4.8 Fire dynamics analysis

22.4.9 Guidelines for selection and use of a fire model

501-22.5 ***The Investigator candidate shall describe the role of fire testing.***

22.5.1 Role of fire testing

22.5.2 Fire test methods

22.5.3 Limitations of fire testing

501-22.6 ***The Investigator candidate shall identify the data required for modeling and testing.***

22.6.1 Materials and contents

22.6.2 Ventilation

SECTION 23

EXPLOSIONS

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene, and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.9 Discriminate the effects of explosions from other types of damage, given standard equipment and tools, so that an explosion is identified and its evidence is preserved.

(A) Requisite Knowledge. Different types of explosions and their causes, characteristics of an explosion, and the difference between low- and high-order explosions.

(B) Requisite Skills. Identify explosive effects on glass, walls, foundations, and other building materials; distinguish between low- and high-order explosion effects; and analyze damage to document the blast zone and origin.

501-23.1 ***The Investigator candidate shall define the term “explosion”.***

501-23.2 ***The Investigator candidate shall identify the different types of explosions.***

23.2.1 Mechanical explosion

23.2.2 Boiling liquid expanding vapor explosion (BLEVE)

23.2.3 Chemical explosion

23.2.4 Combustion explosion

23.2.5 Electrical explosion

23.2.6 Nuclear explosion

501-23.3 ***The Investigator candidate shall distinguish between the characterization of explosion damage.***

23.3.1 Low-order damage

23.3.2 High-order damage

501-23.4 ***The Investigator candidate shall be able to describe the effects of explosions.***

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- 23.4.1 Blast overpressure and wave effect
 - 23.4.1.1 General
 - 23.4.1.2 Positive pressure phase
 - 23.4.1.3 Negative pressure phase
 - 23.4.1.4 Shape of blast wave (front)
 - 23.4.1.5 Rate of pressure rise versus maximum pressure
- 23.4.2 Shrapnel effect (projectiles)
- 23.4.3 Thermal effect
- 23.4.4 Seismic effect (ground shock)

501-23.5 ***The Investigator candidate shall identify the factors controlling explosion effects.***

- 23.5.1 Fuel
- 23.5.2 Turbulence
- 23.5.3 Nature of confining space
- 23.5.4 Location and magnitude of ignition source
- 23.5.5 Venting
- 23.5.6 Blast pressure wave (blast pressure front) modification by reflection
- 23.5.7 Blast pressure front modification by refraction and blast focusing

501-23.6 ***The Investigator candidate shall be able to identify a seated explosion.***

- 23.6.1 General
- 23.6.2 Explosives
- 23.6.3 Boiler and pressure vessels
- 23.6.4 Confined fuel gas and liquid vapor

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23.6.5 Boiling liquid expanding vapor explosion (BLEVE)

501-23.7 ***The Investigator candidate shall be able to identify a non-seated explosion.***

23.7.1 Fuel gases

23.7.2 Pool flammable/combustible liquids

23.7.3 Dusts

23.7.4 Backdraft (smoke explosion)

501-23.8 ***The Investigator candidate shall be able to describe the characteristics of gas/vapor explosions.***

23.8.1 Ignition of gases and vapors

23.8.2 Interpretation of explosion damage

23.8.2.1 Fuel-air ratio

23.8.2.2 Specific gravity (air) (vapor density)

23.8.3 Underground migration of fuel gases

23.8.4 Multiple explosions

501-23.9 ***The Investigator candidate shall describe the characteristics of dust explosions.***

23.9.1 General

23.9.2 Particle size

23.9.3 Concentration

23.9.4 Turbulence in dust explosions

23.9.5 Moisture

23.9.6 Minimum ignition energy for dust

23.9.7 Multiple explosions

501-23.10 ***The Investigator candidate shall be able to describe backdraft (smoke explosions).***

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501-23.11 **The Investigator candidate shall be able to identify an outdoor vapor cloud explosion.**

501-23.12 **The Investigator candidate shall be able to distinguish the two types of explosives.**

23.12.1 Low explosives

23.12.2 High explosives

501-23.13 **The Investigator candidate shall describe the complexity of the investigation of explosive incidents.**

501-23.14 **The Investigator candidate shall be able to investigate the explosion scene.**

23.14.1 General

23.14.2 Securing the scene

23.14.2.1 Establishing the scene

23.14.2.2 Obtain background information

23.14.2.3 Establish the scene search pattern

23.14.2.4 Safety at the explosion scene

23.14.3 Initial scene assessment

23.14.3.1 General

23.14.3.2 Identify explosion or fire

23.14.3.3 Document damage

23.14.3.4 Seated or nonseated explosion

23.14.3.5 Identify type of explosion

23.14.3.6 Identify potential general fuel type

23.14.3.7 Establish the origin

23.14.3.8 Establish ignition source

23.14.4 Detailed scene assessment

23.14.4.1 Identify damage effects of explosion

23.14.4.2 Identify pre-blast and post-blast fire damage

23.14.4.3 Locate and identify articles of evidence

23.14.4.4 Identify force vectors

501-23.15 **The Investigator candidate shall analyze the origin (epicenter) of an explosion scene.**

501-23.16 ***The Investigator candidate shall analyze a fuel source.***

501-23.17 ***The Investigator candidate shall analyze the ignition source.***

501-23.18 ***The Investigator candidate shall analyze to establish cause.***

23.18.1 General

23.18.2 Time line analysis

23.18.3 Damage pattern analysis

23.18.3.1 Debris analysis

23.18.3.2 Relative structural damage analysis

23.18.4 Correlation of explosion type and energy with damage incurred

23.18.5 Analysis of damaged items and structures

23.18.6 Correlation of thermal effects

SECTION 24

INCENDIARY FIRES

4.6 Post-Incident Investigation.

Duties shall include the investigation of all factors beyond the fire scene at the time of the origin and cause determination.

NFPA 1033 4.6.4 Establish evidence as to motive and/or opportunity, given an incendiary fire, so that the evidence is supported by documentation and meets the evidentiary requirements of the jurisdiction.

(A) Requisite Knowledge. Types of motives common to incendiary fires, methods used to discover opportunity, and human behavioral patterns relative to fire-setting.

(B) Requisite Skills. Financial analysis, records gathering and analysis, interviewing, and interpreting fire scene information and evidence for relationship to motive and/or opportunity.

NFPA 1033 4.6.5 Formulate an opinion concerning origin, cause, or responsibility for the fire, given all investigative findings, so that the opinion regarding origin, cause, or responsibility for a fire is supported by the data, facts, records, reports, documents, and evidence.

(A) Requisite Knowledge: Analytical methods and procedures (e.g., hypothesis development and testing, systems analysis, time lines, link analysis, fault tree analysis, and data reduction matrixing).

(B) Requisite Skills: Analytical and assimilation skills.

501-24.1 ***The Investigator candidate shall define “incendiary” fires.***

501-24.2 ***The Investigator candidate shall identify and describe indicators of incendiary fires.***

- 24.2.1 Multiple fires
- 24.2.2 Trailers
- 24.2.3 Lack of expected fuel load and ignition sources
- 24.2.4 Exotic accelerants
- 24.2.5 Unusual fuel load or configuration
- 24.2.6 Burn injuries
- 24.2.7 Incendiary devices
 - 24.2.7.1 Examples of incendiary devices
 - 24.2.7.2 Delay devices

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24.2.7.3 Presence of ignitable liquids in area of origin

24.2.8 Assessment of fire growth and fire damage

501-24.3 ***The Investigator candidate shall identify and explain potential indicators of incendiary fires not directly related to combustion.***

24.3.1 Remote locations with view blocked or obscured

24.3.2 Fires near service equipment and appliances

24.3.3 Removal or replacement of contents prior to the fire

24.3.3.1 Replacement

24.3.3.2 Removal

24.3.3.3 Absences of personal items prior to the fire

24.3.4 Entry blocked or obstructed

24.3.5 Sabotage to the structure or fire protection systems

24.3.5.1 Definition of sabotage

24.3.5.2 Damage to fire-resistive assemblies

24.3.5.3 Damage to fire protection systems

24.3.6 Open windows and exterior doors

501-24.4 ***The Investigator candidate shall identify and describe other evidentiary factors associated with incendiary fires.***

24.4.1 Evidentiary factors that should be recorded and examined

24.4.2 Analysis of confirmed incendiary fires

24.4.2.1 Geographic areas or clusters

24.4.2.2 Temporal frequency

24.4.2.3 Materials and method

24.4.3 Evidence of other crimes, crime concealment

24.4.4 Indications of financial stress

24.4.5 Existing or history of code violations

24.4.6 Owner with fires at other properties

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- 24.4.7 Overinsurance
- 24.4.8 Timed opportunity
 - 24.4.8.1 Fires during severe natural conditions
 - 24.4.8.2 Fires during civil unrest
 - 24.4.8.3 Fire department unavailable
- 24.4.9 Motives for firesetting behavior
 - 24.4.9.1 Define “motive”
 - 24.4.9.2 Motive versus intent
 - 24.4.9.3 Classifications of motive
 - 24.4.9.3.1 Introduction
 - 24.4.9.3.2 Vandalism
 - 24.4.9.3.2.1 Willful and malicious mischief
 - 24.4.9.3.2.2 Peer or group pressure
 - 24.4.9.3.3 Excitement
 - a. Thrill seeking
 - b. Attention seeking
 - c. Recognition
 - d. Sexual gratification or perversion
 - 24.4.9.3.4 Revenge
 - a. Personal retaliation
 - b. Societal retaliation
 - c. Institutional retaliation
 - d. Group retaliation
 - 24.4.9.3.5 Crime Concealment
 - a. Murder concealment
 - b. Burglary concealment
 - c. Destruction of records or documents
 - 24.4.9.3.6 Profit
 - 24.4.9.3.7 Extremism
 - a. Terrorism
 - b. Riot/civil disturbance

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SECTION 25

FIRE AND EXPLOSION DEATHS AND INJURIES

4.4 Evidence Collection/Preservation.

Duties shall include using proper physical and legal procedures to identify, document, collect and preserve evidence required within the investigation.

NFPA 1033 4.4.1 Utilize proper procedures for managing victims and fatalities, given a protocol and appropriate personnel, so that all evidence is discovered and preserved and the protocol procedures are followed.

(A) Requisite Knowledge. Types of evidence associated with fire victims and fatalities and evidence preservation methods.

(B) Requisite Skills. Observational skills and the ability to apply protocols to given situations.

501-25.1 **The Investigator candidate shall demonstrate the ability to utilize specialized skills associated with death and injuries from fire and explosions.**

501-25.2 **The Investigator candidate shall identify the mechanisms of death and injury.**

- 25.2.1 Carbon monoxide
- 25.2.2 Cyanide
- 25.2.3 Other toxic gases
- 25.2.4 Hyperthermia
- 25.2.5 Skin burns
- 25.2.6 Inhalation of hot gases
- 25.2.7 Soot and smoke
- 25.2.8 Hypoxia
- 25.2.9 Sublethal inhalation exposure effects on the individual
 - 25.2.9.1 Narcotic gases
 - 25.2.9.2 Irritant gases
 - 25.2.9.3 Smoke
- 25.2.10 Explosion related injuries
 - 25.2.10.1 Blast pressure injuries

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- 25.2.10.2 Shrapnel injuries
- 25.2.10.3 Thermal injuries
- 25.2.10.4 Building collapse injuries

501-25.3 ***The Investigator candidate shall describe the consumption of the body by fire.***

- 25.3.1 Skin
- 25.3.2 Muscle
- 25.3.3 Bone
- 25.3.4 Fat

501-25.4 ***The Investigator candidate shall describe the postmortem changes that a deceased body will undergo when exposed to heat and to death.***

- 25.4.1 Lividity
- 25.4.2 Rigor mortis

501-25.5 ***The Investigator candidate shall describe the considerations to be made before the investigation of a fatal fire.***

- 25.5.1 Notifications
- 25.5.2 The fire department
- 25.5.3 Team investigation
- 25.5.4 Safety
- 25.5.5 Scene documentation
- 25.5.6 Victim documentation
- 25.5.7 Recovery of bodies and evidence
 - 25.5.7.1 Layering of debris
 - 25.5.7.2 Sifting of debris
 - 25.5.7.3 Body removal
 - 25.5.7.4 Victim clothing

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25.5.8 Collection of other physical evidence

501-25.6 ***The Investigator candidate shall describe the steps of investigating fire scenes with injuries.***

- 25.6.1 Notification laws
- 25.6.2 Scene documentation
- 25.6.3 Victim documentation
- 25.6.4 Victim timeline
- 25.6.5 Physical evidence

501-25.7 ***The Investigator candidate shall describe the documentation of an explosion incident where injury and/or death has occurred.***

25.7.1 Collecting physical evidence from explosions

501-25.8 ***The Investigator candidate shall describe post scene investigation of injuries.***

- 25.8.1 Burns
- 25.8.2 Inhalation medical evidence
- 25.8.3 Hospital tests and documentation
- 25.8.4 Access to medical evidence

501-25.9 ***The Investigator candidate shall describe the fire death pathological and toxicological examination***

- 25.9.1 The coroner or medical examiner
- 25.9.2 Identifying the remains
 - 25.9.2.1 Human vs. animal remains
 - 25.9.2.2 Visual identification
 - 25.9.2.3 Identification by clothing and personal effects
 - 25.9.2.4 Fingerprint identification
 - 25.9.2.5 X-ray identification
 - 25.9.2.6 DNA identification

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- 25.9.3 X-ray examination
- 25.9.4 Carbon monoxide levels
- 25.9.5 Cyanide levels
- 25.9.6 Presence of other toxicants
- 25.9.7 Smoke and soot exposure
- 25.9.8 Burns
- 25.9.9 Physical trauma and wounds
- 25.9.10 Stomach contents
- 25.9.11 Internal body temperature
- 25.9.12 Pre-existing medical conditions
- 25.9.13 Death pre-fire
- 25.9.14 Death from a medical condition

501-25.10 ***The Investigator candidate shall describe how to analyze the data developed from the death or injury investigation and correlate it with the other data from the investigation.***

- 25.10.1 Timeline development
- 25.10.2 Victim activity
- 25.10.3 Pre-fire victim impairment
- 25.10.4 Medical history
- 25.10.5 Fire patterns
- 25.10.6 Burns
- 25.10.7 Clothing

- 25.10.8 Applications of toxicology in fire investigation
 - 25.10.8.1 Toxicological analysis techniques
 - 25.10.8.2 Physiological models
 - 25.10.8.2.1 The Steward Equation
 - 25.10.8.2.2 The Colburn Forster Kane (CFK) Equation

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SECTION 26

APPLIANCES

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene, and/or conducting a comprehensive review of documentation generated during the examination(s) of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought the ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.8 Inspect the performance of building systems, including detection, suppression, HVAC, utilities, and building compartmentation, given standard and special equipment and tools, so that a determination can be made as to the need for expert resources, an operating system's impact on fire growth and spread is considered in identifying origin areas, defeated and/or failed systems are identified, and the system's potential as a fire cause is recognized.

(A) Requisite Knowledge. Different types of detection, suppression, HVAC, utility, and building compartmentation such as fire walls and fire doors; types of expert resources for building systems; the impact of fire on various systems; common methods used to defeat a system's functional capability; and types of failures.

(B) Requisite Skills. Determine the system's operation and its effect on the fire; identify alterations to, and failure indicators of, building systems; and evaluate the impact of suppression efforts on building systems.

501-26.1 ***The Investigator candidate shall analyze appliances as it relates to investigation of the cause of fires.***

501-26.2 ***The Investigator candidate shall record the scene involving an appliance.***

- 26.2.1 Recording specific appliances
- 26.2.2 Measurements of the location of the appliances
- 26.2.3 Positions of appliance controls
- 26.2.4 Document appliance information
- 26.2.5 Gathering all of the parts from the appliance

501-26.3 ***The Investigator candidate shall analyze the origin of fires involving appliances.***

- 26.3.1 Relationship of the appliance to the origin

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- 26.3.2 Fire patterns
- 26.3.3 Plastic appliance components
- 26.3.4 Reconstruction of the area of origin

501-26.4 ***The Investigator candidate shall analyze the cause of fires involving appliances.***

- 26.4.1 How the appliance generated heat
- 26.4.2 The use and design of the appliance
- 26.4.3 Electrical appliances as ignition sources
- 26.4.4 Photographing appliance disassembly
- 26.4.5 Obtaining exemplar appliances
- 26.4.6 Testing exemplar appliances

501-26.5 ***The Investigator candidate shall describe each of the common parts or components that might be found in various appliances.***

- 26.5.1 Appliance housings
- 26.5.2 Power sources
 - 26.5.2.1 Power cords
 - 26.5.2.2 Voltages less than 120
 - 26.5.2.3 Batteries
 - 26.5.2.4 Overcurrent protection
- 26.5.3 Switches
 - 26.5.3.1 Manual switches
 - 26.5.3.2 Automatic switches
- 26.5.4 Solenoids and relays
- 26.5.5 Transformers
- 26.5.6 Motors
- 26.5.7 Heating elements

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- 26.5.8 Lighting
 - 26.5.8.1 Fluorescent lighting systems
 - 26.5.8.2 High intensity discharge lighting systems

26.5.9 Miscellaneous components

501-26.6 ***The Investigator candidate shall describe the operation and components of common residential appliances.***

- 26.6.1 Range or oven
- 26.6.2 Coffee makers
- 26.6.3 Toaster
- 26.6.4 Electric can opener
- 26.6.5 Refrigerator
- 26.6.6 Dishwasher
- 26.6.7 Microwave oven
- 26.6.8 Portable space heater
- 26.6.9 Electric blanket
- 26.6.10 Window air conditioner unit
- 26.6.11 Hair dryer and hair curler
- 26.6.12 Clothes iron
- 26.6.13 Clothes dryer
- 26.6.14 Consumer electronics
- 26.6.15 Lighting

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SECTION 27

MOTOR VEHICLE FIRES

Annex A Explanatory Material

NFPA 1033 A.1.1 The intent of this standard applies to all fire investigation, including outside, wildland, vehicle, and structural fires.

4.1 General

NFPA 1033 4.1.3 Because fire investigators are required to perform activities in adverse conditions, site safety assessments shall be completed on all scenes and regional and national safety standards shall be followed and included in organizational policies and procedures.

4.2 Scene Examination.

Duties shall include inspecting and evaluating the fire scene, or evidence of the scene if the scene is no longer available, so as to determine the area or point of origin, source of ignition, material(s) ignited, and act or activity that brought ignition source and materials together and to assess the subsequent progression, extinguishment, and containment of the fire.

NFPA 1033 4.2.4 Interpret fire patterns, given standard equipment and tools and some structural or content remains, so that each individual pattern is evaluated with respect to the burning characteristics of the material involved and in context and relationship with all patterns observed in the mechanisms of heat transfer that lead to the formation of the pattern.

(A) Requisite Knowledge. Fire dynamics, fire development, and the interrelationship of heat release rate, form, and ignitability of materials.

(B) Requisite Skills. Ability to interpret the effects of burning characteristics on different types of materials.

NFPA 1033 4.2.5 Interpret and analyze fire patterns, given standard equipment and tools and some structural or content remains, so that fire development is determined, methods and effects of suppression are evaluated, false origin area patterns are recognized, and all areas of origin are correctly identified.

(A) Requisite Knowledge. Fire behavior and spread based on fire chemistry, fire dynamics, and physics, fire suppression effects, building construction.

(B) Requisite Skills. Interpret variations of fire patterns on different materials with consideration given to heat release rate, form, and ignitability; distinguish impact of different types of fuel loads; evaluate fuel trails; and analyze and synthesize information.

NFPA 1033 4.2.6 Examine and remove fire debris, given standard equipment and tools, so that all debris is checked for fire cause evidence, potential ignition source(s) is identified, and evidence is preserved without investigator-inflicted damage or contamination.

(A) Requisite Knowledge. Basic understanding of ignition processes, characteristics of ignition sources, and ease of ignition of fuels; debris-layering techniques; use of tools and equipment during the debris search; types of fire cause evidence commonly found in various degrees of damage; and evidence-gathering methods and documentation.

(B) Requisite Skills. Employ search techniques that further the discovery of fire cause evidence and ignition sources, use search techniques that incorporate documentation, and collect and preserve evidence.

501-27.1 **The Investigator candidate shall describe the factors related to the investigation of fires involving motor vehicles.**

501-27.2 **The Investigator candidate shall describe the differences, in safety related concerns, that burned vehicles pose as compared to those found in structure fires.**

501-27.3 **The Investigator candidate shall describe and identify the different types of fuels that may be involved in vehicle fires.**

27.3.1 Ignitable liquids

27.3.2 Gaseous fuels

27.3.3 Solid fuels

501-27.4 **The Investigator candidate shall describe and identify the different ignition sources that can be present in vehicle fires.**

27.4.1 Open flames

27.4.2 Electrical sources

27.4.2.1 Recreational vehicles

27.4.2.2 Overloaded wiring

27.4.2.3 Electrical high resistance connections

27.4.2.4 Electrical short circuits and arcs (electric discharge)

27.4.2.5 Arc (carbon) tracking

27.4.2.6 Lamp bulbs and filaments

27.4.2.7 External electrical sources used in vehicles

27.4.3 Hot surfaces

27.4.4 Mechanical sparks

27.4.5 Smoking materials

501-27.5 **The Investigator shall identify the different types of systems that a motor vehicle may possess and their respective functions.**

27.5.1 Fuel system

27.5.1.1 Vacuum/low pressure carbureted systems

27.5.1.2 High-pressure fuel-injected systems

27.5.1.3 Diesel fuel system

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- 27.5.1.4 Natural gas
- 27.5.1.5 Propane fuel
- 27.5.1.6 Turbochargers

- 27.5.2 Emission control system

- 27.5.3 Motor vehicle electrical systems

- 27.5.4 Mechanical power systems
 - 27.5.4.1 Lubrication systems
 - 27.5.4.2 Liquid cooling systems
 - 27.5.4.3 Air-cooled systems
 - 27.5.4.4 Electric motors

- 27.5.5 Mechanical power distribution
 - 27.5.5.1 Mechanically geared transmissions
 - 27.5.5.2 Hydraulically geared transmission

- 27.5.6 Accessories to the mechanical power system

- 27.5.7 Hydraulic braking system

- 27.5.8 Windshield washer systems

501-27.6 ***The Investigator candidate shall identify the different body systems that can be found within or upon motor vehicles.***

- 27.6.1 Interior finishes and accessories
- 27.6.2 Cargo areas

501-27.7 ***The Investigator candidate shall identify and employ the proper technique for investigating motor vehicle fires.***

- 27.7.1 Vehicle identification
- 27.7.2 Vehicle fire scene history
- 27.7.3 Vehicle particulars
- 27.7.4 Documenting the vehicle at the fire scene
- 27.7.5 Documenting the vehicle away from the scene

501-27.8 **The Investigator candidate shall identify factors related to the examination of motor vehicles after they have burned.**

- 27.8.1 General
- 27.8.2 Examination of vehicle systems
- 27.8.3 Switches, handles, and levers

501-27.9 **The Investigator candidate shall define total burns as it relates to motor vehicle fires and describe the actions that should be taken when these types of fires are encountered.**

501-27.10 **The Investigator candidate shall identify factors related to incendiary vehicle fires.**

501-27.11 **The Investigator shall identify components of the vehicle's ignition system as they relate to the fire investigation.**

501-27.12 **The Investigator candidate shall identify factors concerning vehicle fires in structures and evaluate them as a potential source of fire ignition.**

501-27.13 **The Investigator candidate shall identify and describe the factors relative to the investigation of recreational vehicle fires.**

501-27.14 **The Investigator candidate shall identify the factors related to fire investigations involving heavy equipment.**

- 27.14.1 Medium and heavy-duty trucks and buses
- 27.14.2 Mass transit vehicles
- 27.14.3 Earth-moving equipment
- 27.14.4 Forestry/logging equipment
- 27.14.5 Landfill equipment
- 27.14.6 Agricultural equipment

501-27.15 **The Investigator candidate shall identify the factors related to fire investigations involving self-propelled agricultural equipment and drawn implements.**

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27.15.1 Agricultural equipment investigation safety

27.15.2 Equipment classification and description

27.15.3 Unique safety concerns

27.15.4 Unique fire cause concerns

27.15.5 Fuels

27.15.6 Ignition sources

501-27.16 ***The Investigator candidate shall identify factors related to the investigation of fires involving hybrid vehicles.***

27.16.1 Hybrid vehicle investigation safety

27.16.2 Hybrid vehicle technology

27.16.3 Investigation of hybrid vehicle fires

501-27.17 ***The Investigator candidate shall identify factors related to towing or vehicle transport as it relates to fire investigations.***

501.27.18 ***The Investigator candidate shall identify factors related to the investigation of fires involving hydrogen fueled vehicles.***

SECTION 28

WILDFIRE INVESTIGATIONS

Annex A Explanatory Material

NFPA 1033 A.1.1 The intent of this standard applies to all fire investigation, including outside, wildland, vehicle, and structural fires.

501-28.1 ***The Investigator candidate shall identify the specialized techniques, practices, equipment, and terminology associated with the investigation of wildfires.***

501-28.2 ***The Investigator candidate shall identify and describe wildfire fuels.***

28.2.1 Fuel condition analysis

28.2.2 Ground fuels

28.2.2.1 Duff

28.2.2.2 Roots

28.2.3 Surface fuels

28.2.3.1 Fine dead wood

28.2.3.2 Dead leaves and coniferous litter

28.2.3.3 Grass

28.2.3.4 Downed logs, stumps and large limbs

28.2.3.5 Low brush and reproduction

28.2.4 Aerial fuels

28.2.4.1 Tree branches and crowns

28.2.4.2 Tree moss

28.2.4.3 High brush

28.2.5 Species

28.2.6 Fuel size

28.2.7 Fuel moisture content

28.2.8 Oil content

501-28.3 ***The Investigator candidate shall identify and describe the effects of weather on fire spread.***

28.3.1 Weather history

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- 28.3.2 Temperature
- 28.3.3 Relative humidity
- 28.3.4 Wind influences
 - 28.3.4.1 Meteorological winds
 - 28.3.4.2 Diurnal winds
 - 28.3.4.3 Foehn winds
 - 28.3.4.4 Fire winds

501-28.4 ***The Investigator candidate shall identify, describe and interpret the effect of topography on fire spread.***

- 28.4.1 Slope
- 28.4.2 Aspect

501-28.5 ***The Investigator candidate shall be able to describe fire shape.***

- 28.5.1 Fire head
- 28.5.2 Fire flanks
- 28.5.3 Fire heel
- 28.5.4 Factors affecting fire spread
 - 28.5.4.1 Lateral confinement
 - 28.5.4.2 Fuel influence
 - 28.5.4.3 Suppression
- 28.5.5 Other natural mechanisms of fire spread
 - 28.5.5.1 Embers and firebrands
 - 28.5.5.2 Fire storms
 - 28.5.5.3 Animals

501-28.6 ***The Investigator candidate shall identify and describe indicators of a wildfire.***

- 28.6.1 Wildfire V shaped patterns
- 28.6.2 Degree of damage
- 28.6.3 Grass stems
- 28.6.4 Angle of char
- 28.6.5 White ash deposit
- 28.6.6 Cupping

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- 28.6.7 Die out pattern
- 28.6.8 Exposed and protected fuels
- 28.6.9 Staining and sooting
- 28.6.10 Depth of char
- 28.6.11 Spalling
- 28.6.12 Foliage freeze
- 28.6.13 Curling

501-28.7 ***The Investigator candidate shall identify the area of origin of a wildfire.***

- 28.7.1 Initial area of investigation
- 28.7.2 General origin area
- 28.7.3 General origin investigation techniques
- 28.7.4 Specific origin investigation techniques
- 28.7.5 Search equipment

501-28.8 ***The Investigator shall determine the cause of a wildfire.***

- 28.8.1 Natural causes
- 28.8.2 Human fire causes

501-28.9 ***The Investigator candidate shall recognize that evidence protection, preservation, collection, and documentation at wildfires are similar to other fires.***

501-28.10 ***The Investigator candidate shall identify special safety considerations associated with investigation of wildfires.***

501-28.11 ***The Investigator candidate shall identify sources of information pertaining to wildfire investigation.***

SECTION 29

MANAGEMENT OF COMPLEX INVESTIGATIONS

NFPA 1033 4.1 General

NFPA 1033 4.1.6 The fire investigator shall understand the organization and operation of the investigative team within an incident management system.

501-29.1 ***The Investigator candidate shall distinguish those issues that are unique to managing investigations that are complex due to size, scope, or duration.***

- 29.1.1 Governmental inquiry
- 29.1.2 Intent
- 29.1.3 Purpose
- 29.1.4 Interested parties
- 29.1.5 Definitions

501-29.2 ***The Investigator candidate shall describe the basic information and documents associated with complex investigations.***

501-29.3 ***The Investigator candidate shall recognize the importance of communications among interested parties.***

- 29.3.1 Notice to interested parties
 - 29.3.1.1 Entity in control
 - 29.3.1.2 All interested parties
 - 29.3.1.3 Roster of interested parties
 - 29.3.1.4 Notification of changes
 - 29.3.1.5 Making notification
 - 29.3.1.6 Content of notification
 - 29.3.1.7 Subsequent notifications
- 29.3.2 Meetings
 - 29.3.2.1 Preliminary meeting
 - 29.3.2.2 Meetings as the investigation progresses
 - 29.3.2.3 Website
 - 29.3.2.4 Additional dissemination of information

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501-29.4 ***The Investigator candidate shall recognize the complexity of the investigation and ensure that all known interested parties are afforded an opportunity to investigate the incident and protect their respective interests, understandings or agreements.***

- 29.4.1 Purposes
- 29.4.2 Scheduling
- 29.4.3 Cost sharing
- 29.4.4 Non-disclosure agreements
- 29.4.5 Protocols
- 29.4.6 Information sharing
- 29.4.7 Interviews
- 29.4.8 Amendments to agreement
- 29.4.9 Disagreements

501-29.5 ***The Investigator candidate shall identify and describe the components of managing a complex investigation.***

- 29.5.1 Organizational models
- 29.5.2 Control of the site and scene
 - 29.5.2.1 Securing the site and scene
 - 29.5.2.2 Delegation of control
 - 29.5.2.3 Transfer of control
 - 29.5.2.4 Site and scene access
 - 29.5.2.4.1 Control of the site
 - 29.5.2.4.2 Establishing procedures for access
 - 29.5.2.4.3 Monitoring entry to the site
 - 29.5.2.4.4 Access control
 - 29.5.2.4.5 Escorts
 - 29.5.2.4.6 Public sector concerns
 - 29.5.2.4.7 Occupant access and control
 - 29.5.2.4.8 Decontamination in and out
 - 29.5.2.5 Site-specific restrictions or requirements
 - 29.5.2.6 Scene integrity

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29.5.2.7 Release of information

501-29.6 ***The Investigator candidate shall recognize the unique components of handling evidence of a complex investigation.***

- 29.6.1 Evidence control
 - 29.6.1.1 Evidence custodian
 - 29.6.1.2 Interested party responsibility
- 29.6.2 Evidence removal from the scene
- 29.6.3 Evidence storage
- 29.6.4 Evidence inspections
 - 29.6.4.1 Non-destructive inspections
 - 29.6.4.2 Destructive inspections
 - 29.6.4.3 Testing of evidence

501-29.7 ***The Investigator candidate shall identify logistical support needs involving the complex investigation.***

- 29.7.1 Transportation
- 29.7.2 Equipment
- 29.7.3 Investigation site security
- 29.7.4 Decontamination
- 29.7.5 Environmental
- 29.7.6 Communications
- 29.7.7 Sanitary and comfort needs
- 29.7.8 Trash disposal and removal
- 29.7.9 Snow and ice removal
- 29.7.10 Lighting
- 29.7.11 Evidence storage

501-29.8 ***The Investigator candidate shall distinguish the unique characteristics of safety at the complex investigation site.***

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SECTION 30

MARINE FIRE INVESTIGATION

Annex A Explanatory Material

NFPA 1033 A.1.1 The intent of this standard applies to all fire investigation, including outside, wildland, vehicle, and structural fires.

501-30.1 ***The Investigator candidate shall identify the factors related to the investigations of fires involving recreational boats.***

501-30.2 ***The Investigator candidate shall define the following terms.***

30.2.1 Accommodation space

30.2.2 Adrift

30.2.3 Afloat

30.2.4 Aft

30.2.5 Aground

30.2.6 Beam

30.2.7 Below

30.2.8 Bilge

30.2.9 Boat

30.2.10 Bulkhead

30.2.11 Cabin

30.2.12 Capsize

30.2.13 Chain plate

30.2.14 Deck

30.2.15 Dock

30.2.16 Dorade vent

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- 30.2.17 Fender
- 30.2.18 Forward
- 30.2.19 Freeboard
- 30.2.20 Galley
- 30.2.21 Gear
- 30.2.22 Gunwale
- 30.2.23 Hatch
- 30.2.24 Hold
- 30.2.25 Hull
- 30.2.26 Inboard
- 30.2.27 Inboard/Out-Drive (I/O)
- 30.2.28 Outboard
- 30.2.29 Overboard
- 30.2.30 Port
- 30.2.31 Rub Rail
- 30.2.32 Shore power
- 30.2.33 Shroud
- 30.2.34 Sole
- 30.2.35 Starboard
- 30.2.36 Superstructure
- 30.2.37 Topside
- 30.2.38 Transom
- 30.2.39 Underway

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30.2.40 Vessel

30.2.41 Waterline

501-30.3 ***The Investigator candidate shall recognize the importance of boat investigation safety.***

30.3.1 Safety assessment

30.3.2 Inspection of boats on land

30.3.3 Inspection of boats afloat

30.3.4 Underwater inspections

30.3.5 Specific safety concerns

30.3.5.1 Confined spaces

30.3.5.1.1 Automatic fire suppression
systems inactive/deactivated

30.3.5.2 Airborne particulates

30.3.5.3 Identify and assess energy sources

30.3.5.3.1 Batteries

30.3.5.3.2 Inverters

30.3.5.3.3 Shore power

30.3.5.4 Fuel leaks

30.3.5.5 Sewage holding tank

30.3.5.6 Hydrogen gas

30.3.5.7 Other hydrocarbon contaminants

30.3.5.8 Stability

30.3.5.9 Damage to the structure of the boat

30.3.5.10 Wharves, docks, and jetties

30.3.5.11 Submerged boat

30.3.5.12 Visual distress signals and pyrotechnics

30.3.6 Openings

501-30.4 ***The Investigator candidate shall identify the different marine systems and functions.***

30.4.1 Fuel systems: propulsion and auxiliary

30.4.1.1 Vacuum/low pressure carbureted

30.4.1.2 High pressure/marine fuel injection (including
return systems)

30.4.1.3 Diesel

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- 30.4.2 Fuel systems: cooking and heating
 - 30.4.2.1 Liquefied petroleum gases
 - 30.4.2.2 Compressed natural gas
 - 30.4.2.3 Alcohol
 - 30.4.2.4 Solid fuels
 - 30.4.2.5 Diesel
- 30.4.3 Turbochargers/super chargers
- 30.4.4 Exhaust system
 - 30.4.4.1 Dry exhaust systems
 - 30.4.4.2 Wet exhaust systems
 - 30.4.4.3 De-watered exhaust systems
- 30.4.5 Electrical system
 - 30.4.5.1 Alternating current (AC)
 - 30.4.5.2 Direct current (DC)
- 30.4.6 Engine cooling system
- 30.4.7 Ventilation
- 30.4.8 Transmissions
 - 30.4.8.1 Mechanical gear transmissions
 - 30.4.8.2 Hydraulic-gear transmissions
- 30.4.9 Accessories

501-30.5 ***The Investigator candidate shall identify the exterior construction of the vessel.***

- 30.5.1 Hull construction
- 30.5.2 Superstructure construction material
- 30.5.3 Deck
- 30.5.4 Exterior accessories

501-30.6 ***The Investigator candidate shall identify the interior construction of the vessel.***

- 30.6.1 Construction materials

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- 30.6.2 Finishes
 - 30.6.2.1 Accommodation furnishings
 - 30.6.2.2 Interior accessories
 - 30.6.2.3 Engine/machinery compartments
 - 30.6.2.4 Flammable/explosive vapor detectors
 - 30.6.2.5 Storage and holds
 - 30.6.2.6 Fuel tanks

501-30.7 ***The Investigator candidate shall identify the propulsion system of the vessel.***

- 30.7.1 Electric systems
- 30.7.2 Fuels for boats with motorized propulsion systems
 - 30.7.2.1 Fuel systems
 - 30.7.2.1.1 Engines
 - 30.7.2.1.1.1 Outboard engines (outboard motors)
 - 30.7.2.1.1.2 Inboard gasoline engines
 - 30.7.2.1.1.3 Diesel engines
 - 30.7.2.1.1.4 Propulsion system fluids
 - 30.7.2.2 Appliance fuel systems
 - 30.7.2.3 Electric generators
- 30.7.3 Other fuel systems used for propulsion

501-30.8 ***The Investigator candidate shall identify common ignition sources found in marine vessels.***

- 30.8.1 Open flames
- 30.8.2 Electrical sources
 - 30.8.2.1 Overloaded wiring
 - 30.8.2.2 Electrical short circuiting and arcs
 - 30.8.2.3 Electrical connections
 - 30.8.2.4 Lightning
 - 30.8.2.5 Static electricity and incendive arcs
- 30.8.3 Hot surfaces
 - 30.8.3.1 Manifolds
 - 30.8.3.2 Exhaust systems
 - 30.8.3.3 Cooking surfaces
 - 30.8.3.4 Heating systems

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- 30.8.4 Mechanical
 - 30.8.4.1 Bearing failures
 - 30.8.4.2 Friction
- 30.8.5 Smoking materials

501-30.9 ***The Investigator candidate shall describe proper documentation of the boat fire scene.***

- 30.9.1 On land
- 30.9.2 In water
 - 30.9.2.1 Moored
 - 30.9.2.2 Anchored and underway
 - 30.9.2.3 Underwater
- 30.9.3 Boat identification
 - 30.9.3.1 Hull Identification Number (HIN)
 - 30.9.3.2 Registration numbers
 - 30.9.3.3 US Coast Guard documentation numbers
 - 30.9.3.4 Boat name and hailing port
 - 30.9.3.5 Boat history
 - 30.9.3.6 Fire scene history
 - 30.9.3.6.1 Actions before the fire
 - 30.9.3.6.2 Actions during the fire
 - 30.9.3.6.3 Actions after the fire
- 30.9.4 Boat particulars

501-30.10 ***The Investigator candidate shall identify the steps of a proper boat examination.***

- 30.10.1 General
- 30.10.2 Examination of boat systems

501-30.11 ***The Investigator candidate shall describe marine fire investigations of boats in structures.***

501-30.12 ***The Investigator candidate shall describe legal considerations related to marine fire investigations.***

SECTION 31

PRACTICAL EXERCISES

4.7 Presentations.

Duties shall include the presentation of findings to those individuals not involved in the actual investigations.

NFPA 1033 4.7.1 Prepare a written report, given investigative findings, documentation, and a specific audience, so that the report accurately reflects the investigative findings, is concise, expresses the investigator's opinion, contains facts and data that the investigator relies on in rendering an opinion, contains the reasoning of the investigator by which each opinion was reached, and meets the needs or requirements of the intended audience(s).

(A) Requisite Knowledge. Elements of writing, typical components of a written report, and types of audiences and their respective needs or requirements.

(B) Requisite Skills. Writing skills, ability to analyze information and determine the reader's needs or requirements.

NFPA 1033 4.7.2 Express investigative findings verbally, given investigative findings, notes, a time allotment, and a specific audience, so that the information is accurate, the presentation is completed within the allotted time, and the presentation includes only need-to-know information for the intended audience.

(A) Requisite Knowledge. Types of investigative findings, the informational needs of various types of audiences, and the impact of releasing information.

(B) Requisite Skills. Communication skills and ability to determine audience needs and correlate findings.

NFPA 1033 4.7.3 Testify during legal proceedings, given investigative findings, contents of reports, and consultation with legal counsel, so that all pertinent investigative information and evidence are presented clearly and accurately and the investigator's demeanor and attire are appropriate to the proceedings.

(A) Requisite Knowledge. Types of investigative findings, types of legal proceedings, professional demeanor requirements, and an understanding of due process and legal proceedings.

(B) Requisite Skills. Communication and listening skills and ability to differentiate facts from opinion and determine accepted procedures, practices, and etiquette during legal proceedings.

501-31.1 ***The Investigator candidate shall demonstrate proficiency in all required skills in the TCFP Fire Investigator Skills Manual.***

CHAPTER NINE
FIRE OFFICER I
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
901-4.1	General	4
901-4.2	Human Resources Management	6
901-4.3	Community and Government Relations	6
901-4.4	Administration	4
901-4.5	Inspection and Investigation	4
901-4.6	Emergency Service Delivery	10
901-4.7	Health and Safety	8
	Performance Skills*	18
	TOTAL RECOMMENDED HOURS	60

*The recommended hours for skills evaluation is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

REFERENCE LIST FOR THE FIRE OFFICER I CURRICULUM

Certified Training Facilities approved to teach this curriculum, must have the following reference materials:

Fire and Emergency Service Company Officer (4th Ed) (2007) Stillwater, OK: International Fire Service Training Association

Fire Officer Principles and Practice (2nd Ed.) (2010) Sudbury, MA: Jones and Bartlett Publishers, Inc.

NFPA 1021: Standard for Fire Officer Professional Qualifications (2013 Ed.) Quincy, MA: National Fire Protection Association NFPA Publications

Standards Manual for Fire Protection Personnel Austin, TX: Texas Commission on Fire Protection.

FIRE OFFICER I

A Fire Officer I is a first-line supervisory officer who has met all the job performance and certification requirements of Fire Fighter II as defined in NFPA 1001, *Standard for Fire Fighter Professional Qualifications*, and Fire Instructor I as defined in NFPA 1041, *Standard for Fire Service Instructor Professional Qualifications*. An individual at the Fire Officer I level, as part of his or her duties and responsibilities performs the following:

- Uses human resources to accomplish assignments in accordance with safety plans in an efficient manner, evaluates member task performance, supervises personnel during emergency, and non-emergency work periods
- Deals with inquiries from the community, projects the role of the department to the public, delivers safety, injury prevention and fire prevention education programs
- Performs general administrative functions and implements departmental policies and procedures at the unit/company level
- Performs a fire investigation to determine preliminary cause, secures the incident scene, and preserves evidence
- Supervises emergency operations, conducts pre-incident planning, and deploys assigned resources in accordance with the local emergency plan
- Integrates safety plans, policies, and procedures into the daily activities as well as on the emergency scene, including the donning of appropriate levels of personal protective equipment to ensure a safe work environment, in accordance with health and safety plans, for all assigned members

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901-4.1 General

For qualification at Fire Officer Level I, the candidate shall meet the requirements of Fire Fighter II as defined in NFPA 1001, Fire Instructor I as defined in NFPA 1041, and the job performance requirements defined in Sections 4.2 through 4.7 of this standard.

901-A.4.1 It is recognized that the job of Fire Officer may not be as physically demanding as that of a Fire Fighter. However, the physiological and emotional stress incurred by Fire Officers can still be significant. Therefore, it is recommended that physical fitness requirements for Fire Officer personnel be developed and validated by the AHJ.

901-4.1.1 General Prerequisite Knowledge

- 1) The organizational structure of the department
- 2) Geographical configuration and characteristics of response districts
- 3) Departmental operating procedures for administration, emergency operations, incident management system, and safety
- 4) Fundamentals of leadership**
- 5) Departmental budget process
- 6) Information management and recordkeeping
- 7) The fire prevention and building safety codes and ordinances applicable to the jurisdiction
- 8) Current trends, technologies, and socioeconomic and political factors that affect the fire service
- 9) Cultural diversity
- 10) Methods used by supervisors to obtain cooperation within a group of subordinates
- 11) The rights of management and members
- 12) Agreements in force between the organization and members
- 13) Generally accepted ethical practices, including a professional code of ethics

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- 14) Policies and procedures regarding the operation of the department as they involve supervisors and members

901-A.4.1.1 Other prerequisite knowledge can include an understanding of negligence, duty to act, standard of care, tort immunity, types of laws (statutes, regulations, etc.), role of OSHA, impact of NFPA standards on OSHA and standard of care, and sexual harassment.

901-4.1.2 General Prerequisite Skills

- 1) The ability to effectively communicate in writing utilizing technology provided by the AHJ
- 2) Write reports, letters, and memos utilizing word processing and spreadsheet programs
- 3) Operate in an information management system
- 4) Effectively operate at all levels in the incident management system utilized by the AHJ

901-4.2 Human Resource Management

This duty involves utilizing human resources to accomplish assignments in accordance with safety plans and in an efficient manner. This duty also involves evaluating member performance and supervising personnel during emergency and nonemergency work periods, according to the following job performance requirements.

- 901-4.2.1** Assign tasks or responsibilities to unit members, given an assignment at an emergency incident, so that the instructions are complete, clear, and concise; safety considerations are addressed; and the desired outcomes are conveyed.

Requisite Knowledge: Verbal communications during emergency incidents, techniques used to make assignments under stressful situations, and methods of confirming understanding.

- 1) Verbal communications during emergency incidents
 - a) National Incident Management System (NIMS) standards including but not limited to the following:
 - i) Command presence
 - (1) Calm
 - (2) Clear
 - (3) Concise

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- (4) Accurate
 - ii) Clear text (no ten codes)
 - iii) Standard resource typing
 - iv) Standard terminology for facilities, equipment and resources
 - v) State the desired outcome
- 2) Techniques used to make assignments under stressful situations
 - a) Standard operating procedures/guidelines
 - b) Maintain span of control
 - c) Safety considerations
 - d) Accountability
 - e) Develop an incident action plan
 - f) Establish tactical priorities
 - i) Life safety
 - ii) Incident stabilization
 - iii) Environmental conservation
 - iv) Property conservation
- 3) Methods of confirming understanding
 - a) Feedback (repeat message)
 - b) Ask for any questions/clarifications

Requisite Skills: The ability to condense instructions for frequently assigned unit tasks based on training and standard operating procedures.

- 901-4.2.2** Assign tasks or responsibilities to unit members, given an assignment under nonemergency conditions at a station or other work location, so that the instructions are complete, clear, and concise; safety considerations are addressed; and the desired outcomes are conveyed.

Requisite Knowledge: Verbal communications under nonemergency situations, techniques used to make assignments under routine situations, and methods of confirming understanding.

- 1) Verbal communications under nonemergency situations
 - a) Calm
 - b) Clear
 - c) Concise
 - d) Accurate
 - e) State the desired outcome
- 2) Techniques used to make assignments under routine situations
 - a) Verbal

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- b) Written
- 3) Methods of confirming understanding
 - a) Feedback (repeat message)
 - b) Ask for any questions/clarifications

Requisite Skills: The ability to issue instructions for frequently assigned unit tasks based on department policy.

- 901-4.2.3** Direct unit members during a training evolution, given a company training evolution and training policies and procedures, so that the evolution is performed in accordance with safety plans, efficiently, and as directed.

Requisite Knowledge: Verbal communication techniques to facilitate learning.

- 1) Communication model
 - a) Sender
 - b) Message
 - c) Instructional medium
 - d) Receiver
 - e) Feedback
 - f) Environment
- 2) Factors in effective delivery
 - a) Voice inflection
 - b) Eye contact
 - c) Common/appropriate terminology
 - d) Appropriate terminology
 - e) Body language
 - f) Facial expressions
 - g) Tone of voice
 - h) Appropriate appearance
- 3) Basic rules of effective spoken communication
 - a) Be adaptive to audience
 - b) Have a specific purpose
 - c) Be clear and concise
 - d) Be focused

Requisite Skills: The ability to distribute issue-guided directions to unit members during training evolutions.

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901-4.2.4 Recommend action for member-related problems, given a member with a situation requiring assistance and the member assistance policies and procedures, so that the situation is identified and the actions taken are within the established policies and procedures.

Requisite Knowledge: The signs and symptoms of member-related problems, causes of stress in emergency services personnel, adverse effects of stress on the performance of emergency service personnel, and awareness of AHJ member assistance policies and procedures.

A.4.2.4(A) Member-related problems could include substance abuse; acute, chronic, and delayed stress; and health, financial, personal, family, and other situations that adversely affect the member's job performance.

- 1) The signs and symptoms of member-related problems
 - a) Substance abuse
 - b) Health problems
 - i) Mental
 - ii) Physical
 - c) Financial problems
 - d) Personal/family problems
 - e) Behavioral problems

- 2) Causes of stress in emergency services personnel
 - a) Environmental
 - i) Weather
 - ii) Workplace conditions/expectations
 - iii) Emergency scenes
 - b) Physiological
 - i) Interrupted meals/sleep
 - ii) Shift work
 - iii) Constant heightened sense of awareness
 - c) Psychological
 - i) Multiple casualty incidents
 - ii) Gruesome injuries
 - iii) Co-worker injuries or deaths
 - iv) Injuries or deaths involving children
 - d) Cultural
 - i) Age
 - ii) Gender
 - iii) Ethnicity
 - iv) Religion

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- e) Personal
 - i) Financial
 - ii) Issues outside of work
- 3) Adverse effects of stress on the performance of emergency service personnel
 - a) Failure to meet job performance requirements
 - b) Injuries/illnesses
 - c) Death
- 4) Awareness of AHJ member assistance policies and procedures

Requisite Skills: The ability to recommend a course of action for a member in need of assistance.

901-4.2.5 Apply human resource policies and procedures, given an administrative situation requiring action, so that policies and procedures are followed.

901-A.4.2.5 The Fire Officer I should be able to deal with administrative procedures that might include transfers, promotions, compensation/member benefits, sick leave, vacation, requests for pay or benefits while acting in a temporary position, change in member benefits, commendations, disciplinary actions, and grievances.

Requisite Knowledge: Human resource policies and procedures.

- 1) Laws
 - a) Federal
 - b) State
- 2) Local AHJ (e.g. Employee Assistance Program)
- 3) Departmental (e.g. Wellness/fitness program)

Requisite Skills: The ability to communicate orally and in writing and to relate interpersonally.

901-4.2.6 Coordinate the completion of assigned tasks and projects by members, given a list of projects and tasks and the job requirements of subordinates, so that the assignments are prioritized, a plan for the completion of each assignment is developed, and members are assigned to specific tasks and both supervised during and held accountable for the completion of the assignments.

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Requisite Knowledge: Principles of supervision and basic human resource management.

- 1) Principles of supervision
 - a) Delegate responsibility
 - b) Consistent management
 - c) Motivate
 - d) Communicate
 - e) Train
 - f) Decision making
 - g) Resource management
 - h) Time management
 - i) Coach/counsel
 - j) Discipline (positive and negative)
 - k) Accountability
 - l) Employee performance appraisals
 - m) Conflict resolution
 - n) Risk management
 - o) Leadership styles
 - i) Autocratic
 - ii) Democratic
 - iii) Laissez-faire

- 2) Basic human resource management
 - a) Managerial theories
 - b) Human resource planning
 - c) Employee relations
 - d) Staffing
 - e) Performance management
 - f) Human resource development
 - g) Compensation and benefits
 - h) Employee health, safety and security
 - i) Risk benefit analysis

Requisite Skills: The ability to plan and to set priorities.

901-4.3 Community and Government Relations

This duty involves dealing with inquiries of the community and communicating the role, image, and mission of the department to the public and delivering safety, injury, and fire prevention education programs, according to the following job performance requirements.

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901-4.3.1 Initiate action on a community need, given policies and procedures, so that the need is addressed.

Requisite Knowledge: Community demographics and service organizations, as well as verbal and nonverbal communication, and an understanding of the role and mission of the department.

- 1) Community demographics and service organizations
 - a) Statistical analysis
 - i) Age
 - ii) Income
 - iii) Ethnicity
 - iv) Gender
 - v) Educational level
 - vi) Special needs
 - b) Service organizations
 - i) Civic (e.g. Lions, Rotary)
 - ii) Religious (e.g. Knights of Columbus, Salvation Army)
 - iii) Volunteer (e.g. Red Cross, Community Emergency Response Team (CERT), Fire Corps)
- 2) Verbal and nonverbal communication
 - a) Verbal communication
 - i) Voice inflection
 - ii) Appropriate/common terminology
 - iii) Tone of voice
 - iv) Have a specific purpose
 - v) Be clear and concise
 - vi) Be focused
 - b) Nonverbal communication
 - i) Eye contact
 - ii) Body language
 - iii) Facial expressions
 - iv) Appropriate appearance
- 3) An understanding of the role and mission of the department

Requisite Skills: Familiarity with public relations and the ability to communicate verbally.

901-4.3.2 Initiate action to a citizen's concern, given policies and procedures, so that the concern is answered or referred to the correct individual for action and all policies and procedures are complied with.

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Requisite Knowledge: Interpersonal relationships and verbal and nonverbal communication.

- 1) Interpersonal relationships
 - a) Blake and Mouton's Managerial Grid
 - b) Maslow's Hierarchy of Needs
- 2) Verbal and nonverbal communication
 - a) Verbal communication
 - i) Voice inflection
 - ii) Appropriate/common terminology
 - iii) Tone of voice
 - iv) Have a specific purpose
 - v) Be clear and concise
 - vi) Be focused
 - b) Nonverbal communication
 - i) Eye contact
 - ii) Body language
 - iii) Facial expressions
 - iv) Appropriate appearance

Requisite Skills: Familiarity with public relations and the ability to communicate verbally.

- 901-4.3.3** Respond to a public inquiry, given policies and procedures, so that the inquiry is answered accurately, courteously, and in accordance with applicable policies and procedures.

Requisite Knowledge: Written and oral communication techniques.

- 1) Written communication techniques
 - a) Consider the reader
 - b) Emphasis
 - c) Concise
 - d) Simplicity
 - e) Summarize
- 2) Oral communication techniques
 - a) Voice inflection
 - b) Appropriate/common terminology
 - c) Tone of voice
 - d) Have a specific purpose

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- e) Be clear and concise
- f) Be focused

Requisite Skills: The ability to relate interpersonally and to respond to public inquiries.

901-4.4 Administration

This duty involves general administrative functions and the implementation of departmental policies and procedures at the unit level, according to the following job performance requirements.

- 901-4.4.1** Recommend changes to existing departmental policies and/or implement a new departmental policy at the unit level, given a new departmental policy, so that the policy is communicated to and understood by unit members.

Requisite Knowledge: Written and oral communication.

- 1) Written communication techniques
 - a) Consider the reader
 - b) Emphasis
 - c) Concise
 - d) Simplicity
 - e) Summarize
- 2) Oral communication techniques
 - a) Voice inflection
 - b) Appropriate/common terminology
 - c) Tone of voice
 - d) Have a specific purpose
 - e) Be clear and concise
 - f) Be focused

Requisite Skills: The ability to relate interpersonally and to communicate change in a positive manner.

- 901-4.4.2** Execute routine unit-level administrative functions, given forms and record-management systems, so that the reports and logs are complete and files are maintained in accordance with policies and procedures.

Requisite Knowledge: Administrative policies and procedures and records management.

- 1) Administrative policies and procedures - AHJ

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- 2) Records management
 - a) Paper-based
 - b) Electronic
 - c) Record retention requirements
 - d) Storage and security

Requisite Skills: The ability to communicate orally and in writing.

- 901-4.4.3** Prepare a budget request, given a need and budget forms, so that the request is in the proper format and is supported with data.

Requisite Knowledge: Policies and procedures and the revenue sources and budget process.

- 1) Policies and procedures - AHJ
- 2) Revenue sources
 - a) Taxes
 - b) Trust funds
 - c) Enterprise funds
 - d) Grants/gifts
 - e) Restricted funds
- 3) Budget process - AHJ

Requisite Skill: The ability to communicate in writing.

- 901-4.4.4** Explain the purpose of each management component of the organization, given an organization chart, so that the explanation is current and accurate and clearly identifies the purpose and mission of the organization.

Requisite Knowledge: Organizational structure of the department and functions of management.

- 1) Organizational structure of the department
 - a) Scalar structure
 - b) Line and staff personnel
 - c) Decision making authority
- 2) Functions of management
 - a) Planning
 - b) Organizing

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- c) Leading
 - d) Controlling
- 3) Principles of organization
- a) Unity of command
 - b) Span of control
 - c) Division of labor
 - d) Discipline

Requisite Skills: The ability to communicate verbally in a clear and concise manner.

- 901-4.4.5** Explain the needs and benefits of collecting incident response data, given the goals and mission of the organization, so that incident response reports are timely and accurate.

Requisite Knowledge: The agency's records management system.

- 1) NFIRS
- 2) TXFIRS
- 3) Report development
 - a) Completeness
 - b) Clarity
 - c) Objectivity
 - d) Factuality

Requisite Skills: The ability to communicate both orally and in writing.

901-4.5 Inspection and Investigation

This duty involves conducting inspections to identify hazards and address violations, performing a fire investigation to determine preliminary cause, securing the incident scene, and preserving evidence, according to the following job performance requirements.

901-A.4.5 The committee's intent is to instill an awareness of those areas that officers might address in the performance of their duties. Organizations that desire higher levels of competency in these areas should refer to the applicable NFPA professional qualifications standards: NFPA 1031 and NFPA 1033.

- 901-4.5.1** Describe the procedures of the AHJ for conducting fire inspections, given any of the following occupancies, so that all hazards, including hazardous

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materials, are identified, approved forms are completed, and approved action is initiated:

- 1) Assembly
- 2) Educational
- 3) Health care
- 4) Detention and correctional
- 5) Residential
- 6) Mercantile
- 7) Business
- 8) Industrial
- 9) Storage
- 10) Unusual structures
- 11) Mixed occupancies

Requisite Knowledge: Inspection procedures; fire detection, alarm, and protection systems; identification of fire and life safety hazards; and marking and identification systems for hazardous materials.

- 1) Inspection procedures
- 2) Fire detection, alarm and protection systems
- 3) Identification of fire and life safety hazards
- 4) Marking and identification systems for hazardous materials

Requisite Skills: The ability to communicate in writing and to apply the appropriate codes and standards.

901-4.5.2 Identify construction, alarm, detection, and suppression features that contribute to or prevent the spread of fire, heat, and smoke throughout the building or from one building to another, given an occupancy, and the policies and forms of the AHJ so that a pre-incident plan for any of the following occupancies is developed:

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- 1) Public assembly
- 2) Educational
- 3) Institutional
- 4) Residential
- 5) Business
- 6) Industrial
- 7) Manufacturing
- 8) Storage
- 9) Mercantile
- 10) Special properties

Requisite Knowledge: Fire behavior; building construction; inspection and incident reports; detection, alarm, and suppression systems; and applicable codes, ordinances, and standards.

- 1) Fire behavior
 - a) Fire load
 - b) Fire classifications (A, B, C, D, K)
- 2) Building construction
 - a) Type I – fire resistive
 - b) Type II – non-combustible
 - c) Type III – ordinary
 - d) Type IV – heavy timber (mill)
 - e) Type V – wood frame
- 3) Inspection and incident reports
 - a) Occupancy type
 - b) Required fire flow
 - c) Special hazards (i.e., hazardous materials or life safety)
- 4) Detection, alarm and suppression systems
 - a) Basic fire protection systems and features
 - b) Sprinkler systems
 - c) Standpipe systems

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- d) Alert/detection systems
- e) Other special extinguishing systems
- f) Fire Department Connections (FDC)
- g) Water supplies

5) Applicable codes, ordinances and standards (AHJ)

Requisite Skills: The ability to use evaluative methods and to communicate orally and in writing.

901-4.5.3 Secure an incident scene, given rope or barrier tape, so that unauthorized persons can recognize the perimeters of the scene and are kept from restricted areas, and all evidence or potential evidence is protected from damage or destruction.

Requisite Knowledge: Types of evidence, the importance of fire scene security, and evidence preservation.

- 1) Types of evidence
 - a) Demonstrative
 - b) Documentary/circumstantial
 - c) Testimonial
- 2) The importance of fire scene security
 - a) Evidence protection
 - b) Public safety
- 3) Evidence preservation
 - a) Chain of custody
 - b) Contributes to prosecution
 - c) Use of caution during salvage and overhaul

Requisite Skills: The ability to establish perimeters at an incident scene.

901-4.6 **Emergency Service Delivery**
This duty involves supervising emergency operations, conducting pre-incident planning, and deploying assigned resources in accordance with the local emergency plan and according to the following job performance requirements.

901-A.4.6 **Emergency service delivery is the component of fire department organization providing mitigation of responses to emergency incidents, such as those involving fires, emergency medical**

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situations, mass casualties, hazardous materials, weapons of mass destruction, and terrorism, as well as other emergency events.

- 901-4.6.1** Develop an initial action plan, given size-up information for an incident and assigned emergency response resources, so that resources are deployed to control the emergency.

Requisite Knowledge: Elements of a size-up, standard operating procedures for emergency operations, and fire behavior.

A.4.6.1(A) Size-up includes the many variables that the officer observes from the time of the alarm, during response, and upon arrival in order to develop an initial action plan to control an emergency incident. These observations can include building type and occupancy, fire involvement, number of occupants, atmospheric and environmental monitoring, mechanism of injury, materials spilled or involved in fire, damage to buildings and infrastructure, wind direction, topography, and demographics, among others.

- 1) Elements of a size-up
 - a) Size-up includes the many variables that the officer observes from the time of the alarm, during response, and upon arrival, in order to develop an initial action plan to control an emergency incident.
 - i) Size up processes
 - (1) Layman's 5-step process
 - (2) National Fire Academy (NFA) size-up system
 - b) Size-up elements
 - i) Building type and occupancy
 - ii) Demographics
 - iii) Fire and smoke conditions
 - iv) Materials spilled or involved in fire
 - v) Modes of action
 - (1) Defensive
 - (2) Offensive
 - (3) Transition
 - vi) Number of occupants
 - vii) Time of day
 - viii) Water supply
 - ix) Weather
 - x) Other hazards
- 2) Standard operating procedures for emergency operations - AHJ

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- 3) Fire behavior
 - a) Fire load
 - b) Fire classifications (A, B, C, D, K)
 - c) Phase of fire
 - d) Percentage involvement

Requisite Skills: The ability to analyze emergency scene conditions; to activate the local emergency plan, including localized evacuation procedures; to allocate resources; and to communicate orally.

A.4.6.1(B) The Fire Officer I should be able to perform an all-hazards assessment at incidents in accordance with policies and procedures of the AHJ.

- 901-4.6.2** Implement an action plan at an emergency operation, given assigned resources, type of incident, and a preliminary plan, so that resources are deployed to mitigate the situation.

901-A.4.6.2 This requirement takes into consideration the officer's ability to give orders, direct personnel, evaluate information, and allocate resources to respond to the wide variety of emergency situations the fire service encounters.

Requisite Knowledge: Standard operating procedures, resources available for the mitigation of fire and other emergency incidents, an incident management system, scene safety, and a personnel accountability system.

- 1) Standard operating procedures - AHJ
- 2) Resources available for the mitigation of fire and other emergency incidents
 - a) Single company
 - b) One alarm
 - c) Multiple alarm
 - d) Mutual aid
 - e) Automatic aid
- 3) An incident management system
 - a) National Incident Management System (NIMS)
 - b) Incident Command System
- 4) Scene safety
 - a) Rapid intervention/backup team

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- b) Two-in/two-out
- c) Incident safety officer

5) Personnel accountability system

Requisite Skills: The ability to implement an incident management system, to communicate orally, to manage scene safety, and to supervise and account for assigned personnel under emergency conditions.

901-4.6.3 Develop and conduct a post-incident analysis, given a single unit incident and post-incident analysis policies, procedures, and forms, so that all required critical elements are identified and communicated, and the approved forms are completed and processed in accordance with policies and procedures.

Requisite Knowledge: Elements of a post-incident analysis, basic building construction, basic fire protection systems and features, basic water supply, basic fuel loading, fire growth and development, and departmental procedures relating to dispatch response tactics and operations and customer service.

- 1) Elements of a post-incident analysis
 - a) Reconstruct the incident to establish a clear picture of the events surrounding the incident
 - b) Non-punitive
 - c) Focus on improving emergency response
- 2) Basic building construction
 - a) Construction type
 - b) Occupancy type
- 3) Basic fire protection systems and features
 - a) Sprinkler systems
 - b) Standpipe systems
 - c) Alert/detection systems
 - d) Other special extinguishing systems
- 4) Basic water supply
 - a) Determine location(s) of water supplies
 - b) Fire Department Connections (FDC)
 - c) Determine required fire flow
- 5) Basic fuel loading

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- a) Hazard class of material
 - b) Quantity of material
 - c) Location/distribution of material
- 6) Fire growth and development
- a) Phase of fire
 - b) External growth factors (e.g., weather, loss of water supply, incendiary, etc.)
- 7) Departmental procedures relating to dispatch response tactics and operations – AHJ
- 8) Customer service – AHJ

Requisite Skills: The ability to write reports, to communicate orally, and to evaluate skills.

901-4.7 Health and Safety

This duty involves integrating health and safety plans, policies, and procedures into daily activities as well as the emergency scene, including the donning of appropriate levels of personal protective equipment to ensure a work environment that is in accordance with health and safety plans for all assigned members, according to the following job performance requirements.

901-A.4.7 One of the fire officer's primary responsibilities is safety both on the fire ground and during normal operations. The fire officer must be cognizant that these operations can include risks and threats of intentional harm to personnel. This standard defines the minimum requirements for the fire officer. NFPA 1521 and applicable OSHA regulations define additional requirements for the officer who might be assigned those duties.

- 901-4.7.1** Apply safety regulations at the unit level, given safety policies and procedures, so that required reports are completed, in-service training is conducted, and member responsibilities are conveyed.

Requisite Knowledge: The most common causes of personal injury and accident to members, safety policies and procedures, basic workplace safety, and the components of an infectious disease control program.

- 1) The most common causes of personal injury and accident to members
 - a) Improper lifting
 - b) Falls

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- c) Improper use of, or lack of Personal Protective Equipment (PPE)
 - d) Other causes
- 2) Safety policies and procedures
- a) Federal (e.g. Occupational Safety and Health Administration (OSHA))
 - b) State (e.g. Texas Commission on Fire Protection (TCFP))
 - c) Local (e.g. standard operating policies)
 - d) National Consensus Standards (e.g. National Fire Protection Association (NFPA))
- 3) Basic workplace safety
- a) Wear Personal Protective Equipment (PPE)
 - b) Good housekeeping
 - c) Good maintenance
 - d) Follow manufacturer's recommendations
 - e) Implement and provide ongoing safety training program
- 4) The components of an infectious disease control program
- a) Written goal
 - b) Written risk management plan
 - c) Annual training
 - d) Designated control officer
 - e) Immunizations for employees
 - f) Exposure procedures
 - g) Other state and public health authority requirements

Requisite Skills: The ability to identify safety hazards and to communicate orally and in writing.

- 901-4.7.2** Conduct an initial accident investigation, given an incident and investigation forms, so that the incident is documented and reports are processed in accordance with policies and procedures of the AHJ.

Requisite Knowledge: Procedures for conducting an accident investigation and safety policies and procedures.

- 1) Procedures for conducting an accident investigation
 - a) Identify and collect physical evidence
 - b) Interview witnesses
 - c) Complete required written documents

- 2) Safety policies and procedures - AHJ

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Requisite Skills: The ability to communicate orally and in writing and to conduct interviews.

- 901-4.7.3** Explain the benefits of being physically and medically capable of performing assigned duties and effectively functioning during peak physical demand activities, given current fire service trends and agency policies, so that the need to participate in wellness and fitness programs is explained to members.

Requisite Knowledge: National death and injury statistics; fire service safety and wellness initiatives; agency policies.

- 1) National death and injury statistics
 - a) NIOSH reports
 - b) NFPA reports
 - c) US Fire Administration/National Fire Academy

- 2) Fire service safety and wellness initiatives
 - a) National Fallen Firefighters Foundation, Courage To Be Safe
 - b) International Association of Firefighters/International Association of Fire Chiefs Joint Wellness Initiative

- 3) Agency policies
 - a) Local
 - b) State
 - c) Federal

Requisite Skills: The ability to communicate orally.

CHAPTER NINE
FIRE OFFICER II
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
902-5.1	General	1
902-5.2	Human Resources Management	10
902-5.3	Community and Government Relations	3
902-5.4	Administration	10
902-5.5	Inspection and Investigation	10
902-5.6	Emergency Service Delivery	8
902-5.7	Health and Safety	6
	Performance Skills*	12
	TOTAL RECOMMENDED HOURS	60

*The recommended hours for skills evaluation is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

REFERENCE LIST FOR THE FIRE OFFICER II CURRICULUM

Certified Training Facilities approved to teach this curriculum, must have the following reference materials:

Fire and Emergency Service Company Officer (4th Ed) (2007) Stillwater, OK:
International Fire Service Training Association

Fire Officer Principles and Practice (2nd Ed) (2010). Sudbury, MA: Jones and Bartlett
Publishers, Inc.

NFPA 1021: Standard for Fire Officer Professional Qualifications (2013 Ed.) Quincy,
MA: National Fire Protection Association. NFPA Publications

Standards Manual for Fire Protection Personnel Austin, TX: Texas Commission on Fire
Protection.

FIRE OFFICER II

A Fire Officer II is a midlevel supervisor who performs both supervisory and first-line managerial functions who has met all the job performance and certification requirements of Fire Officer I as defined in NFPA 1021, *Standard for Fire Officer Professional Qualifications*. An individual at the Fire Officer II level as part of his or her duties and responsibilities:

- Evaluates member job performance
- Prepares a project or divisional budget, news releases, and/or new policy or changes in existing policies
- Conducts inspections to identify hazards and addresses violations and conducts fire investigations to determine origin and preliminary causes
- Supervises multi-unit emergency operations, deploys assigned resources, and develops and conducts post-incident analysis
- Reviews injury, accident, and health exposure reports, identifies unsafe work environments or behaviors, and takes approved action to prevent their reoccurrence

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902-5.1 General

For qualification at Level II, the Fire Officer I shall meet the requirements of Fire Instructor I as defined in NFPA 1041 and the job performance requirements defined in Sections 5.2 through 5.7 of this standard.

902-5.1.1 General Prerequisite Knowledge

The organization of local government; enabling and regulatory legislation and the law-making process at the local, state/provincial, and federal levels; and the functions of other bureaus, divisions, agencies, and organizations and their roles and responsibilities that relate to the fire service.

902-A.5.1.1 Other prerequisite knowledge can include an understanding of negligent hiring, negligent supervision, negligent retention; respondeat superior; understanding of tort claims acts, sovereign immunity, statutory immunity, special duty, public duty; and knowledge of OSHA standards and citations and strategies for compliance with OSHA documentation requirements.

902-5.1.2 General Prerequisite Skills:

Intergovernmental and interagency cooperation.

902-5.2 Human Resource Management

This duty involves evaluating member performance, according to the following job performance requirements.

902-5.2.1 Initiate actions to maximize member performance and/or to correct unacceptable performance, given human resource policies and procedures, so that member and/or unit performance improves or the issue is referred to the next level of supervision.

Requisite Knowledge: Human resource policies and procedures, problem identification, organizational behavior, group dynamics, leadership styles, types of power, and interpersonal dynamics.

- 1) Human resource policies and procedures
 - a) Federal (e.g. Americans with Disabilities Act)
 - b) State (e.g. Local Government Code)
 - c) Local/Authority Having Jurisdiction (AHJ) (e.g. city policies)
 - d) Departmental (e.g. departmental policies)

- 2) Problem identification
 - a) Performance
 - b) Behavior

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- 3) Organizational behavior
 - a) Acceptable/unacceptable job performance
 - b) Acceptable/unacceptable behavior
 - c) Culture
 - d) Change/status quo

- 4) Group dynamics
 - a) Common binding interest
 - b) Vital group image
 - c) Sense of continuity
 - d) Shared set of values
 - e) Different roles within the group

- 5) Leadership styles
 - a) Autocratic
 - b) Democratic
 - c) Laissez-faire

- 6) Types of power
 - a) Reward
 - b) Coercive
 - c) Identification
 - d) Expert
 - e) Legitimate
 - f) Informal

- 7) Interpersonal dynamics
 - a) Blake and Mouton's Managerial Grid
 - b) Maslow's Hierarchy of Needs
 - c) Others

Requisite Skills: The ability to communicate orally and in writing, to solve problems, to increase team work, and to counsel members.

- 902-5.2.2** Evaluate the job performance of assigned members, given personnel records and evaluation forms, so each member's performance is evaluated accurately and reported according to human resource policies and procedures.

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Requisite Knowledge: Human resource policies and procedures, job descriptions, objectives of a member evaluation program, and common errors in evaluating.

- 1) Human resource policies and procedures
 - a) Federal (e.g. Fair Labor Standards Act)
 - b) State (e.g. Local Government Code)
 - c) Local/Authority having jurisdiction (e.g. city policies)
 - d) Departmental (e.g. departmental policies)

- 2) Job descriptions
 - a) General description of work
 - b) Typical tasks
 - c) Knowledge, skills and abilities
 - d) Education and experience
 - e) Special requirements
 - f) Future requirements

- 3) Objectives of a member evaluation program
 - a) Accuracy
 - b) Fairness
 - c) Consistency
 - d) Thoroughness
 - e) Identify areas of excellence or improvement
 - f) Document member's work history

- 4) Common errors in evaluating
 - a) Halo/Horn effect
 - b) Central tendency
 - c) Contrast effect
 - d) Leniency or severity
 - e) Personal bias
 - f) Recency
 - g) Frame of reference

Requisite Skills: The ability to communicate orally and in writing and to plan and conduct evaluations.

- 902-5.2.3** Create a professional development plan for a member of the organization, given the requirements for promotion, so that the individual acquires the necessary knowledge, skills, and abilities to be eligible for the examination for the position.

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Requisite Knowledge: Development of a professional development guide and job shadowing.

- 1) Development of a professional development guide (AHJ)
 - a) Education
 - b) Experience
 - c) Certifications
 - d) Personal development
- 2) Job shadowing
 - a) Mentoring
 - b) Peer assistance

Requisite Skills: The ability to communicate orally and in writing.

902-5.3 Community and Government Relations

This duty involves dealing with inquiries of allied organizations in the community and projecting the role, mission, and image of the department to other organizations with similar goals and missions for the purpose of establishing strategic partnerships and delivering safety, injury, and fire prevention education programs, according to the following job performance requirements.

- 902-5.3.1** Explain the benefits to the organization of cooperating with allied organizations, given a specific problem or issue in the community, so that the purpose for establishing external agency relationships is clearly explained.

Requisite Knowledge: Agency mission and goals and the types and functions of external agencies in the community.

- 1) Agency (fire department) mission and goals
 - a) Mission statement
 - b) Strategic plan
- 2) Types and functions of external agencies in the community
 - a) Law enforcement
 - b) EMS/hospitals/clinics
 - c) Municipal/county/state departments
 - d) Local business and industry
 - e) Private non-profit organizations
 - f) Local/state/federal agencies

Requisite Skills: The ability to develop interpersonal relationships and to communicate orally and in writing.

902-5.4 Administration

This duty involves preparing a project or divisional budget, news releases, and policy changes, according to the following job performance requirements.

902-5.4.1 Develop a policy or procedure, given an assignment, so that the recommended policy or procedure identifies the problem and proposes a solution.

Requisite Knowledge: Policies and procedures and problem identification.

- 1) Policies and procedures
 - a) Develop policies/procedures
 - b) Train members
 - c) Implement policies/procedures
 - d) Evaluate/revise policies/procedures
- 2) Problem identification
 - a) Be attentive
 - b) Ask questions
 - c) Encourage subordinates to report problems

Requisite Skills: The ability to communicate in writing and to solve problems.

902-5.4.2 Develop a project or divisional budget, given schedules and guidelines concerning its preparation, so that capital, operating, and personnel costs are determined and justified.

Requisite Knowledge: The supplies and equipment necessary for ongoing or new projects; repairs to existing facilities; new equipment, apparatus maintenance, and personnel costs; and appropriate budgeting system.

- 1) The supplies and equipment necessary for ongoing or new projects (AHJ)
- 2) Repairs to existing facilities
 - a) Structural

- b) Remodel
 - c) Additions
- 3) New equipment
- a) Repair
 - b) Replace
 - c) Upgrade
- 4) Apparatus maintenance
- a) Preventative
 - b) Repair
 - c) Replace
 - d) Upgrade
- 5) Personnel costs
- a) Salary
 - i. Straight time
 - ii. Compensatory time
 - iii. Overtime
 - b) Benefits (AHJ)
- 6) Appropriate budgeting system (AHJ)

Requisite Skill: The ability to allocate finances, to relate interpersonally, and to communicate orally and in writing.

902-5.4.3 Describe the process of purchasing, including soliciting and awarding bids, given established specifications, in order to ensure competitive **bidding so that the needs of the organization are met within the applicable federal, state/provincial, and local laws and regulations.**

Requisite Knowledge: Purchasing laws, policies, and procedures.

- 1) Purchasing laws
- a) Local
 - b) State
 - c) Federal
- 2) Policies and procedures (AHJ)

Requisite Skills: The ability to use evaluative methods and to communicate orally and in writing.

902-5.4.4 Prepare a news release, given an event or topic, so that the information is accurate and formatted correctly.

Requisite Knowledge: Policies and procedures and the format used for news releases.

- 1) Policies and procedures (AHJ)
- 2) Format used for news releases
 - a) Oral interview
 - i. Be prepared
 - ii. Stay in control
 - iii. Look and act the part
 - iv. It is not over until it is over
 - b) Written
 - i. Formulate a plan
 - ii. Develop a concept and write the release
 - iii. Make it unique
 - iv. Well organized
 - v. Department letterhead
 - vi. Release news to the media

Requisite Skills: The ability to communicate orally and in writing.

902-5.4.5 Prepare a concise report for transmittal to a supervisor, given fire department record(s) and a specific request for details such as trends, variances, or other related topics, **so that the information required for the AHJ is accurate and documented.**

Requisite Knowledge: The data processing system.

- 1) Word processing software
- 2) Spreadsheet software
- 3) Presentation software
- 4) Database software

Requisite Skills: The ability to communicate in writing and to interpret data.

- 902-5.4.6** Develop a plan to accomplish change in the organization, given an agency's change of policy or procedures, so that effective change is implemented in a positive manner.

Requisite Knowledge: Planning and implementing change.

- 1) Planning change
 - a) Analyze
 - b) Resistance
- 2) Implementing change
 - a) Involvement
 - b) Support
- 3) Evaluating change
 - a) Review
 - b) Monitor
 - c) Analyze

Requisite Skills: The ability to clearly communicate orally and in writing.

902-5.5 **Inspection and Investigation**

This duty involves conducting fire investigations to determine origin and preliminary cause, according to the following job performance requirements.

- 902-5.5.1** Determine the point of origin and preliminary cause of a fire, given a fire scene, photographs, diagrams, pertinent data, and/or sketches, to determine if arson is suspected **so that law enforcement action is taken.**

Requisite Knowledge: Methods used by arsonists, common causes of fire, basic cause and origin determination, fire growth and development, and documentation of preliminary fire investigative procedures.

- 1) Methods used by arsonists
 - a) Disabling built-in fire protection
 - b) Delaying notification/making access difficult
 - c) Using accelerants and trailers
 - d) Setting multiple points of origin
 - e) Tampering or altering equipment
- 2) Common causes of fire
 - a) Accidental

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- b) Natural
 - c) Incendiary/Suspicious
 - d) Undetermined
- 3) Basic cause and origin determination
- a) Basic fire chemistry/sciences
 - b) Area of origin
 - c) Fire patterns
 - d) Legal considerations
- 4) Fire growth and development
- 5) Documentation of preliminary fire investigative procedures
- a) AHJ
 - b) National Fire Incident Reporting System (NFIRS)
 - c) NFPA 921 Guide for Fire and Explosion Investigations

Requisite Skills: The ability to communicate orally and in writing and to apply knowledge using deductive skills.

902-5.6 Emergency Service Delivery

This duty involves supervising multi-unit emergency operations, conducting pre-incident planning, and deploying assigned resources, according to the following job requirements.

- 902-5.6.1** Produce operational plans, given an emergency incident requiring multi-unit operations, the current edition of NFPA 1600, and AHJ-approved safety procedures, so that required resources and their assignments are obtained and plans are carried out in compliance with NFPA 1600 and approved safety procedures resulting in the mitigation of the incident.

Requisite Knowledge: Standard operating procedures; national, state/provincial, and local information resources available for the mitigation of emergency incidents; an incident management system; and a personnel accountability system.

- 1) Standard operating procedures (AHJ)
- 2) National, state/provincial, and local information resources available for the mitigation of emergency incidents
- 3) An incident management system
 - a) National Incident Management System (NIMS)

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b) Incident Command System

4) A personnel accountability system (AHJ)

Requisite Skills: The ability to implement an incident management system, to communicate orally, to supervise and account for assigned personnel under emergency conditions, and to serve in command staff and unit supervision positions within the Incident Management System.

902-5.6.2 Develop and conduct a post-incident analysis, given multi-unit incident and post-incident analysis policies, procedures, and forms, so that all required critical elements are identified and communicated and the approved forms are completed and processed.

Requisite Knowledge: Elements of a post-incident analysis, basic building construction, basic fire protection systems and features, basic water supply, basic fuel loading, fire growth and development, and departmental procedures relating to dispatch response, strategy tactics and operations, and customer service.

- 1) Elements of a post-incident analysis
 - a) Reconstruct the incident to establish a clear picture of the events surrounding the incident
 - b) Non-punitive
 - c) Focus on improving emergency response
- 2) Basic building construction
 - a) Construction type
 - b) Occupancy type
- 3) Basic fire protection systems and features
 - a) Sprinkler systems
 - b) Standpipe systems
 - c) Alert/detection systems
 - d) Other special extinguishing systems
- 4) Basic water supply
 - a) Pressurized sources
 - b) Drafting points
 - c) Fire department connections (FDC)
- 5) Basic fuel loading
 - a) Based on hazard class

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- b) Occupancy type
- 6) Fire growth and development
 - a) Basic fire chemistry/science
 - b) Fire spread
- 7) Departmental procedures relating to dispatch response tactics and operations (AHJ)
- 8) Customer service (AHJ)

Requisite Skills: The ability to write reports, to communicate orally, and to evaluate skills.

- 902-5.6.3** Prepare a written report, given incident reporting data from the jurisdiction, so that the major causes for service demands are identified for various planning areas within the service area of the organization.

Requisite Knowledge: Analyzing data.

- 1) Analyze and interpret incident data
- 2) Needs analysis
- 3) Intended audience
- 4) Report format

Requisite Skills: The ability to write clearly and to interpret response data correctly to identify the reasons for service demands.

- 902-5.7** **Health and Safety**
This duty involves reviewing injury, accident, and health exposure reports, identifying unsafe work environments or behaviors, and taking approved action to prevent reoccurrence, according to the following job requirements.

- 902-5.7.1** Analyze a member's accident, injury, or health exposure history, given a case study, so that a report including action taken and recommendations made is prepared for a supervisor.

Requisite Knowledge: The causes of unsafe acts, health exposures, or conditions that result in accidents, injuries, occupational illnesses, or deaths.

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- 1) The causes of unsafe acts
 - a) Human factors
 - i. Improper attitude
 - ii. Lack of knowledge or skill
 - iii. Physically/mentally unsuited
 - b) Environmental factors
 - i. Weather
 - ii. Hazardous
 - iii. Lighting
 - c) Equipment factors
 - i. Malfunction
 - ii. Improper usage
 - d) Review member's accident history

- 2) Health exposures
 - a) Human factors
 - i. Improper attitude
 - ii. Lack of knowledge or skill
 - iii. Physically/mentally unsuited
 - b) Environmental factors
 - i. Weather
 - ii. Hazardous
 - iii. Lighting
 - c) Equipment factors
 - i. Malfunction
 - ii. Improper usage
 - d) Review member's health exposure history

- 3) Conditions that result in accidents, injuries, occupational illness, or deaths
 - a) Unsafe acts
 - i. Skill based errors
 - ii. Memory failure
 - iii. Technique failure
 - b) Preconditions to unsafe acts
 - i. Adverse mental states
 - ii. Psychological states
 - iii. Physical limitations
 - c) Unsafe supervision
 - i. Inadequate supervision
 - ii. Inappropriate operations
 - iii. Failure to correct known problems
 - iv. Supervisory violations

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Requisite Skills: The ability to communicate in writing and to interpret accidents, injuries, occupational illnesses, or death reports.

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CHAPTER NINE
FIRE OFFICER III
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
903-6.1	General	2
903-6.2	Human Resource Management	10
903-6.3	Community and Government Relations	4
903-6.4	Administration	10
903-6.5	Inspection and Investigation	4
903-6.6	Emergency Service Delivery	6
903-6.7	Health and Safety	4
903-6.8	Emergency Management	4
	Performance Skills*	12
	TOTAL RECOMMENDED HOURS	56

*The recommended hours for skills evaluation is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

REFERENCE LIST FOR THE FIRE OFFICER III CURRICULUM

Certified Training Facilities approved to teach this curriculum must have the following reference materials:

Chief Officer (1st Ed) (2012). Burlington, MA: Jones and Bartlett Learning.

Chief Officer (2nd Ed) (2004). Stillwater, OK: International Fire Service Training Association

National Incident Management System: Principles and Practice (2nd Ed) (2012). Sudbury, MA: Jones and Bartlett Publishers, Inc.

NFPA 1021: Standard for Fire Officer Professional Qualifications (2013 Ed.). Quincy, MA: National Fire Protection Association. NFPA Publications

Officer Development Handbook (2nd Ed) (2010). Fairfax, VA: International Association of Fire Chiefs.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

FIRE OFFICER III

A Fire Officer III is a midlevel supervisor who performs both supervisory and first-line managerial functions who has met all the job performance and certification requirements of Fire Officer II as defined in NFPA 1021, *Standard for Fire Officer Professional Qualifications*. An individual at the Fire Officer III level as part of his or her duties and responsibilities:

- Establishes procedures for hiring, assigning, promoting, and encouraging professional development of members
- Develops programs that improve and expand service and build partnerships with the public
- Prepares a divisional or departmental budget, develops a budget management system, solicits bids, plans for resource allocation and works with information management systems
- Evaluates inspection programs to determine effectiveness and develops public safety plans
- Manages multi-agency planning, deployment, and operations
- Develops, manages and evaluates a departmental safety program

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903-6.1 **General**

For qualification at Fire Officer Level III, the Fire Officer II shall meet the requirements of Fire Instructor Level II as defined in NFPA 1041 and the job performance requirements defined in Sections 6.2 through 6.8 of NFPA 1021, 2009 Edition.

Fire Officer III certification prerequisites include:

- Fire Officer II
- Fire Instructor II

903-6.1.1 **General Prerequisite Knowledge.** Current national and international trends and developments related to fire service organization, management, and administrative principles, **as well as** public and private organizations that support the fire and emergency services and the functions of each.

903-A.6.1.1 **Other prerequisite knowledge can include an understanding of workers' compensation, civil service system, role of courts (civil suit, criminal proceedings, appeals, review of administrative decisions); criminal liability for offenses such as manslaughter and negligent homicide; EEO laws and civil rights; open records and open meetings laws; and conflicts of interests and ethics.**

1. Functions of management
 - a. Planning
 - b. Organizing
 - c. Leading
 - d. Controlling
2. Basic problem solving model
 - a. Analyze
 - b. Plan
 - c. Implement
 - d. Evaluate
3. Planning process
 - a. Analyze opportunities
 - b. Identify goals and objectives
 - c. Identify possible solutions
 - d. Select best solution
 - e. Create plan
 - f. Implement plan
 - g. Monitor plan
 - h. Evaluate plan effectiveness
 - i. Provide feedback and revise

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4. Organizing
 - a. Organizational culture
 - i. Beliefs
 - ii. Values
 - iii. Norms
 - b. Trends
 - i. Traditional
 - a) Hierarchical/scalar
 - b) Bureaucratic
 - ii. New trends
 - a) Flat organizations
 - b) Regionalization
 - c) Flexibility

5. Leadership styles
 - a. Charismatic
 - b. Situational
 - c. Contingency
 - d. Citizen
 - e. Servant
 - f. Chameleon
 - g. Transformational/transactional leadership continuum

6. Fire Service Leadership Model
 - a. Lead from the front
 - b. Effectively communicate
 - c. Advise, mentor and counsel
 - d. Decide, act and evaluate
 - e. Envision the future
 - f. Remain flexible
 - g. Share your knowledge
 - h. Honesty is always right
 - i. Invest in your personnel
 - j. Prepare to fail, if you fail to prepare

7. Controlling
 - a. Organizational behavior
 - i. Performance reviews
 - ii. Policies, procedures, rules, regulations
 - b. Fiscal oversight
 - i. Budget process
 - ii. Purchasing process
 - iii. Audits
 - c. Other

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- i. Capital improvement plans
- ii. Strategic plan
- iii. Emergency management plans
- iv. Information management

8. Fire Officer III Functions
 - a. Human resource management
 - b. Community and government relations
 - c. Administration
 - d. Inspection and investigation
 - e. Emergency service delivery
 - f. Health and safety

903-6.1.2 General Prerequisite Skills. The ability to research, to use evaluative methods, to analyze data, to communicate orally and in writing, and to motivate members.

903-6.2 Human Resource Management

This duty involves establishing procedures for hiring, assigning, promoting, and encouraging professional development of members, according to the following job performance requirements.

1. Human resource management includes:
 - i. Hiring and promoting
 - ii. Recruitment, induction and retention
 - iii. Termination
 - iv. Discipline
 - v. Assigning/work force planning
 - vi. Time management
 - vii. Professional development training/education
 - viii. Health, safety, survival and wellness
 - ix. Compensation and benefits

903-6.2.1 Establish personnel assignments to maximize efficiency, given knowledge, training, and experience of the members available in accordance with policies and procedures, **so that human resources are used in an effective manner.**

Requisite Knowledge. Minimum staffing requirements, available human resources, and policies and procedures.

1. Minimum staffing requirements
 - a. Authority having jurisdiction (AHJ)
 - b. National consensus standards

- i. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*
 - ii. NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*
 - iii. NFPA 1500, *Standard for Fire Department Safety and Health Program*
 - iv. NFPA 1201, *Standard for Providing Emergency Services to the Public*
 - v. NFPA 1221, *Standard for the Installation, Maintenance and Use of Emergency Services Communication Systems*
 - vi. NFPA 1250, *Recommended Practice in Emergency Service Organization Risk Management*
 - vii. NFPA 1600, *Standard on Disaster/Emergency Management and Business Continuity Programs*
 - viii. NFPA 450, *Guide for Emergency Medical Services and Systems*
 - ix. NFPA 551, *Guide for the Evaluation of Fire Risk Assessments*
 - c. Contractual agreements
 - i. Collective bargaining
 - ii. Meet and confer
 - iii. Private sector contracts
2. Available human resources
 - a. Availability of skilled workers
 - b. Applicant pool is determined by:
 - i. Education
 - ii. Experience
 - iii. Certification
 - iv. Ability to perform
3. Policies and procedures
 - a. Legal requirements
 - i. Federal
 - ii. State
 - iii. Local
 - iv. AHJ

Requisite Skills. The ability to relate interpersonally and to communicate orally and in writing.

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- 903-6.2.2** Develop procedures for hiring members, given policies of the AHJ and legal requirements, so that the process is valid and reliable.
- Validity – effectiveness – measures what is supposed to be measured
 - Reliability – dependability – measures performance consistently

Requisite Knowledge. Applicable federal, state/provincial, and local laws; regulations and standards; and policies and procedures.

1. Applicable federal, state/provincial, and local laws
 - a. Federal
 - i. Civil Rights Act of 1964 (Title VII)
 - ii. Age Discrimination and Employment Act (ADEA)
 - iii. Americans With Disabilities Act (ADA)
 - b. State
 - i. Texas Commission on Fire Protection (TCFP) standards
 - ii. Local Government Code 143 (Civil Services)
 - iii. Health and Safety Code 775 (Emergency Services Districts)
 - iv. Texas Department of State Health Services (DSHS) – EMS requirements as applicable
 - v. Texas Commission on Law Enforcement Officers Standards and Education (TCLEOSE) – Peace Officer requirements for Arson Investigators
 - c. Local
 - i. AHJ
 - a) Local Government Code 143 – Local Rules
 - b) Health and Safety Code 775 – Local Rules
 - c) Local ordinances
2. Regulations
 - a. Texas Commission on Fire Protection (TCFP) standards
 - b. Local Government Code 143 (Civil Service)
 - c. Health and Safety Code 775 (Emergency Services Districts)
 - d. Texas Department of State Health Services (DSHS) – EMS requirements as applicable
 - e. Texas Commission on Law Enforcement Officers Standards and Education (TCLEOSE) – Peace Officer requirements for Arson Investigators
3. Standards – may be required by the AHJ
 - a. NFPA Professional Qualification Standards
 - b. NFPA Safety and Health Standards
4. Policies and procedures
 - a. Contractual agreements

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- b. Local policies, procedures, rules and regulations

Requisite Skills. The ability to communicate orally and in writing.

- 903-6.2.3** Develop procedures and programs for promoting members, given applicable policies and legal requirements, so that the process is valid and reliable, job-related, and nondiscriminatory.

Requisite Knowledge. Applicable federal, state/provincial, and local laws; regulations and standards; and policies and procedures.

1. Applicable federal, state/provincial, and local laws
 - a. Federal
 - i. Civil Rights Act of 1964 (Title VII)
 - ii. Age Discrimination and Employment Act (ADEA)
 - iii. Americans With Disabilities Act (ADA)
 - iv. Fair Labor Standards Act (FLSA)
 - v. Equal Pay Act of 1963
 - vi. Uniform Services Employment and Reemployment Rights Act (USERRA)
 - b. State
 - i. Texas Commission on Fire Protection (TCFP) standards - Head of Department designation only
 - ii. Local Government Code 143 (Civil Services)
 - c. Local
 - i. AHJ
 - a) Local Government Code 143 – Local Rules
 - b) Health and Safety Code 775 – Local Rules
 - c) Local ordinances
2. Regulations
 - a. Texas Commission on Fire Protection (TCFP) standards - Head of Department designation only
 - b. Local Government Code 143 (Civil Service)
3. Standards – may be required by the AHJ
 - a. NFPA Professional Qualification Standards
 - b. NFPA Safety and Health Standards
4. Policies and procedures
 - a. Contractual agreements
 - b. Local policies, procedures, rules and regulations

Requisite Skills. The ability to communicate orally and in writing, to encourage professional development, and to mentor members.

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903-6.2.4 Describe methods to facilitate and encourage members to participate in professional development to achieve their full potential, **given a professional development model, so that members achieve their personal and professional goals.**

Requisite Knowledge. Interpersonal and motivational techniques, **professional development model, goal setting, and personal and organizational goals.**

1. Interpersonal and motivational techniques

- a. Mentoring
- b. Coaching
- c. Role modeling
- d. Succession planning
- e. Encouraging participation
- f. Job rotation
- g. Special projects/assignments
- h. Specialized training
- i. Promotional opportunities
- j. Pay incentives
- k. Other compensation (e.g., department-issued vehicle)

2. Professional development model

- a. **National Fire Academy professional development model**
- b. **Professional development programs**
 - i. **National Fire Academy courses**
 - ii. **Texas Fire Chiefs Academy**
 - iii. **College and university degrees**
- c. **Accreditation and credentialing programs**
 - i. **NFA Executive Fire Officer Program**
 - ii. **TEEX Texas Fire Service Chief Executive Officer Program**
 - iii. **Chief Fire Officer Designation Program**

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- iv. **TCFP/IFSAAC Fire Officer III and Fire Officer IV certifications**
- d. **Professional organizations**
 - i. **International Association of Fire Chiefs**
 - ii. **Texas Fire Chiefs Association**
 - iii. **International Association of Fire Fighters**
 - iv. **Texas Association of Fire Educators**
 - v. **Texas State Firemen and Fire Marshals Association**
 - vi. **Other professional organizations and associations**
3. **Goal setting**
 - a. **Specific**
 - b. **Measurable**
 - c. **Acceptable**
 - d. **Realistic/attainable**
 - e. **Challenging**
 - f. **Rewarding**
4. **Personal and organizational goals**
 - a. **Short-term – months**
 - b. **Intermediate – months to one or two years**
 - c. **Long-term – three or more years**

Requisite Skills. The ability to evaluate potential, to communicate orally, and to counsel members.

- 903-6.2.5** Develop a proposal for improving an employee benefit, given a need in the organization, so that adequate information is included to justify the requested benefit improvement.

Required Knowledge. Agency's benefit program.

1. Insurance
2. Various accumulated leave (pay for time not worked)
3. Pay
4. Pension
5. Conditions of work
6. Incentive programs

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7. Employee/member assistance programs

Required Skills. The ability to conduct research and to communicate orally and in writing.

903-6.2.6 Develop a plan for providing an employee accommodation, given an employee need, the requirements, and applicable law, so that adequate information is included to justify the requested change(s).

Required Knowledge. Agency's policies and procedures, and legal requirements or reasonable accommodations.

1. Agency's policies and procedures
2. Legal requirements or reasonable accommodations
 - a. Civil Rights Act of 1964 (Title VII)
 - b. Age Discrimination and Employment Act (ADEA)
 - c. Americans With Disabilities Act (ADA)
 - d. Texas Commission on Fire Protection (TCFP) standards
 - e. Texas Workers' Compensation laws
 - f. Local AHJ

Required Skills. The ability to conduct research and to communicate orally and in writing.

903-6.2.7 Develop an ongoing education training program, given organizational training requirements, so that members of the organization are given appropriate training to meet the mission of the organization.

Required Knowledge. Agency mission and goals, training program development, and needs assessment.

1. Agency mission and goals (AHJ)
2. Training program development
 - a. Training program design
 - b. Developing training policies, records, and standards
 - c. Determining organizational training needs
 - d. Recruiting and selecting instructors
 - e. Scheduling training programs
 - f. Evaluating training programs and instructors
 - g. Providing budget and resource management
3. Needs assessment
 - a. Community or service area needs

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- b. Hazard assessment
- c. Risk analysis
- d. Improved operational efficiency
- e. Continuing education requirements
- f. New certification or training requirements
- g. Demographics (e.g., population, occupancy types, urban/suburban/rural/frontier, etc.)
- h. Fire department type

Required Skills. Ability to perform a needs assessment and to communicate orally and in writing.

903-6.3 **Community and Government Relations**

This duty involves developing programs that improve and expand service and build partnerships with the public, according to the following job performance requirements.

- 903-6.3.1** ~~Prepare community awareness programs to enhance the quality of life by developing nontraditional services that provide for increased safety, injury prevention, and convenient public services.~~ **Develop a community risk reduction program, given risk assessment data, so that program outcomes are met.**

Requisite Knowledge. Community demographics, resource availability, community needs, and customer service principles, **and program development.**

1. Community demographics
 - a. Age
 - b. Gender
 - c. Religion
 - d. Education
 - e. Cultural/ethnic/racial backgrounds
 - f. Income level
 - g. Population density
2. Resource availability
 - a. Staffing
 - b. Equipment, apparatus, and facilities
 - c. Funding
3. Community needs
 - a. Community hazard and risk analysis
 - b. Community threat profile

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- c. Urban/suburban/rural/frontier
- 4. Customer service principles
 - a. Caring attitude
 - b. Excellent technical service
- 5. **Program development**
 - a. **Conduct a Community Risk Analysis**
 - b. **Develop Community Partnerships**
 - c. **Create an Intervention Strategy**
 - d. **Implement the Strategy**
 - e. **Evaluate the results**

Requisite Skills. The ability to relate interpersonally, and to communicate orally and in writing, **and to analyze and interpret data.**

903-6.4 Administration

This duty involves preparing a divisional or departmental budget, developing a budget management system, soliciting bids, planning for resource allocation, and working with records management systems, according to the following job performance requirements.

- 903-6.4.1** Develop a divisional or departmental budget, given schedules and guidelines concerning its preparation, so that capital, operating, and personnel costs are determined and justified.

Requisite Knowledge. The supplies and equipment necessary for existing and new programs; repairs to existing facilities; new equipment, apparatus maintenance, and personnel costs; and approved budgeting system.

- 1. The supplies and equipment necessary for existing and new programs
- 2. Repairs to existing facilities
 - a. Federal requirements may include:
 - i. Americans with Disabilities Act (ADA)
 - ii. National Historic Preservation Act
 - iii. Environmental and historic preservation review
 - b. State requirements may include:
 - i. Texas Historical Commission
 - ii. Texas Asbestos Health Protection rules
 - c. AHJ requirements may include:
 - i. Local codes and standards
 - ii. Zoning restrictions

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iii. Ordinances

3. New equipment
 - a. Is there a local need?
 - b. Is there a statutory requirement?
 - c. Equipment specifications
 - d. Cost/benefit analysis
4. Apparatus maintenance
 - a. Manufacturer's recommendations
 - b. Statutory requirements
5. Personnel costs
 - a. Direct costs
 - b. Indirect costs
6. Approved budgeting system
 - a. Types of budgets
 - i. Operating/expense budget
 - ii. Capital budget
 - b. Budgeting systems
 - i. Line-item budget
 - ii. Zero-based budget
 - iii. Program budget
 - iv. Matrix budget

Requisite Skills. The ability to allocate finances, to relate interpersonally, and to communicate orally and in writing.

903-6.4.2 Develop a budget management system, given fiscal and financial policies, so that the division or department stays within the budgetary authority.

903-A.6.4.2 The following are some of the budgeting systems commonly used:

- (1) **Planning programming budgeting system (PPBS)**
- (2) **Line item budgets**
- (3) **Zero-based budgeting (ZBB)**
- (4) **Program budgeting**
- (5) **Performance budgeting**
- (6) **Matrix budgets**

Requisite Knowledge. Revenue to date, anticipated revenue, expenditures to date, encumbered amounts, and anticipated expenditures.

1. Revenue to date – current funding status from:

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- a. grants
 - b. fund raisers
 - c. private foundations
 - d. corporate/individual donations and gifts
 - e. taxes
 - f. enterprise funds
 - g. user fees
 - h. bonds
2. Anticipated revenue – projected funding from:
 - a. grants
 - b. fund raisers
 - c. private foundations
 - d. taxes
 - e. enterprise funds
 - f. user fees
 - g. bonds
 3. Expenditures to date – documented costs:
 - a. Personnel
 - b. Operations
 - c. Capital
 4. Encumbered amounts – committed costs:
 - a. Personnel
 - b. Operations
 - c. Capital
 5. Anticipated expenditures – projected costs
 - a. Personnel
 - b. Operations
 - c. Capital

Requisite Skills. The ability to interpret financial data and to communicate orally and in writing.

- 903-6.4.3** Describe the agency's process for developing requests for proposal (RFPs) and soliciting and awarding bids, given established specifications and the agency's policies and procedures, so that competitive bidding is ensured.

Requisite Knowledge. Purchasing laws, policies, and procedures.

1. Purchasing laws

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- a. Federal – purchasing rules required by federal grant programs or agencies
 - i. DHS (Department of Homeland Security) grants
 - ii. FEMA (Federal Emergency Management Agency) grants
 - iii. Federal Highway Administration
 - iv. Federal Aviation Administration (FAA) grants
 - v. Department of Defense (DOD)
 - vi. Housing and Urban Development (HUD) Community Development block grants
 - b. State – Texas local government codes
 - i. Chapter 252 “Competitive Requirements for Certain Purchases
 - ii. Chapter 271 “Competitive Bidding Procedure Applicable to Contract”
 - iii. Chapter 2155 “Purchasing: General Rules and Procedures”
 - iv. Chapter 2156 “Purchasing Methods”
 - v. Chapter 2254 “Professional Consulting Services”
 - vi. Chapter 2161 “Historically Underutilized Businesses”
 - vii. Chapter 2157 “Purchasing: Purchase of Automated Information Systems”
 - viii. Chapter 2262 “Statewide Contract Management”
 - ix. Texas Health and Safety Code – Subchapter E “Finances and Bonds”
 - x. Texas Forest Service grant requirements
 - xi. Department of State Health Services (DSHS)
 - c. Local AHJ ordinances and resolutions
2. Policies and procedures
- a. Federal – agency or grant requirements
 - b. State – agency or grant requirements
 - c. Local AHJ rules, regulations, policies and procedures
 - d. Private – private grant or foundation policies

Requisite Skills. The ability to use evaluative methods and to communicate orally and in writing.

- 903-6.4.4** Direct the development, maintenance, and evaluation of a department record and management system, given policies and procedures, so that completeness and accuracy are achieved.

Requisite Knowledge. The principles involved in the acquisition, implementation, and retrieval of information by data processing as it applies to the record and budgetary processes and the capabilities and limitations of information management systems.

1. The principles involved in the acquisition, implementation and retrieval of information by data processing as it applies to the record and budgetary processes
 - a. Compliance with legal requirements
 - b. High-quality data to support decision making
 - c. Information needed
 - d. Information format
2. The capabilities and limitations of information management systems
 - a. Capabilities
 - i. Provide accurate data for analysis
 - ii. Assist in the decision-making process
 - iii. Software and hardware
 - b. Limitations
 - i. Analysis of records and data
 - ii. Data quality input
 - iii. Ability to retrieve data
 - iv. Validity of data
 - v. Interpretation problems
 - vi. Software and hardware restrictions
 - c. Considerations
 - i. Freedom of Information Act (FOIA)
 - ii. Texas Open Records Act
 - iii. Records retention requirements
 - iv. Historical records

Requisite Skills. The ability to use evaluative methods, to communicate orally and in writing, and to organize data.

903-6.4.5 Analyze and interpret records and data, given a fire department records system, so that validity is determined and improvements are recommended.

- **Validity** – *effectiveness* – measures what is supposed to be measured
- **Reliability** – *dependability* – measures performance consistently
- **Quantitative** – *measuring* – types of information that can be counted or expressed numerically
- **Qualitative** – *describing* – used to describe types of information

Requisite Knowledge. The principles involved in the acquisition, implementation, and retrieval of information and data.

1. The principles involved in the acquisition of information and data
 - a. Sources of data
 - i. Federal

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- a) US Fire Administration
- b) Federal Aviation Administration (FAA)
- c) Centers for Disease Control (CDC) and National Institute for Occupational Safety and Health (NIOSH)
- d) Department of Transportation (DOT)
- e) Department of Defense (DOD)
- f) Occupational Safety and Health Administration (OSHA)
- g) National Institute of Standards and Technology (NIST)
- h) Census Bureau (Department of Commerce)
- i) US Department of Agriculture (USDA)
- j) Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF)
- k) Federal Bureau of Investigation (FBI)
- l) Department of Homeland Security (DHS)
- m) Department of Justice (DOJ)
- ii. State
 - a) Texas Commission on Fire Protection (TCFP)
 - b) Department of Insurance – State Fire Marshal's Office
 - c) Texas Forest Service (TFS)
 - d) Department of State Health Services (DSHS)
 - e) Texas Commission on Environmental Quality (TCEQ)
 - f) General Land Office (GLO)
 - g) Texas Department of Transportation (TxDOT)
 - h) Department of Public Safety (DPS) and Texas Division of Emergency Management (TDEM)
 - i) Railroad Commission (RRC)
- iii. Regional
 - a) Council of Governments (COGs)
 - b) Trauma Regional Advisory Councils (RACS)
 - c) Local Emergency Planning Council (LEPC)
- iv. Local
 - a) AHJ reporting systems
 - 1. TXFIRS (Texas Fire Incident Reporting System)
 - 2. PCRs and PTRs (Patient Care Reports; Patient Transfer Reports)
 - 3. GIS (Geographic Information System)
 - 4. CAD system
 - b) Public works
 - c) Planning departments
 - d) Economic Development Commission (EDC)
- v. Other
 - a) Insurance Service Office (ISO)
 - b) Factory Mutual (FM)
 - c) Underwriters Laboratory (UL)
 - d) Insurance agencies

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- e) State Firemen's and Fire Marshals' Association (SFFMA)
 - f) Universities and colleges
2. The principles involved in the implementation and retrieval of information and data
- a. Qualitative/quantitative data analysis
 - i. Compare results to desired results or standards
 - ii. Compare results to the original goals
 - iii. Compare results to indications of accomplished outcomes
 - iv. Compare results to descriptions of the organization's/program's experiences, strengths, and weaknesses
 - v. Consider recommendations submitted by customers
 - b. Compliance with legal requirements
 - c. Performance evaluations
 - i. Goal-based
 - ii. Process-based
 - iii. Outcome-based
 - d. Benefits of evaluations
 - i. Understanding, verifying, or increasing the effect of services on external customers
 - ii. Making delivery mechanisms more efficient and less costly
 - iii. Verifying that the organization is doing what it planned
 - iv. Focusing management's attention on the mission of the organization
 - v. Producing data or verifying results
 - vi. Producing valid comparisons between various programs
 - vii. Examining and describing effective programs

Requisite Skills. The ability to use evaluative methods, to communicate orally and in writing, and to organize and analyze data.

903-6.4.6 Develop a model plan for continuous organizational improvement, given resources for an area to be protected, so that resource utilization is maximized.

903-A.6.4.6 **The following are some examples of organizational evaluation systems:**

- (1) Commission on Fire Accreditation International Self-Assessment Model**
- (2) Insurance Service Organization Fire Service Rating Schedule**

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Requisite Knowledge. Policies and procedures, physical and geographic characteristics and hazards, demographics, community plan, staffing requirements, response time benchmarks, contractual agreements, recognized best practice assessment programs, and local, state/provincial, and federal regulations.

1. Model plan considerations include:
 - a. Policies and procedures
 - b. Physical and geographic characteristics and hazards
 - c. Demographics
 - d. Community plan
 - e. Staffing requirements
 - f. Response time benchmarks
 - g. Contractual agreements
 - h. Recognized best practice assessment programs
 - i. Local, state/provincial, and federal regulations
2. Local plan development must take the above into consideration.

Requisite Skills. The ability to research, to use evaluative methods, to analyze data, to communicate orally and in writing, and to organize.

903-6.5 **Inspection and Investigation**

This duty involves evaluating inspection programs of the AHJ to determine effectiveness and developing public safety plans, according to the following job performance requirements.

- 903-6.5.1** Evaluate the inspection program of the AHJ, given current program goals, objectives, performance data, and resources so that the results are evaluated to determine effectiveness.

Requisite Knowledge. Policies and procedures, accepted inspection practices, program evaluation, and applicable codes, standards, and laws.

1. Policies and procedures (AHJ)
2. Accepted inspection practices
 - a. NFPA 1031, Standard for Professional Qualifications for Fire Inspector and Plan Examiner
 - b. AHJ
3. Program evaluation
 - a. Describe the program context
 - b. Identify stakeholders and their needs
 - c. Determine the evaluation purpose

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- d. Identify intended uses
 - e. Create an evaluation plan
 - f. Gather data
 - g. Analyze data
 - h. Make conclusions and recommendations
 - i. Report results
4. Applicable codes, standards and laws
- a. Local building and fire codes, etc.
 - b. Standards
 - i. National Fire Protection Association (NFPA)
 - a) NFPA 1, Fire Code
 - b) NFPA 101, Life Safety Code
 - c) NFPA 5000, Building Construction and Safety Code
 - ii. International Code Council (ICC)
 - a) International Building Code
 - b) International Fire Code
 - c. State laws
 - i. TCFP
 - ii. DSHS
 - iii. Texas Administrative Code (TAC)

Requisite Skills. The ability to use evaluative methods, to analyze data, and to communicate orally and in writing.

- 903-6.5.2** Develop a plan, given an identified fire safety problem, so that the approval for a new program, piece of legislation, form of public education, or fire safety code is facilitated.

Requisite Knowledge. Policies and procedures and applicable codes, ordinances, and standards and their development process.

1. Policies and procedures (AHJ)
2. Applicable codes, ordinances, and standards, and their development process
 - a. Local AHJ
 - i. Local building and fire codes, etc.
 - ii. Ordinances
 - b. Standards
 - i. National Fire Protection Association (NFPA)
 - a) NFPA 1, *Fire Code*
 - b) NFPA 101, *Life Safety Code*
 - c) NFPA 5000, *Building Construction and Safety Code*
 - ii. International Code Council (ICC)

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- a) International Building Code
- b) International Fire Code
- c. State laws
 - i. TCFP
 - ii. DSHS
 - iii. TAC
- d. Code adoption process
 - i. Varies by AHJ
 - ii. Basic process
 - a) Model Code research
 - b) Staff review
 - c) Public meetings
 - d) Staff recommendation/proposed resolution
 - e) Adoption by AHJ
 - f) Implementation

Requisite Skills. The ability to use evaluative methods, to use consensus-building techniques, to communicate orally and in writing, and to organize plans.

903-6.6 **Emergency Service Delivery**

This duty involves managing multi-agency planning, deployment, and operations, according to the following job performance requirements.

- 903-6.6.1** Prepare an action plan, given an emergency incident requiring multiple agency operations, so that the required resources are determined and the resources are assigned and placed to mitigate the incident.

Requisite Knowledge. Policies, procedures, and standards, including the current edition of NFPA 1600, and resources, capabilities, roles, responsibilities, and authority of support agencies.

- 1. Policies, procedures and standards, including the current edition of NFPA 1600
 - a. AHJ policies, procedures, rules, regulations
 - b. NFPA 1600, Standard on Disaster/Emergency management and Business Continuity Programs
 - c. Local emergency management plan
 - d. Automatic aid agreements
 - e. Mutual aid agreements
 - i. State
 - ii. Regional
 - iii. Local
 - f. Texas Intrastate Fire Mutual Aid System (TIFMAS)

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2. The following will be primarily dictated by the local emergency management plan:
 - a. Resources of support agencies
 - b. Capabilities of support agencies
 - c. Roles of support agencies
 - d. Responsibilities of support agencies
 - e. Authority of support agencies

Requisite Skills. The ability to use evaluative methods, to delegate authority, to communicate orally and in writing, and to organize plans.

- 903-6.6.2** Develop and conduct a post-incident analysis, given a multi-agency incident and post-incident analysis policies, procedures, and forms, so that all required critical elements are identified and communicated and the appropriate forms are completed and processed in accordance with policies and procedures.

Requisite Knowledge. Elements of a post-incident analysis, emergency management plan, critical issues, involved agencies' resources and responsibilities, procedures relating to dispatch response, strategy tactics and operations, and customer service.

1. Elements of a post-incident analysis
 - a. Reconstruct the incident to establish a clear picture of the events surrounding the incident
 - b. Non-punitive
 - c. Focus on improving emergency response
2. Emergency management plan (AHJ)
3. Critical issues
 - a. Incident dependent
 - b. Interoperability
 - c. Communications
 - d. Command and control
4. Involved agencies' resources and responsibilities
 - a. Local emergency management plan
 - b. Automatic aid responders
 - c. Mutual aid responders
 - d. Command staff
 - e. General staff
 - f. Agency reps
5. Procedures relating to dispatch response (AHJ)

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6. Strategy tactics and operations
 - a. Incident dependent
 - b. Local emergency management plan
 - c. Local policies, procedures, SOPs, UOGs
7. Customer service (AHJ)

Requisite Skills. The ability to write reports, to communicate orally, and to evaluate skills.

- 903-6.6.3** Develop a plan for the agency, given an unmet need for resources that exceed what is available in the organization, so that the mission of the organization is capable of being performed in times of extraordinary need.

Requisite Knowledge. Needs assessment and planning.

1. Develop a needs assessment based on the community threat profile
 - a. Hazard analysis and risk assessment
 - i. The likelihood or frequency of occurring
 - ii. The potential impact or damage to the community
2. Develop a plan based on the following:
 - a. Local emergency management plan
 - b. Automatic aid agreements
 - c. Mutual aid agreements
 - i. State
 - ii. Regional
 - iii. Local
 - d. Texas Intrastate Fire Mutual Aid System (TIFMAS)
 - e. Federal (DHS, FEMA) guidelines

Requisite Skills. The ability to conduct a needs assessment, evaluate external resources, and develop a plan.

903-6.7 **Health and Safety**

This duty involves developing, managing, and evaluating a departmental health and safety program, according to the following job performance requirements.

- 903-6.7.1** Develop a measurable accident and injury prevention program, given relevant local and national data, so that the results are evaluated to determine effectiveness of the program.

Requisite Knowledge. Policies and procedures, accepted safety practices, and applicable codes, standards, and laws.

1. Policies and procedures (AHJ)
2. Accepted safety practices
 - a. 16 Life Safety Initiatives
 - b. Everyone Goes Home
 - c. Protective clothing
 - d. SCBA
 - e. PASS
 - f. Incident Management
 - g. Personnel Accountability System
 - h. Operating at Emergency Incidents
 - i. Interior Structural Fire Fighting
 - j. Wellness/fitness Initiative
 - k. Rules of engagement
 - l. Crew Resource Management
 - m. Wildland standard fire orders
 - n. Wildland watch out situations
3. Applicable codes, standards and laws
 - a. Local AHJ
 - b. Standards
 - i. National Fire Protection Association (NFPA) 1500 series
 - ii. NIOSH (National Institute for Occupational Safety and Health)
 - c. State laws
 - i. TCFP
 - ii. DSHS
 - iii. TAC – TX Administrative Code
 - iv. TWCC – TX Workers Compensation Commission
 - d. Federal laws
 - i. OSHA (Occupational Safety and Health Administration)
 - ii. EPA (Environmental Protection Agency)

Requisite Skills. The ability to use evaluative methods, to analyze data, and to communicate orally and in writing.

903-6.8

Emergency Management

This duty involves policies, procedures, and programs for the role of the fire service in the community's emergency management plan **and the** roles of local, state/provincial, and national emergency management agencies.

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903-6.8.1 Develop a plan for the integration of fire services resources in the community's emergency management plan, given the requirements of the community and the resources available in the fire department, so that the role of the fire service is in compliance with local, state/provincial, and national requirements.

Required Knowledge. Role of the fire service; integrated emergency management system; preparedness-emergency management planning; emergency operations centers; roles of local, state/provincial, and national emergency management agencies.

1. Role of the fire service (AHJ)
2. Integrated emergency management system
 - a. NIMS (National Incident Management System)
 - b. National Response Framework
3. Preparedness – emergency management planning
 - a. Planning “P”
 - b. Local emergency management plan
 - c. Policies and procedures of the AHJ
 - d. NFPA 1600
 - e. Continuity of Operations Plan (COOP)
4. Emergency operations centers
 - a. NFPA 1221
 - b. NFPA 1600
 - c. State operations center
 - d. ASTM International Standard E2668
5. Roles of local, state/provincial, and national emergency management agencies
 - a. Local roles
 - i. Mitigation
 - ii. Preparedness
 - iii. Response
 - iv. Recovery
 - b. State emergency management agencies
 - i. TDEM – Texas Division of Emergency Management
 - ii. Emergency Management Association of Texas
 - iii. Texas Forestry Service
 - c. National emergency management agencies
 - i. FEMA
 - ii. NIMS Integration Center

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Required Skills. The ability to communicate orally and in writing and to organize a plan; and familiarity with emergency management interagency planning and coordination.

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CHAPTER NINE
FIRE OFFICER IV
CURRICULUM OUTLINE

SECTION	SUBJECT	RECOMMENDED HOURS
904-7.1	General	2
904-7.2	Human Resource Management	12
904-7.3	Community and Government Relations	6
904-7.4	Administration	12
904-7.5	Inspection and Investigation	No performance requirements at this level
904-7.6	Emergency Services Delivery	12
904-7.7	Health and Safety	6
	Performance Skills*	6
	TOTAL RECOMMENDED HOURS	56

*The recommended hours for skills evaluation is based on 12 students. Actual hours needed will depend on the number of students, the number of examiners, availability of equipment, and the student skill level.

REFERENCE LIST FOR THE FIRE OFFICER IV CURRICULUM

Certified Training Facilities approved to teach this curriculum must have the following reference materials:

Chief Officer (1st Ed) (2012). Burlington, MA: Jones and Bartlett Learning.

Chief Officer (2nd Ed) (2004). Stillwater, OK: International Fire Service Training Association

National Incident Management System: Principles and Practice (2nd Ed) (2012). Sudbury, MA: Jones and Bartlett Publishers, Inc.

NFPA 1021: Standard for Fire Officer Professional Qualifications (2013 Ed.). Quincy, MA: National Fire Protection Association. NFPA Publications

Officer Development Handbook (2nd Ed) (2010). Fairfax, VA: International Association of Fire Chiefs.

Standards Manual for Fire Protection Personnel. Austin, TX: Texas Commission on Fire Protection.

FIRE OFFICER IV

A Fire Officer IV is an upper level supervisor who performs both supervisory and first-line managerial functions who has met all the job performance and certification requirements of Fire Officer III as defined in NFPA 1021, *Standard for Fire Officer Professional Qualifications*. An individual at the Fire Officer IV level as part of his or her duties and responsibilities:

- Administers job performance requirements, and evaluates and improves the department
- Projects a positive image of the fire department to the community
- Develops long-range plans and fiscal projections
- Develops plans for major disasters
- Administers a comprehensive risk management program

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904-7.1 **General**

For qualification at Fire Officer Level IV, the Fire Officer III shall meet the job performance requirements defined in Sections 7.2 through 7.7 of NFPA 1021, 2009 Edition.

Fire Officer IV certification prerequisites include:

- Fire Officer III

904-A.7.1 **Other prerequisite knowledge can include an understanding of Fair Labor Standards, collective bargaining, and employment discrimination, including the 80% rule, BFOQ, limitations on physical abilities testing, and issues associated with age, gender, ADA, race, and religion.**

904-7.2 **Human Resource Management**

This duty involves administering job performance requirements and evaluating and improving the department, according to the following job performance requirements.

904-7.2.1 Appraise the department's human resource demographics, given appropriate community demographic data, **so that** ~~to determine~~ if the recruitment, selection, and placement of human resources is effective and consistent with law and current best practices.

Requisite Knowledge Policies and procedures; local, state/provincial, and federal regulations; community demographics; community issues; and formal and informal community leaders.

- 1) Policies and procedures (AHJ)
- 2) Local, state/provincial, and federal regulations
 - a. Federal
 - i. Civil Rights Act of 1964 (Title VII)
 - ii. Age Discrimination and Employment Act (ADEA)
 - iii. Americans With Disabilities Act (ADA)
 - b. State
 - i. Texas Commission on Fire Protection (TCFP) standards
 - ii. Local Government Code 143 (Civil Services)
 - iii. Health and Safety Code 775 (Emergency Services Districts)
 - iv. Texas Department of State Health Services (DSHS) – EMS requirements as applicable

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- v. Texas Commission on Law Enforcement Officers Standards and Education (TCLEOSE) – Peace Officer requirements for Arson Investigators
- c. Local (AHJ)
 - i. Local Government Code 143 – Local Rules
 - ii. Health and Safety Code 775 – Local Rules
 - iii. Local ordinances
 - iv. Labor contract or agreement
- 3) Community demographics
 - a. City Planning Department
 - b. US Census Bureau
- 4) Community issues
 - a. Economic Development Corporation
 - b. Local Chamber of Commerce
- 5) Formal and informal community leaders
 - a. Civic groups
 - b. Neighborhood associations
 - c. Boards and commissions
 - d. Special interest groups

Requisite Skills The ability to communicate orally and in writing, to relate interpersonally, to delegate authority, to analyze issues, and to solve problems.

904-7.2.2 Evaluate Initiate the development of a program, given current employee-member/management relations, so that and initiate the development of a process that supports a positive and participative employee-member/management program exists.

Requisite Knowledge Policies and procedures, contractual agreements, and local, state/provincial, and federal regulations.

- 1) Policies and procedures (AHJ)
- 2) Contractual agreements
 - a. Collective bargaining
 - b. Meet and confer
 - c. Private sector contracts
- 3) IAFC/IAFF Labor-Management Initiative
 - a. Improve interpersonal communications between labor and management

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- b. Increase the involvement and cooperation between labor and management
 - c. Gain an increased focus on the goals that will benefit your organization and its members
 - d. Learn how to minimize the number of grievances and other adverse actions that affect labor-management relationships
 - e. Discover new ways to work through and past labor-management obstacles to accomplish more for the fire department and the community
 - f. Roles and Responsibilities: Union, Fire Department, Local Government.
 - g. Labor-Management Best Practices
- 4) Local, state/provincial, and federal regulations
- a. Federal
 - i. Civil Rights Act of 1964 (Title VII)
 - ii. Age Discrimination and Employment Act (ADEA)
 - iii. Americans With Disabilities Act (ADA)
 - b. State
 - i. Local Government Code 143 (Civil Services)
 - ii. Health and Safety Code 775 (Emergency Services Districts)
 - c. Local (AHJ)
 - i. Local Government Code 143 – Local Rules
 - ii. Health and Safety Code 775 – Local Rules
 - iii. Local ordinances
 - iv. Labor contract or agreement

Requisite Skills The ability to communicate orally and in writing, to negotiate, to analyze current status of ~~employee~~ **member** relations, to relate interpersonally, to analyze the current ~~employee~~ **member**/management relations, and to conduct program implementation.

- 904-7.2.3** Establish and evaluate a list of education and in-service training goals, given a summary of the job requirements for all positions within the department, so that all members can achieve and maintain required proficiencies.

Requisite Knowledge Training resources, community needs, internal and external customers, policies and procedures, contractual agreements, and local, state/provincial, and federal regulations.

- 1) Training resources
 - a. NFPA professional qualification standards
 - b. TCFP Curriculum Manual

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- c. DSHS
 - d. TCLEOSE
 - e. Textbooks
 - f. Professional journals
 - g. External training and educational institutions
 - h. NFA (National Fire Academy)
- 2) Community needs
- a. Demographics (e.g. population, occupancy types, urban/suburban/rural/frontier, etc.)
 - b. Fire department type
 - c. Community or service area needs
 - d. Hazard assessment
 - e. Risk analysis
 - f. Improved operational efficiency
 - g. Continuing education requirements
 - h. New certification or training requirements
- 3) Internal and external customers
- 4) Policies and procedures (AHJ)
- 5) Contractual agreements
- a. Collective bargaining
 - b. Meet and confer
 - c. Private sector contracts
- 6) Local, state/provincial, and federal regulations
- a. Federal
 - i. OSHA (Occupational Safety and Health Administration)
 - ii. EPA (Environmental Protection Agency)
 - iii. DHS (Department of Homeland Security)
 - b. State
 - i. TCFP
 - ii. DSHS
 - iii. TCLEOSE
 - iv. ISO-PPC (Insurance Service Office – Public Protection Class)
 - c. Local (AHJ)

Requisite Skills The ability to communicate orally and in writing and to organize data and resources.

904-7.2.4 Appraise a member-assistance program, given data, ~~to determine if~~ so that the program, when used, produces the ~~desired results and benefits~~ stated program outcomes.

Requisite Knowledge Policies and procedures, available assistance programs, contractual agreements, and local, state/provincial, and federal regulations.

- 1) Policies and procedures (AHJ)
- 2) Available assistance programs
 - a. Smoking cessation
 - b. Financial counseling
 - c. Relationship counseling
 - d. Mental health counseling
 - e. Health and wellness
 - f. Substance abuse
 - g. Legal counseling
 - h. Critical incident stress management
 - i. Suicide prevention
- 3) Contractual agreements
 - a. Collective bargaining
 - b. Meet and confer
 - c. Private sector contracts
- 4) Local, state/provincial, and federal regulations
 - a. Local
 - i. Private contracts
 - ii. Public departments
 - b. State
 - i. DSHS
 - ii. TCFP
 - c. Federal
 - i. HHS (US Department of Health and Human Services)
- 5) Resources
 - a. NFPA 1500
 - b. National Fallen Fire Fighters Foundation
 - c. IAFF (International Association of Fire Fighters)
 - d. IAFC (International Association of Fire Chiefs)

Requisite Skills The ability to communicate orally and in writing, to relate interpersonally to members, and to analyze needs and results.

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904-7.2.5 Evaluate an incentive program, given data, so that a determination is made regarding achievement of the desired results.

Requisite Knowledge Policies and procedures, available incentive programs, contractual agreements, and local, state/provincial, and federal regulations.

- 1) Policies and procedures (AHJ)
- 2) Available incentive programs
 - a. Awards and recognition
 - b. Educational incentive
 - c. Certification pay
 - d. Longevity pay
 - e. Tuition reimbursement
- 3) Contractual agreements
 - a. Collective bargaining
 - b. Meet and confer
 - c. Private sector contracts
- 4) Local, state/provincial, and federal regulations

Requisite Skills The ability to communicate orally and in writing, to relate interpersonally, and to analyze programs.

904-7.3 **Community and Government Relations**

This duty involves projecting a positive image of the fire department to the community, according to the following job performance requirements.

904-7.3.1 Attend, participate in, and assume a leadership role in ~~given~~ community events **functions, in given community needs,** ~~in order to understand and respond to community needs and enhance~~ **so that** the image of the fire department **organization is enhanced.**

Requisite Knowledge Community demographics, community and civic issues, effective customer service methods, and formal and informal community leaders.

- 1) Community demographics
 - a. City Planning Department
 - b. US Census Bureau
 - c. Occupancy types
 - d. Urban/suburban/rural/frontier

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- 2) Community and civic issues
 - a. Perception vs. reality
 - b. Taxes
 - c. Response times
 - d. Services provided

- 3) Effective customer service methods
 - a. Phoenix Fire Department model
 - i. Deliver best service possible
 - ii. Always be nice
 - iii. Execute standard problem solving outcome
 - iv. Regard everyone as a customer
 - v. Consider how/what you are doing looks
 - vi. Don't disqualify customer with your qualifications
 - vii. Customer-centered organizational behavior
 - viii. Continually improve customer service
 - b. NYPD model
 - i. Courtesy
 - ii. Professionalism
 - iii. Respect
 - c. RESPECT model for customer service
 - i. Responsive
 - ii. Educate
 - iii. Solution focused
 - iv. Professional
 - v. Empathize
 - vi. Courtesy
 - vii. Teamwork
 - d. Other

- 4) Formal and informal community leaders
 - a. Civic groups
 - b. Neighborhood associations
 - c. Boards and commissions
 - d. Special interest groups

Requisite Skills Familiarity with public relations and the ability to communicate orally ~~and familiarity with public relations.~~

904-7.4

Administration

This duty involves long-range planning and fiscal projections, according to the following job performance requirements.

904-7.4.1 Develop a comprehensive long-range plan, given community requirements, current department status, and resources, so that the projected needs of the community are met.

Requisite Knowledge Policies and procedures, physical and geographic characteristics, demographics, community plan, staffing requirements, response time benchmarks, contractual agreements, and local, state/provincial, and federal regulations.

- 1) Policies and procedures (AHJ)
- 2) Physical and geographic characteristics
 - a. Urban/suburban/rural/frontier
 - b. Community or service area needs
 - c. Hazard assessment
 - d. Risk analysis
- 3) Demographics
 - a. City Planning Department
 - b. US Census Bureau
 - c. Occupancy types
 - d. Urban/suburban/rural/frontier
- 4) Community plan
 - a. Community's financial plan
 - b. Community's master plan
 - c. Continuity of operation plan
- 5) Staffing requirements
 - a. ISO
 - b. NFPA
 - c. CFAI (Commission on Fire Accreditation International)
 - d. Labor contracts or agreements
- 6) Response time benchmarks
 - a. NFPA 1710
 - b. NFPA 1720
 - c. CFAI
 - d. ISO
 - e. NIST (National Institute of Standards and Technology) Report on Residential Fireground Field Experiments
- 7) Contractual agreements
 - a. Collective bargaining
 - b. Meet and confer

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c. Private sector contracts

8) Local, state/provincial, and federal regulations

Requisite Skills The ability to communicate orally and in writing, **make public presentations, interpret** and familiarity with fiscal analysis, **comply with** public policy processes, forecast resources, and analyze current department status requirements.

904-7.4.2 Evaluate and project training requirements, facilities, and buildings needs, given data that reflect community needs and resources, ~~to meet~~ **so that** departmental training goals **are met**.

Requisite Knowledge Policies and procedures, physical and geographic characteristics, building and fire codes, departmental plan, staffing requirements, training standards, needs assessment, contractual agreements, and local, state/provincial, and federal regulations.

- 1) Policies and procedures (AHJ)
- 2) Physical and geographic characteristics
 - a. Urban/suburban/rural/frontier
 - b. Community or service area needs
 - c. Hazard assessment
 - d. Risk analysis
- 3) Building and fire codes
 - a. National Fire Protection Association (NFPA)
 - i. NFPA 1, Fire Code
 - ii. NFPA 101, Life Safety Code
 - iii. NFPA 5000, Building Construction and Safety Code
 - b. International Code Council (ICC)
 - i. International Building Code
 - ii. International Fire Code
- 4) Departmental plan
 - a. Strategic plan
 - b. Master plan
 - c. Financial plan
 - d. Staffing plan
- 5) Staffing requirements
 - a. ISO
 - b. NFPA
 - c. CFAI

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- d. Contracts
- 6) Training standards
 - a. TCFP Curriculum Manual
 - b. NFPA 1402, 1403, 1404
 - c. NFPA 1500
 - d. NFPA Professional Qualification Standards
 - e. AHJ
 - f. ISO
 - g. DSHS
 - h. Local medical standards
 - i. NFPA 472, 473
- 7) Needs assessment
 - a. Demographics (e.g. population, occupancy types, urban/suburban/rural/frontier, etc.)
 - b. Fire department type
 - c. Community or service area needs
 - d. Hazard assessment
 - e. Risk analysis
 - f. Improved operational efficiency
 - g. Continuing education requirements
 - h. New certification or training requirements
- 8) Contractual agreements
 - a. Collective bargaining
 - b. Meet and confer
 - c. Private sector contracts
- 9) Local, state/provincial, and federal regulations
 - a. Local (AHJ)
 - i. Building and fire codes
 - ii. Ordinances
 - b. State
 - i. TCFP
 - ii. DSHS
 - iii. TAC (Texas Administrative Code)
 - iv. Texas Historical Commission
 - v. Texas Asbestos Health Protection rules
 - c. Federal
 - i. ADA
 - ii. National Historic Preservation Act
 - iii. Environmental and historic preservation review
 - iv. OSHA
 - v. EPA

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vi. NIMS (National Incident Management System)

Requisite Skills The ability to communicate orally and in writing, make public presentations, interpret and familiarity with fiscal analysis, forecasting needs, and analyzing data.

904-7.4.3 Complete a written comprehensive risk, hazard, and value analysis of the community, given the appropriate features of the service area of the organization, so that an accurate evaluation is made for service delivery decision-making.

Requisite Knowledge Risk, hazard, and value analysis methods and process, as well as community development features, community demographics, and assessed valuation of properties in the community.

- 1) Risk, hazard, and value analysis methods and process
 - a. Mitigation action plan
 - i. Establish hazard mitigation goals and objectives
 - ii. Identify and prioritize hazard mitigation actions
 - iii. Prepare the implementation strategy
 - iv. Document the planning process
 - b. RHAVE – Risk Hazard and Value Evaluation
 - c. NFPA Risk Management model
 - i. Risk identification
 - ii. Risk evaluation
 - iii. Risk control techniques
 - iv. Risk management monitoring
 - d. CWPP (Community Wildfire Protection Program)
- 2) Community development features
 - a. Urban/suburban/rural/frontier
 - b. Fire department type
 - c. Community or service area needs
 - d. Improved operational efficiency
- 3) Community demographics
 - a. Population
 - b. Occupancy types
- 4) Assessed valuation of properties in the community
 - a. County appraisal district
 - b. Tax rate
 - c. Tax role

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Requisite Skills The ability to conduct a needs assessment plan, to effectively communicate in writing, **and to** problem solveing.

- 904-7.4.4** Develop a plan for a capital improvement project or program, given an unmet need in the community, so that there is adequate information to educate citizens about the needs of the department.

Requisite Knowledge Strategic planning, capital improvement planning and budgeting, and facility planning.

- 1) Strategic planning
 - a. Define the organization's mission
 - b. Establish goals/objectives
 - c. Identify strategic alternatives
 - d. Formulate a strategy
- 2) Capital improvement planning and budgeting
 - a. Establish a capital planning committee with bylaws
 - b. Take inventory of existing capital assets
 - c. Evaluate previously approved, unimplemented or incomplete projects
 - d. Assess financial capacity
 - e. Solicit, compile and evaluate new project requests
 - f. Prioritize projects
 - g. Develop a financing plan
 - h. Adopt a capital improvements program
 - i. Monitor and manage approved projects within the CIP
 - j. Update existing/ongoing capital programs
- 3) Facility planning
 - a. Design
 - b. Location
 - c. Finance

Requisite Skills The ability to conduct a needs assessment plan, to effectively communicate in writing, and **to** problem solveing.

904-7.5 **Inspection and Investigation**

- 904-7.5.1** **Definition of Duty.** No additional job performance requirements at this level.

904-7.6 **Emergency Services Delivery**

This duty involves developing plans for major disasters, according to the following job performance requirements.

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904-7.6.1 Develop a comprehensive disaster plan that integrates other agencies' resources, given **risk, vulnerability, and capability** data, in order to rapidly and **so that the organization can** effectively mitigate the impact on **to the** community.

Requisite Knowledge Major incident policies and procedures, physical and geographic characteristics, demographics, target hazards, incident management systems, communications systems, **intelligence data**, contractual and mutual-aid agreements, and local, state/provincial, and federal regulations and resources.

- 1) Major incident policies and procedures (AHJ)
- 2) Physical and geographic characteristics
 - a. Urban/suburban/rural/frontier
 - b. Community or service area needs
 - c. Hazard assessment
 - d. Risk analysis
- 3) Demographics
 - a. City Planning Department
 - b. US Census Bureau
 - c. Occupancy types
 - d. Urban/suburban/rural/frontier
- 4) Target hazards (AHJ)
 - a. Critical infrastructure
 - b. High occupancy
 - c. High hazard industry
- 5) Incident management systems
 - a. NIMS
 - b. ICS (Incident Command System - FIREScope)
 - c. IMS (Incident Management System - NFPA 1561)
 - d. Fireground Command System (Blue card)
- 6) Communications systems
 - a. NFPA 1221
 - b. AHJ
 - c. Interoperability
 - d. Texas SCIP (Statewide Communications Interoperability Plan)
- 7) **Intelligence data**
 - a. **Hazard mitigation plans**

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- b. **State preparedness report**
 - c. **Threat and Hazard Identification and Risk Assessment report**
 - d. **Flood plain map/flood protection plan**
 - e. **Wildland fire assessment system**
 - f. **National weather service**
 - g. **Fusion centers**
- 8) Contractual and mutual-aid agreements
- a. Mutual aid
 - b. Auto aid
 - c. Private contracts
 - d. State contracts
- 9) Local, state/provincial, and federal regulations and resources
- a. Local Resources
 - i. Community Emergency Management Plan
 - ii. Community Wildfire Protection Plan
 - iii. Local SOPs/SOGs
 - b. State Resources
 - i. TDEM (Texas Division of Emergency Management)
 - a) TFS (Texas Forest Service)
 - b) DSHS
 - c) Texas Adjutant General (National Guard)
 - d) Texas Task Force One
 - ii. TXDOT (Texas Department of Transportation)
 - iii. GLO (General Land Office)
 - iv. TCEQ (Texas Commission on Environmental Quality)
 - v. Texas Parks and Wildlife
 - vi. DPS (Department of Public Safety)
 - c. Federal Resources
 - i. USDA (US Department of Agriculture)
 - a) US Forest Service
 - ii. DHS
 - a) FEMA (Federal Emergency Management Agency)
 - b) US Coast Guard
 - c) Secret Service
 - iii. DOJ (Department of Justice)
 - a) FBI (Federal Bureau of Investigation)
 - iv. Department of the Treasury
 - a) BATF (Bureau of Alcohol, Tobacco and Firearms)
 - d. Other Resources
 - i. NFPA 1710
 - ii. NFPA 1720
 - iii. NFPA 1500

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- iv. NFPA 1561
- e. Local Regulations (AHJ)
- f. State Regulations
 - i. TCFP
 - ii. DSHS
 - iii. TCLEOSE
 - iv. TDEM
- g. Federal Regulations
 - i. OSHA
 - ii. EPA
 - iii. FEMA
 - iv. DHS
 - a) NIMS
 - b) National Response Framework

Requisite Skills The ability to analyze data, to communicate orally and in writing, and to organize develop a disaster plan, and to coordinate interagency activity familiarity with inter-agency planning and coordination.

- 904-7.6.2** Develop a comprehensive plan, given data (including agency data), so that the agency operates at a civil disturbance, integrates with other agencies' actions, and provides for the safety and protection of members.

Requisite Knowledge Major incident policies and procedures, physical and geographic characteristics, demographics, incident management systems, communications systems, contractual and mutual-aid agreements, and local, state/provincial, and federal regulations and resources.

- 1) Major incident policies and procedures (AHJ)
- 2) Physical and geographic characteristics
 - a. Urban/suburban/rural/frontier
 - b. Community or service area needs
 - c. Hazard assessment
 - d. Risk analysis
- 3) Demographics
 - a. City Planning Department
 - b. US Census Bureau
 - c. Occupancy types
 - d. Urban/suburban/rural/frontier
- 4) Incident management systems

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- a. NIMS
- 5) Communications systems
 - a. AHJ
 - b. Interoperability
- 6) Contractual and mutual-aid agreements
 - a. Mutual aid
 - b. Auto aid
 - c. Private contracts
 - d. State contracts
- 7) Local, state/provincial, and federal regulations and resources
 - a. Local Resources
 - i. Community Emergency Management Plan
 - ii. Local SOPs/SOGs
 - b. State Resources
 - i. TDEM
 - a) TFS
 - b) DSHS
 - c) Texas Adjutant General (National Guard)
 - d) Texas Task Force One
 - ii. TXDOT
 - iii. DPS
 - c. Federal Resources
 - i. DHS
 - a) FEMA
 - b) US Coast Guard
 - c) Secret Service
 - ii. DOJ
 - a) FBI
 - iii. Department of the Treasury
 - a) BATF
 - d. Local Regulations (AHJ)
 - e. State Regulations
 - i. TCFP
 - ii. DSHS
 - iii. TCLEOSE
 - iv. TDEM
 - f. Federal Regulations
 - i. OSHA
 - ii. EPA
 - iii. FEMA
 - iv. DHS
 - a) NIMS

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b) National Response Framework

Requisite Skills The ability to communicate orally and in writing and to organize a plan; familiarity with interagency planning and coordination.

904-7.7 **Health and Safety**

This duty involves administering a comprehensive risk management program, according to the following job performance requirements.

904-7.7.1 Maintain, develop, and provide leadership for a risk management program, given specific data, so that injuries and property damage accidents are reduced.

Requisite Knowledge Risk management concepts, retirement qualifications, occupational hazards analysis, and disability procedures, regulations, and laws.

- 1) Risk management concepts
 - a. NFPA Risk Management model
 - i. Risk identification
 - ii. Risk evaluation
 - iii. Risk control techniques
 - iv. Risk management monitoring
- 2) Retirement qualifications
 - a. Age
 - b. Years of service
 - c. Disability
 - d. AHJ
- 3) Occupational hazards analysis
 - a. Select the job
 - b. Break the job into successive steps
 - c. Identify the hazards in each step of the process
 - d. Eliminate or reduce the hazard
- 4) Disability procedures, regulations and laws
 - a. TWCC (Texas Workers Compensation Commission)
 - b. ADA
 - c. AHJ
 - d. Civil Service Rules and Laws

Requisite Skills The ability to communicate orally and in writing, to analyze data, and to use evaluative methods.

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4. **Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 421, Standards for Certification, including but not limited to, §421.1, Procedures for Meetings, §421.3, Minimum Standards Set by the Commission, §421.5 Definitions, §421.9, Designation of Fire Protection Duties, §421.11, Requirement to be Certified Within One Year, §421.13, Individual Certificate Holders, §421.15, Extension of Training Period, and §421.17, Requirement to Maintain Certification.**

CHAPTER 421

STANDARDS FOR CERTIFICATION

§421.5 Definitions.

The following words and terms, when used in the Standards Manual, shall have the following meanings, unless the context clearly indicates otherwise.

(1) Administrative duties--

(2)~~[(1)]~~ Admission to employment--An entry level full-time employee of a local government entity in one of the categories of fire protection personnel.

(3)~~[(2)]~~ Appointment--The designation or assignment of a person to a discipline regulated by the commission. The types of appointments are:

(A) permanent appointment--the designation or assignment of certified fire protection personnel or certified part time fire protection employees to a particular discipline (See Texas Government Code, Chapter 419, §419.032); and

(B) probationary or temporary appointment--the designation or assignment of an individual to a particular discipline, except for head of a fire department, for which the individual has passed the commission's certification and has met the medical requirement of §423.1(c) of this title (relating to Minimum Standards for Structure Fire Protection Personnel), if applicable, but has not yet been certified. (See Texas Government Code, Chapter, §419.032.)

(4)~~[(3)]~~ Approved training--Any training used for a higher level of certification must be approved by the commission and assigned to either the A-List or the B-List. The training submission must be in a manner specified by the commission and contain all information requested by the commission. The commission will not grant credit twice for the same subject content or course. Inclusion on the A-List or B-List does not preclude the course approval process as stated elsewhere in the Standards Manual.

(5)~~[(4)]~~ Assigned/work--A fire protection personnel or a part-time fire protection employee shall be considered "assigned/working" in a position, any time the individual is receiving compensation and performing the duties that are regulated by the commission and has been permanently appointed, as defined in this section, to the particular discipline.

(6)~~[(5)]~~ Assistant fire chief--The officer occupying the first position subordinate to the head of a fire department.

(7)~~[(6)]~~ Auxiliary fire fighter--A volunteer fire fighter.

(8)~~[(7)]~~ Benefits--Benefits shall include, but are not limited to, inclusion in group insurance plans (such as health, life, and disability) or pension plans, stipends, free water usage, and reimbursed travel expenses (such as meals, mileage, and lodging).

(9)~~[(8)]~~ Chief Training Officer--The individual, by whatever title he or she may be called, who coordinates the activities of a certified training facility.

(10)~~[(9)]~~ Class hour--Defined as not less than 50 minutes of instruction, also defined as a contact hour; a standard for certification of fire protection personnel.

(11)~~[(10)]~~ Code--The official legislation creating the commission.

(12)~~[(11)]~~ College credits--Credits earned for studies satisfactorily completed at an institution of higher education accredited by an agency recognized by the U.S. Secretary of Education and including National Fire Academy (NFA) open learning program colleges, or courses recommended for college credit by the American Council on Education (ACE) or delivered through the National Emergency Training Center (both EMI and NFA) programs. A course of study satisfactorily completed and identified on an official transcript from a college or in the ACE National Guide that is primarily related to Fire Service, Emergency Medicine, Emergency Management, or Public Administration is defined as applicable for Fire Science college credit, and is acceptable for higher levels of certification. A criminal justice course related to fire and or arson investigation that is satisfactorily completed and identified on an official transcript from a college or in the ACE National Guide may be used to qualify for Master Arson Investigator certification.

(13)~~[(12)]~~ Commission--Texas Commission on Fire Protection.

(14)~~[(13)]~~ Commission-recognized training--A curriculum or training program which carries written approval from the commission, or credit hours that appear on an official transcript from an accredited college or university, or any fire service training received from a nationally recognized source, i.e., the National Fire Academy.

(15)~~[(14)]~~ Compensation--Compensation is to include wages, salaries, and "per call" payments (for attending drills, meetings or answering emergencies).

(16)~~[(15)]~~ Expired--Any certification that has not been renewed on or before the end of the certification period.

(17)~~[(16)]~~ Federal fire fighter--A person as defined in Texas Government Code, Chapter 419, §419.084(h).

(18)~~[(17)]~~ Fire chief--The head of a fire department.

(19)~~[(18)]~~ Fire department--A department of a local government that is staffed by one or more fire protection personnel or part-time fire protection employees.

(20)~~[(19)]~~ Fire protection personnel--Any person who is a permanent full-time employee of a fire department or governmental entity and who is appointed duties in one of the following categories/disciplines: fire suppression, fire inspection, fire and arson investigation, marine fire fighting, aircraft rescue fire fighting, fire training, fire education, fire administration and others employed in related positions necessarily or customarily appertaining thereto.

(21)~~[(20)]~~ Fire Code Inspection—Also called Fire Safety Inspection as referenced in Texas Government Code, Chapter 419, §419.909. An inspection performed for the purpose of determining and enforcing compliance with an adopted fire code.

(22)~~[(21)]~~ Fire suppression duties--Engaging in the controlling or extinguishment of a fire of any type or performing activities which are required for and directly related to the control and extinguishment of fires or standing by on the employer's premises or apparatus or nearby in a state of readiness to perform these duties.

(23)~~[(22)]~~ Full-time--An officer or employee is considered full-time if the employee works an average of 40 hours a week or averages 40 hours per week or more during a work cycle in a calendar year. For the purposes of this definition paid leave will be considered time worked.

(24)~~[(23)]~~ Government entity--The local authority having jurisdiction as employer of full-time fire protection personnel in a state agency, incorporated city, village, town or county, education institution or political subdivision.

(25)~~[(24)]~~ High school--A school accredited as a high school by the Texas Education Agency or equivalent accreditation agency from another jurisdiction.

(26)~~[(25)]~~ Immediately dangerous to life or health (IDLH)--An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

(27)~~[(26)]~~ Incipient stage fire--A fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus.

(28)~~[(27)]~~ Instructor:

(A) Lead Instructor--Oversees the presentation of an entire course and assures that course objectives are met in accordance with the applicable curriculum or course material. The lead instructor should have sufficient experience in presenting all units of the course so as to be capable of last-minute substitution for other instructors.

(B) Instructor (also Unit Instructor for wildland courses)--Responsible for the successful presentation of one or more areas of instruction within a course, and should be experienced in the lesson content they are presenting.

(C) Guest Instructor--An individual who may or may not hold Instructor certification but whose special knowledge, skill, and expertise in a particular subject area may enhance the effectiveness of the training in a course. Guest instructors shall teach under the endorsement of the lead instructor.

(29)~~[(28)]~~ Interior structural fire fighting--The physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR §1910.155.)

(30)~~[(29)]~~ Municipality--Any incorporated city, village, or town of this state and any county or political subdivision or district in this state. Municipal pertains to a municipality as defined in this section.

(31)~~[(30)]~~ National Fire Academy semester credit hours--The number of hours credited for attendance of National Fire Academy courses is determined as recommended in the most recent edition of the "National Guide to Educational Credit for Training Programs," American Council on Education (ACE).

(32)~~[(31)]~~ National Fire Protection Association (NFPA)--An organization established to provide and advocate consensus codes and standards, research, training, and education for fire protection.

(33)~~[(32)]~~ National Wildfire Coordinating Group (NWCG)--An operational group designed to establish, implement, maintain, and communicate policy, standards, guidelines, and qualifications for wildland fire program management among participating agencies.

(34)~~[(33)]~~ Non-self-serving affidavit--A sworn document executed by someone other than the individual seeking certification.

(35)~~[(34)]~~ Participating volunteer fire fighter--An individual who voluntarily seeks certification and regulation by the commission under the Texas Government Code, Chapter 419, Subchapter D.

(36)~~[(35)]~~ Participating volunteer fire service organization--A fire department that voluntarily seeks regulation by the commission under the Texas Government Code, Chapter 419, Subchapter D.

(37)~~(36)~~ Part-time fire protection employee--An individual who is appointed as a part-time fire protection employee and who receives compensation, including benefits and reimbursement for expenses. A part-time fire protection employee is not full-time as defined in this section.

(38)~~(37)~~ Personal alert safety system (PASS)--Devices that are certified as being compliant with NFPA 1982 and that automatically activates an alarm signal (which can also be manually activated) to alert and assist others in locating a fire fighter or emergency services person who is in danger.

(39)~~(38)~~ Political subdivision--A political subdivision of the State of Texas that includes, but is not limited to the following:

- (A) city;
- (B) county;
- (C) school district;
- (D) junior college district;
- (E) levee improvement district;
- (F) drainage district;
- (G) irrigation district;
- (H) water improvement district;
- (I) water control and improvement district;
- (J) water control and preservation district;
- (K) freshwater supply district;
- (L) navigation district;
- (M) conservation and reclamation district;
- (N) soil conservation district;
- (O) communication district;
- (P) public health district;
- (Q) river authority;
- (R) municipal utility district;
- (S) transit authority;
- (T) hospital district;
- (U) emergency services district;
- (V) rural fire prevention district; and

(W) any other governmental entity that:

- (i) embraces a geographical area with a defined boundary;
- (ii) exists for the purpose of discharging functions of the government; and
- (iii) possesses authority for subordinate self-government through officers selected by it.

(40)~~[(39)]~~ Pre-fire Planning—Also called a Pre-fire Survey. A walk-through performed by fire fighters for the purpose of gaining familiarity with a building, its contents, and its occupancy.

(41)~~[(40)]~~ Reciprocity for IFSAC seals--Valid documentation of accreditation from the International Fire Service Accreditation Congress used for commission certification may only be used for obtaining an initial certification.

(42)~~[(41)]~~ Recognition of training--A document issued by the commission stating that an individual has completed the training requirements of a specific phase level of the Basic Fire Suppression Curriculum.

(43)~~[(42)]~~ School--Any school, college, university, academy, or local training program which offers fire service training and included within its meaning the combination of course curriculum, instructors, and facilities.

(44)~~[(43)]~~ Structural fire protection personnel--Any person who is a permanent full-time employee of a government entity who engages in fire fighting activities involving structures and may perform other emergency activities typically associated with fire fighting activities such as rescue, emergency medical response, confined space rescue, hazardous materials response, and wildland fire fighting.

(45)~~[(44)]~~ Trainee--An individual who is participating in a commission approved training program.

(46)~~[(45)]~~ Volunteer fire protection personnel--Any person who has met the requirements for membership in a volunteer fire service organization, who is assigned duties in one of the following categories: fire suppression, fire inspection, fire and arson investigation, marine fire fighting, aircraft rescue fire fighting, fire training, fire education, fire administration and others in related positions necessarily or customarily appertaining thereto.

(47)~~[(46)]~~ Volunteer fire service organization--A volunteer fire department or organization not under mandatory regulation by the commission.

(48)~~[(47)]~~ Years of experience--For purposes of higher levels of certification or fire service instructor certification:

(A) Except as provided in subparagraph (B) of this paragraph, years of experience is defined as full years of full-time, part-time or volunteer fire service while holding:

- (i) a commission certification as a full-time, or part-time employee of a government entity, a member in a volunteer fire service organization, and/or an employee of a regulated non-governmental fire department; or
- (ii) a State Firemen's and Fire Marshals' Association advanced fire fighter certification and have successfully completed, as a minimum, the requirements for an Emergency Care Attendant (ECA) as specified by the Department of State Health Services (DSHS), or its successor agency, or its equivalent; or

(iii) an equivalent certification as a full-time fire protection personnel of a governmental entity from another jurisdiction, including the military, or while a member in a volunteer fire service organization from another jurisdiction, and have, as a minimum, the requirements for an ECA as specified by the DSHS, or its successor agency, or its equivalent; or

(iv) for fire service instructor eligibility only, a State Firemen's and Fire Marshals' Association Level II Instructor Certification, received prior to June 1, 2008 or Instructor I received on or after June 1, 2008 or an equivalent instructor certification from the DSHS or the Texas Commission on Law Enforcement. Documentation of at least three years of experience as a volunteer in the fire service shall be in the form of a non self-serving sworn affidavit.

(B) For fire service personnel certified as required in subparagraph (A) of this paragraph on or before October 31, 1998, years of experience includes the time from the date of employment or membership to date of certification not to exceed one year.

5. **Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 441, Continuing Education, §441.1, Objective, §441.3, Definitions, §441.5, Requirements, §441.7, Continuing Education for Structure Fire Protection Personnel, §441.9, Continuing Education for Aircraft Rescue Fire Fighting Personnel, §441.11, Continuing Education for Marine Fire Protection Personnel, §441.13, Continuing Education for Fire Inspection Personnel, §441.15, Continuing Education for Arson Investigator or Fire Investigator, §441.17, Continuing Education for Hazardous Materials Technician, §441.19, Continuing Education for Head of a Fire Department, §441.21, Continuing Education for Fire Service Instructor, and §441.23, Continuing Education for Wildland Fire Fighter.**

CHAPTER 441

CONTINUING EDUCATION

§441.1 Objective.

Continuing education is intended to maintain or increase the knowledge and skills pertinent to the fire service.

§441.3 Definitions.

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise.

- (1) Certification period--That period from the time a certificate is obtained or renewed until it is time for the certificate to be renewed again. See §437.5 of this title (relating to Renewal Fees) for the definition of certification period.
- (2) Level 1--Training intended to maintain previously learned skills as stated in the commission certification curriculum manual for the certifications held.
- (3) Level 2--Fire service training or education intended to develop new skills that are not contained in the commission's certification curriculum manual for certifications held.

§441.5 Requirements.

- (a) Continuing education shall be required in order to renew certification.
- (b) The continuing education requirement for renewal shall consist of a minimum of 18 hours of training to be conducted during the certification period. All documentation of training used to satisfy the continuing education requirements must be maintained for a period of three years from the date of the training. Continuing education records shall be maintained by the department in accordance with the Texas State Library and Archives Commission, State and Local Records Management Division, Records Schedule, Local Schedule (GR 1050-28), whichever is greater.
- (c) Level 1 training must be conducted by a certified instructor. Interactive computer-based continuing education training that is supervised and verified by a certified instructor is acceptable.
- (d) The continuing education program of a regulated entity must be administered and maintained in accordance with commission rule by a certified instructor.
- (e) No more than four hours per year in any one subject of Level 1 training may be counted toward the continuing education requirement for a particular certification.
- (f) There shall be no "hour per subject limit" placed on Level 2 courses, except that emergency medical courses shall be limited to four hours per year.
- (g) The head of a fire department may select subject matter for continuing education appropriate for a particular discipline.
- (h) The head of a fire department must certify whether or not the individuals whose certificates are being renewed have complied with the continuing education requirements of this chapter on the certification renewal document. Unless exempted from the continuing education requirements, an

individual who fails to comply with the continuing education requirements in this chapter shall be notified by the commission of the failure to comply.

- (i) After notification from the commission of a failure to comply with continuing education requirements, an individual who holds a certificate is prohibited from performing any duties authorized by a required certificate until such time as the deficiency has been resolved and written documentation is furnished by the department head for approval by the commission, through its Fire Service Standards and Certification Division director. Continuing education hours obtained to resolve a deficiency may not be applied to the continuing education requirements for the current certification period.
- (j) Any person who is a member of a paid or volunteer fire department who is on extended leave for a cumulative period of six months or longer due to a documented illness, injury, or activation to military service may be exempted from the continuing education requirement for the applicable renewal period(s). Such exemptions shall be reported by the head of the department to the commission at renewal time, and a copy kept with the department continuing education records for three years.
- (k) Any individual who is not a member of a paid or volunteer fire department who is unable to perform work, substantially similar in nature as would be performed by fire protection personnel appointed to that discipline, may be exempted from the continuing education requirement for the applicable renewal period(s). Commission staff shall determine the exemption using documentation of the illness or injury that cumulatively lasts six months or longer, which is provided by the individual and the individual's treating physician or by documentation of activation to military service.
- (l) In order to renew certification for any discipline which has a continuing education requirement stated in this chapter, an individual holder of a certificate not employed by a regulated entity must comply with the continuing education requirements for that discipline. Only 20 total hours of continuing education for each certification period in Level 1 or Level 2 subjects relating to the certification being renewed shall be required to renew all certificates the individual holds, except as provided in §441.17 of this title (relating to Continuing Education for Hazardous Materials Technician).
- (m) An individual certificate holder, not employed by a regulated entity, shall submit documentation of continuing education training upon notification by the commission. An example of documentation of continuing education training may include, but not be limited to a Certificate of Completion, a college or training facility transcript, a fire department training roster, etc. Commission staff will review and may approve or disapprove such documentation of training in accordance with applicable commission rules and/or procedures. The training for a resident of Texas at the time the continuing education training is conducted shall be administered by a commission instructor, commission certified training facility, an accredited institution of higher education, or a military or nationally recognized provider of training. The training for a nonresident of Texas[,] shall be delivered by a state fire academy, a fire department training facility, an accredited institution of higher education, or a military or nationally recognized provider of training. The individual must submit training documentation to the commission for evaluation of the equivalency of the training required by this chapter. The individual certificate holder is responsible for maintaining all of his/her training records for a period of three years from the date of the training.
- (n) If an individual has completed a commission approved academy in the 12 months prior to his or her certification expiration date, a copy of that certificate of completion will be acceptable documentation of continuing education for that certification renewal period.

§441.7 Continuing Education for Structure Fire Protection Personnel.

- (a) A minimum of two hours of continuing education in structure fire protection subjects in addition to the continuing education requirements in §441.5(b) of this title (relating to Requirements) will be

required for personnel certified as structure fire protection personnel and who are appointed to structure fire protection duties.

- (b) Subjects selected to satisfy the continuing education requirement may be selected from ~~either~~ Level 1, Level 2, or a combination of **both**~~the two~~.

§441.9 Continuing Education for Aircraft Rescue Fire Fighting Personnel.

- (a) Continuing education will be required for personnel assigned as aircraft rescue fire fighting personnel.
- (b) Continuing education must, at a minimum, meet the specific training requirements of FAR 139.319(i)(2) and (3) (pertaining to Aircraft Rescue and Fire Fighting Operational Requirements). Continuing education required by this subsection may exceed 20 hours, if necessary, to complete all required subjects.

§441.11 Continuing Education for Marine Fire Protection Personnel.

- (a) A minimum of two hours of continuing education in marine fire protection subjects in addition to the continuing education requirements in §441.5(b) of this title (relating to Requirements) will be required for personnel certified as marine fire protection personnel and who are appointed to marine fire protection duties for any certification period beginning after October 31, 1993.
- (b) Subjects selected to satisfy the continuing education requirement may be selected from ~~either~~ Level 1, Level 2, or a combination of **both**~~the two~~.

§441.13 Continuing Education for Fire Inspection Personnel.

- (a) A minimum of two hours of continuing education in fire inspection subjects in addition to the continuing education requirements in §441.5(b) of this title (relating to Requirements) will be required for personnel certified as fire inspection personnel and who are appointed to fire inspection duties.
- (b) Subjects selected to satisfy the continuing education requirement may be selected from ~~either~~ Level 1, Level 2, or a combination of **both**~~the two~~.

§441.15 Continuing Education for Arson Investigator or Fire Investigator.

- (a) A minimum of two hours of continuing education in arson or fire investigation subjects in addition to the continuing education requirements in §441.5(b) of this title (relating to Requirements) will be required for personnel certified as arson investigation or fire investigation personnel and who are appointed to arson or fire investigation duties.
- (b) Subjects selected to satisfy the continuing education requirement may be selected from ~~either~~ Level 1, Level 2, or a combination of **both**~~the two~~.

§441.17 Continuing Education for Hazardous Materials Technician.

- (a) Eight hours of continuing education in hazardous materials (technician level) will be required for individuals certified as a hazardous materials technician. This will be in addition to continuing education required by other sections of this chapter.
- (b) Subjects selected to satisfy the continuing education requirement may be selected from ~~either~~ Level 1, Level 2, or a combination of **both**~~the two~~.

§441.19 Continuing Education for Head of a Fire Department.

- (a) A minimum of two hours of continuing education in fire administration subjects in addition to the continuing education requirements in §441.5(b) of this title (relating to Requirements) will be required for personnel certified as head of a fire department and who are appointed as head of a department.
- (b) (b) Subjects selected to satisfy the continuing education requirement may be selected from [~~either~~] Level 1, Level 2, or a combination of **both** [~~the two~~].

§441.21 Continuing Education for Fire Service Instructor.

- (a) A minimum of two hours of continuing education in fire service instruction subjects in addition to the continuing education requirements in §441.5(b) of this title (relating to Requirements) will be required for individuals certified as a fire service instructor and who are appointed to fire service instructor duties.
- (b) Subjects selected to satisfy the continuing education requirement may be selected from [~~either~~] Level 1, Level 2, or a combination of **both** [~~the two~~].

§441.23 Continuing Education for Wildland Fire Fighter.

A minimum of four hours of continuing education in Wildland Fire Fighting subjects will be required for individuals certified as a Wildland Fire Fighter. The required hours must include hands-on refresher training in the use and deployment of a fire shelter. The four hours may be included in the eighteen hours required during the certification renewal period.

6. **Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 449, Head of a Fire Department, including but not limited to, §449.1, Minimum Standards for the Head of a Fire Department, §449.3, Minimum Standards for Certification as Head of a Suppression Fire Department, §449.5, Minimum Standards for Certification as Head of a Prevention Only Department.**

CHAPTER 449

HEAD OF A FIRE DEPARTMENT

~~§449.1 Minimum Standards for the Head of a Fire Department.~~

- ~~[(a) An individual who becomes employed and is assigned as the head of a fire department must be certified by the Commission as head of a fire department, within one year of appointment.]~~
- ~~[(b) An individual appointed head of a department must be eligible to be certified at the time of the appointment or will become eligible to be certified within one year of the appointment and must submit an affidavit verifying eligibility status at the time of the appointment if not holding a Commission certification.]~~
- ~~[(c) Holding the head of a fire department certification does not qualify an individual for any other certification. An individual who seeks certification in another discipline must meet the requirements for that discipline.]~~
- ~~[(d) Nothing contained in this chapter shall be construed to supercede Chapter 143, Local Government Code, in regard to appointment of a head of a fire department.]~~

~~§449.3 Minimum Standards for Certification as Head of a Suppression Fire Department.~~

- ~~[(a) Applicants for Head of a Fire Department certification must complete the following requirements:]~~
 - ~~[(1) must be appointed as head of a fire department; and]~~
 - ~~[(2) complete the Standards Review Assignment for Head of a Fire Department identified in the applicable chapter of the Curriculum Manual; and]~~
 - ~~[(3) meet with a Texas Commission on Fire Protection Compliance Section representative for review and approval of the Standards Review Assignment; and]~~
 - ~~[(4) attend at least one Texas Commission on Fire Protection regularly scheduled commission meeting or one regularly scheduled fire fighter advisory committee meeting in the first year of appointment; and]~~
 - ~~[(5) hold a certification as a fire protection personnel in any discipline that has a commission approved curriculum that requires structural fire protection personnel certification and five years experience in a full-time fire suppression position; or]~~
 - ~~[(6) an individual from another jurisdiction who possesses valid documentation of accreditation from the International Fire Service Accreditation Congress that is deemed equivalent to the commission's approved basic fire suppression curriculum and provide documentation in the form of a sworn nonself serving affidavit of five years experience in a full-time fire suppression position; or]~~
 - ~~[(7) provide documentation in the form of a nonself serving sworn affidavit of ten years experience as an employee of a local governmental entity in a full-time structural fire protection personnel position in a jurisdiction other than Texas; or]~~
 - ~~[(8) provide documentation in the form of a sworn nonself serving affidavit of ten years of experience as a certified structural part-time fire protection employee; or]~~

~~[(9) provide documentation in the form of a sworn nonself-serving affidavit of ten years experience as an active volunteer fire fighter in one or more volunteer fire departments that meet the requirements of subsection (b) of this section].~~

~~[(b) The ten years of volunteer service must include documentation of attendance at 40% of the drills for each year and attendance of at least 25% of a department's emergencies in a calendar year while a member of a volunteer fire department or departments with 10 or more active members that conducts a minimum of 48 hours of drills in a calendar year].~~

~~[(c) Individuals certified as the head of a fire department must meet the continuing education requirement as provided for in Chapter 441 of this title (relating to Continuing Education)].~~

~~[(d) An individual certified as head of a fire department under this section may engage in fire fighting activities only as the head of a fire department. These activities include incident command, direction of fire fighting activities or other emergency activities typically associated with fire fighting duties, i.e. rescue, confined space and hazardous materials response.]~~

~~[\$449.5 Minimum Standards for Certification as Head of a Prevention Only Department].~~

~~[(a) Applicants for Head of a Fire Department certification must complete the following requirements:]~~

~~[(1) must be appointed as head of a fire department; and]~~

~~[(2) complete the Standards Review Assignment for Head of a Fire Department identified in the applicable chapter of the Curriculum Manual; and]~~

~~[(3) meet with a Texas Commission on Fire Protection Compliance Section representative for review and approval of the Standards Review Assignment; and]~~

~~[(4) attend at least one Texas Commission on Fire Protection regularly scheduled commission meeting or one regularly scheduled fire fighter advisory committee meeting in the first year of appointment; and]~~

~~[(5) hold a certification as a fire inspector, fire investigator, or arson investigator and have five years of full-time experience in fire prevention activities; or]~~

~~[(6) an individual from another jurisdiction who possesses valid documentation of accreditation from the International Fire Service Accreditation Congress that is deemed equivalent to the commission's approved basic arson investigator, fire investigator or fire inspector curriculum and provide documentation in the form of a sworn nonself-serving affidavit of five years experience in a full-time fire prevention position; or]~~

~~[(7) provide documentation in the form of a sworn nonself-serving affidavit of ten years experience as an employee of a local governmental entity in a full-time fire inspector, fire investigator, or arson investigator position in a jurisdiction other than Texas; or]~~

~~[(8) provide documentation in the form of a sworn nonself-serving affidavit of ten years experience as a certified fire investigator, fire inspector or arson investigator as a part-time fire prevention employee; or]~~

~~[(9) provide documentation in the form of a sworn nonself-serving affidavit of ten years experience as an active volunteer fire inspector, fire investigator, or arson investigator with ten years experience in fire prevention.]~~

~~[(b) Individuals certified as the head of a fire department under this section must meet the continuing education requirement as provided for in Chapter 441 of this title (relating to Continuing Education).]~~

CHAPTER 449

HEAD OF A FIRE DEPARTMENT

SUBCHAPTER A

MINIMUM STANDARDS FOR HEAD OF A SUPPRESSION FIRE DEPARTMENT

§449.1 Minimum Standards for the Head of a Suppression Fire Department.

- (a) An individual who becomes employed and is assigned as the head of a suppression fire department must be certified by the commission as Head of a Suppression Fire Department, within one year of appointment.
- (b) An individual appointed head of a suppression fire department must be eligible to be certified at the time of the appointment or will become eligible to be certified within one year of the appointment and must submit an affidavit verifying eligibility status at the time of the appointment if not holding a commission certification.
- (c) Holding the Head of a Suppression Fire Department certification does not qualify an individual for any other certification. An individual who seeks certification in another discipline must meet the requirements for that discipline.
- (d) Nothing contained in this chapter shall be construed to supercede Chapter 143, Local Government Code, in regard to appointment of a head of a suppression fire department.
- (e) Individuals certified as the Head of a Suppression Fire Department must meet the continuing education requirement as provided for in Chapter 441 of this title (relating to Continuing Education).
- (f) An individual certified as Head of a Suppression Fire Department under this subchapter may engage in fire fighting activities only as the head of a suppression fire department. These activities include incident command, direction of fire fighting activities or other emergency activities typically associated with fire fighting duties, i.e. rescue, confined space and hazardous materials response.

§449.3 Minimum Standards for Basic Head of a Suppression Fire Department Certification.

- (a) Applicants for Basic Head of a Suppression Fire Department Certification must complete the following requirements:
 - (1) must be appointed as head of a suppression fire department; and
 - (2) complete the Standards Review Assignment for Head of a Fire Department identified in the applicable chapter of the Certification Curriculum Manual; and
 - (3) meet with a Texas Commission on Fire Protection Compliance Section representative for review and approval of the Standards Review Assignment; and
 - (4) attend at least one Texas Commission on Fire Protection regularly scheduled commission meeting or one regularly scheduled fire fighter advisory committee meeting in the first year of appointment; and
 - (5) document completion of the National Incident Management System courses 100, 200, 700, and 800; and

- (6) hold a Texas Commission on Fire Protection certification as a fire protection personnel in any discipline that has a commission approved curriculum that requires structural fire protection personnel certification and five years experience within the last ten years in a full-time fire suppression position; or
 - (7) an individual from another jurisdiction who possesses valid documentation of accreditation from the International Fire Service Accreditation Congress that is deemed equivalent to the commission's approved basic fire suppression curriculum and provide documentation in the form of a sworn nonself serving affidavit of five years experience within the last ten years in a full-time fire suppression position; or
 - (8) provide documentation in the form of a nonself serving sworn affidavit of ten years experience within the last fifteen years as an employee of a local governmental entity in a full-time structural fire protection personnel position in a jurisdiction other than Texas; or
 - (9) provide documentation in the form of a sworn nonself serving affidavit of ten years of experience within the last fifteen years as a certified structural part-time fire protection employee; or
 - (10) provide documentation in the form of a sworn nonself serving affidavit of ten years experience within the last fifteen years as an active volunteer fire fighter in one or more volunteer fire departments that meet the requirements of subsection (b) of this section.
- (b) The ten years of volunteer service referenced in subsection (a) paragraph (10) must include documentation of attendance at 40% of the drills for each year and attendance of at least 25% of a department's emergencies in a calendar year while a member of a volunteer fire department or departments with ten or more active members that conducts a minimum of 48 hours of drills in a calendar year.

§449.5 Minimum Standards for Intermediate Head of a Suppression Fire Department Certification.

(a) Applicants for Intermediate Head of a Suppression Fire Department Certification must complete the following requirements:

- (1) have a minimum of two years of experience in a full time head of a suppression fire department position or five years experience in administrative duties within a suppression fire department; and**
- (2) hold, as a prerequisite, Basic Head of a Suppression Fire Department Certification through the commission; and**
- (3) hold Fire Officer II certification through the commission; and**
- (4) document completion of the National Incident Management System courses 300 and 400; and**
- (5) complete training listed in one of the following options:**
 - (A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or**
 - (B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-**

List course and four B-List courses. (See the exception outlined in subsection (c) of this section); or

(C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1, with either one A-List course or four B-List courses (See the exception outlined in subsection (c) of this section).

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level Head of a Fire Department Certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§449.7 Minimum Standards for Advanced Head of a Suppression Fire Department Certification.

(a) Applicants for Advanced Head of a Suppression Fire Department Certification must complete the following requirements:

(1) have a minimum of four years of experience in a full time head of a suppression fire department position; and

(2) hold, as a prerequisite, an Intermediate Head of a Suppression Fire Department Certification through the commission; and

(3) hold Fire Officer III certification through the commission; and

(4) complete training listed in one of the following options:

(A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or

(B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-List course and four B-List courses. (See the exception outlined in subsection (c) of this section); or

(C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1, with either one A-List course or four B-List courses (See the exception outlined in subsection (c) of this section).

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level Head of a Fire Department Certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§449.9 Minimum Standards for Master Head of a Suppression Fire Department Certification.

(a) Applicants for Master Head of a Suppression Fire Department Certification must complete the following requirements:

- (1) have a minimum of six years of experience in a full time head of a suppression fire department position; and**
- (2) hold, as a prerequisite, an Advanced Head of a Suppression Fire Department Certification through the commission; and**
- (3) hold Fire Officer IV certification through the commission; and**
- (4) acquire 60 college semester hours or an associate degree, which includes at least 18 college semester hours in fire science subjects.**

(b) College level courses from both the upper and lower division may be used to satisfy the education requirement for Master Head of a Suppression Fire Department Certification.

SUBCHAPTER B

MINIMUM STANDARDS FOR HEAD OF A PREVENTION ONLY FIRE DEPARTMENT

§449.201 Minimum Standards for the Head of Prevention Only Fire Department.

- (a) An individual who becomes employed and is assigned as the head of a prevention only fire department must be certified by the commission as Head of a Prevention Only Fire Department, within one year of appointment.
- (b) An individual appointed head of a prevention only fire department must be eligible to be certified at the time of the appointment or will become eligible to be certified within one year of the appointment and must submit an affidavit verifying eligibility status at the time of the appointment if not holding a commission certification.
- (c) Holding the Head of a Prevention Only Fire Department certification does not qualify an individual for any other certification. An individual who seeks certification in another discipline must meet the requirements for that discipline.
- (d) Nothing contained in this chapter shall be construed to supercede Chapter 143, Local Government Code, in regard to appointment of a head of a prevention only fire department.
- (e) Individuals certified as the Head of a Prevention Only Fire Department must meet the continuing education requirement as provided for in Chapter 441 of this title (relating to Continuing Education).

§449.203 Minimum Standards for Basic Head of Prevention Only Fire Department Certification.

- (a) Applicants for Basic Head of a Prevention Only Fire Department Certification must complete the following requirements:
 - (1) must be appointed as head of a prevention only fire department; and
 - (2) complete the Standards Review Assignment for Head of a Fire Department identified in the applicable chapter of the Certification Curriculum Manual; and
 - (3) meet with a Texas Commission on Fire Protection Compliance Section representative for review and approval of the Standards Review Assignment; and
 - (4) attend at least one Texas Commission on Fire Protection regularly scheduled commission meeting or one regularly scheduled fire fighter advisory committee meeting in the first year of appointment; and
 - (5) documentation of completion of National Incident Management System 100, 200, 700 and 800; and
 - (6) hold a Texas Commission on Fire Protection certification as a fire inspector, fire investigator, or arson investigator and have five years experience within the last ten years in a full-time fire prevention position; or
 - (7) an individual from another jurisdiction who possesses valid documentation of accreditation from the International Fire Service Accreditation Congress that is deemed equivalent to the commission's approved basic arson investigator, fire investigator or fire

inspector curriculum and provide documentation in the form of a sworn non self serving affidavit of five years experience within the last ten years in a full-time fire prevention position; or

(8) provide documentation in the form of a sworn non self serving affidavit of ten years experience within the last fifteen years as an employee of a local governmental entity in a full-time fire inspector, fire investigator, or arson investigator position in a jurisdiction other than Texas; or

(9) provide documentation in the form of a sworn non self serving affidavit of ten years experience within the last fifteen years as a certified fire investigator, fire inspector or arson investigator as a part-time fire prevention employee; or

(10) provide documentation in the form of a sworn non self serving affidavit of ten years fire prevention experience within the last fifteen years as an active volunteer fire inspector, fire investigator or arson investigator.

§449.205 Minimum Standards for Intermediate Head of a Prevention Only Fire Department Certification.

(a) Applicants for Intermediate Head of a Prevention Only Fire Department Certification must complete the following requirements:

(1) have a minimum of two years of experience in a full time head of a prevention only fire department position or five years of experience in administrative duties within a prevention only fire department.

(2) hold, as a prerequisite, a Basic Head of a Prevention Only Fire Department Certification through the commission; and

(3) hold Fire Officer II certification through the commission; and

(4) document completion of National Incident Management System 300 and 400; and

(5) complete training listed in one of the following options:

(A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or

(B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-List course and four B-List courses. (See the exception outlined in subsection (c) of this section); or

(C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1, with either one A-List course or four B-List courses (See the exception outlined in subsection (c) of this section).

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level Head of a Fire Department Certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§449.207 Minimum Standards for Advanced Head of a Prevention Only Fire Department Certification.

(a) Applicants for Advanced Head of a Prevention Only Fire Department certification must complete the following requirements:

- (1) have a minimum of four years of experience in a full time head of a prevention only fire department position; and**
- (2) hold, as a prerequisite, an Intermediate Head of a Prevention Only Fire Department through the commission; and**
- (3) hold Fire Officer III certification through the commission; and**
- (4) complete training listed in one of the following options:**
 - (A) Option 1--Successfully complete six semester hours of fire science or fire technology from an approved Fire Protection Degree Program and submit documentation as required by the commission that the courses comply with subsections (b) and (c) of this section; or**
 - (B) Option 2--Completion of coursework from either the A-List or the B-List courses. Acceptable combinations of courses are as follows: two A-List courses; or eight B-List courses; or one A-List course and four B-List courses. (See the exception outlined in subsection (c) of this section); or**
 - (C) Option 3--Completion of coursework from either the A-List or the B-List courses in combination with college courses in fire science or fire protection. Acceptable combinations of courses are three semester hours meeting the requirements of Option 1, with either one A-List course or four B-List courses (See the exception outlined in subsection (c) of this section).**

(b) Non-traditional credit awarded at the college level, such as credit for experience or credit by examination obtained from attending any school in the commission's Certification Curriculum Manual or for experience in fire service, may not be counted toward this level of certification.

(c) The training required in this section must be in addition to any training used to qualify for any lower level Head of a Fire Department Certification. Repeating a course or a course of similar content cannot be used towards this level of certification.

§449.209 Minimum Standards for Master Head of a Prevention Only Fire Department Certification.

(a) Applicants for Master Head of a Prevention Only Fire Department Certification must complete the following requirements:

- (1) have a minimum of six years of experience in a full time head of a prevention only fire department position; and**

- (2) hold, as a prerequisite, an Advanced Head of a Prevention Only Fire Department Certification through the commission; and
 - (3) hold Fire Officer IV certification through the commission; and
 - (4) acquire 60 college semester hours or an associate degree, which includes at least 18 college semester hours in fire science subjects.
- (b) College level courses from both the upper and lower division may be used to satisfy the education requirement for Master Head of a Prevention Only Fire Department Certification.

- 7. Discussion and possible action regarding proposed rule changes to title 37 TAC, Chapter 457, Incident Safety Officer, including but not limited to, §457.1, Incident Safety Officer Certification, §457.3, Minimum Standards for Incident Safety Officer Certification, and §457.5, Examination Requirements.**

CHAPTER 457

MINIMUM STANDARDS FOR INCIDENT SAFETY OFFICER CERTIFICATION

§457.1 Incident Safety Officer Certification.

- (a) An Incident Safety Officer is defined as a member of the command staff responsible for monitoring and assessing safety hazards or unsafe situations and for developing measures for ensuring personnel safety at an incident.
- (b) All individuals holding an Incident Safety Officer certification shall be required to comply with the continuing education requirements in Chapter 441 of this title (relating to Continuing Education).
- (c) All Safety Officer certifications issued by the commission and referenced in this chapter are voluntary.

§457.3 Minimum Standards for Incident Safety Officer Certification.

In order to be certified as an Incident Safety Officer an individual must:

- (1) hold commission certification as Fire Officer I and;
- (2) possess valid documentation of accreditation from the International Fire Service Accreditation Congress as an Incident Safety Officer; or
- (3) complete a commission approved Incident Safety Officer program and successfully pass the commission examination as specified in Chapter 439 of this title (relating to Examinations for Certification). An approved Incident Safety Officer program must consist of one of the following:
 - (A) completion of a commission approved Incident Safety Officer curriculum as specified in the applicable chapter of the commission's Certification Curriculum Manual; or
 - (B) completion of the National Fire Academy Incident Safety Officer course; or
 - (C) completion of the Fire Department Safety Officers Association Incident Safety Officer course; or
- (D) completion of an out-of-state, educational institution of higher education, and/or military training program that has been submitted to the commission for evaluation and found to be equivalent to, or exceeds the commission approved Incident Safety Officer curriculum.

§457.5 Examination Requirements.

- (a) Examination requirements of Chapter 439 of this title (relating to Examinations for Certification) must be met in order to receive an Incident Safety Officer certification, unless otherwise specified in this chapter.
- (b) Individuals will be permitted to take the commission examination for Incident Safety Officer certification by documenting Fire Officer I certification through the commission or the equivalent IFSAC seal, and completing a commission approved Incident Safety Officer curriculum.

- 8. Discussion regarding status of issue related to protective clothing for airport firefighters and the National Fire Protection Association's response to the formal interpretation request.**



National Fire Protection Association

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June 4, 2014

Mr. Jessie Gentry, Assistant Fire Chief VIA EMAIL ONLY
Dallas Fort Worth International Airport Fire Department
P.O. Drawer 610687
DFW Airport, TX 75261

Re: Formal Interpretation Request for NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2014 edition

Dear Mr. Gentry:

NFPA is in receipt of your request for a Formal Interpretation of NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting* (2014 edition), and specifically Section 5.1.2 (1-7).

In accordance with the *Regulations Governing the Development of NFPA Standards* (Regulations), I have consulted with the appropriate Staff Liaison and determined that your request for a Formal Interpretation will not be processed. The reasons for this determination are found in Section 6.1.5 (d) of the Regulations. Specifically, the requested Formal Interpretation addresses NFPA 1851 requirements which involve “subjects that are not addressed in the NFPA Standard.”

NFPA 1851, *Chapter 5*, sets forth risk assessment criteria to be considered by an organization (as that term is defined within the Standard) prior to the selection of fire fighting ensembles and ensemble elements. As expressed within the Scope of NFPA 1851 (see *Chapter 1, 1.1 Scope, Chapter 5, 5.1.3* and the associated *Annex A.5.1.3*), the standard “shall specify the minimum selection, care, and maintenance requirements” for structural and proximity fire fighting protective ensembles and ensemble elements. Simply, the standard requires an organization to conduct a risk assessment prior to deciding what ensembles and ensemble elements to purchase but beyond this, does not address the scope of authority of an organization nor how the organization may exercise its judgment in determining whether or not to purchase such (see *Chapter 5, 5.1.1, Annex Note A.5.1.1, and Table A.5.1.1*).

Thank you for your interest in the NFPA standards development process. We look forward to your continued involvement.

Sincerely,

Dawn Michele Bellis
Secretary, NFPA Standards Council



Dallas/Fort Worth International Airport
Public Safety

Firefighter Advisory Committee Meeting
Airport Firefighters & Proximity Firefighting
April 2, 2014



Objective

- Reverse the compliance ruling that all Airport Firefighters must wear Proximity Clothing

- Recommendations driven by:
 - NFPA 1500
 - NFPA 1971
 - NFPA 1851
 - Texas Government Code
 - Texas Administrative Code
 - Customer Service (safety)



Standards & Codes

- NFPA 1500 (7.3) Protective Clothing for Proximity Fire-Fighting Operations
 - 7.3.1 When determining the need for proximity ensembles, the organization shall perform a risk assessment as required by Chapter 5 of NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Firefighting*.
 - 7.3.2 When it is determined proximity protective ensembles are required, members shall be provided with and shall use proximity fire-fighting protective ensembles and ensemble elements that are compliant with NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*.



Standards & Codes

- NFPA 1851 (Chapter 5, Selection and Purchase)
 - 5.1.1 Prior to starting the selection process of structural fire fighting ensembles and ensemble elements and proximity fire fighting ensembles and ensemble elements, the organization shall perform a risk assessment.
 - 5.1.2 The risk assessment shall include, but not limited to, the hazards that can be encountered by structural or proximity fire fighters based on the following:
 - Types of duties performed
 - Frequency of use of ensemble elements
 - Organizations experiences
 - Incident Operations
 - Geographical location and climate
 - Specific general area of operation
 - Likelihood of or response to CBRN terrorism incident



Standards & Codes

- NFPA 1971 (1.1) Scope
 - 1.1.1 This standard shall specify the minimum design, performance, testing, and certification requirements for structural fire fighting protective ensembles and ensemble elements that include coats, trousers, coverall, helmets, gloves, footwear, and interface components.
 - 1.1.2 This standard shall specify the minimum design, performance, testing, and certification requirements for proximity fire fighting protective ensembles and ensemble elements that include coats, trousers, coverall, helmets, gloves, footwear, and interface components.
 - A1.1 Organizations responsible for specialized functions including, but not limited to, wildland firefighting, proximity firefighting, and other specialized fire fighting, emergency medical service, special operations, and hazardous materials response should use appropriate protective clothing and protective equipment specifically designed for those activities.



Standards & Codes

- Texas Government Code (419.043)
 - The National Fire Protection Association standard applicable to protective clothing, self-contained breathing apparatus, or personal alert safety systems is the standard in effect when a fire-fighting agency contracts to purchase the item. The agency may continue to use an item that was in use or contracted for before a change in a standard unless the commission determines that the continued use constitutes an undue risk to the wearer, in which case the commission shall order the use be discontinued and shall set an appropriate date for compliance with the revised standard.



Standards & Codes

- Texas Government Code (419.040)
- (a) A fire department shall purchase, provide, and maintain a complete ensemble of appropriate protective clothing for each of its fire protection personnel who would be exposed to hazardous conditions from fire or other emergencies or where the potential for such exposure exists.
- (b) The protective clothing shall be suitable for the task that the individual is expected to perform and must comply with the minimum standards of the National Fire Protection Association or its successor.
- (c) The fire department shall develop and maintain a standard operating procedure covering the proper use, selection, care, and maintenance of all of its protective clothing.



Standards & Codes

- Texas Administrative Code (427.7)
 - Each and every set of protective clothing, including proximity clothing, that will be used during the course of instruction for a commission approved fire protection personnel curriculum shall comply with §435.1 of this title (relating to Protective Clothing). This rule applies whether the protective clothing is provided by the academy or the trainee.
 - (1) Protective clothing and elements no longer in use to the organization for emergency operations service, but are not contaminated, defective, or damaged, may be used for training that does not involve live fire training, provided such clothing and elements are appropriately marked to be easily recognized.
 - (2) Protective clothing used for aircraft rescue, live fire training, shall be suitable for the type of fire the student is being trained for and shall be determined by the chief training officer of the training facility.



Standards & Codes

- Texas Administrative Code (435.1)
 - A regulated fire department shall:
 - (2) ensure that all protective clothing which are used by fire protection personnel assigned to fire suppression duties comply with the minimum standards of the National Fire Protection Association suitable for the tasks the individual is expected to perform. The National Fire Protection Association standard applicable to protective clothing is the standard in effect at the time the entity contracts for new, rebuilt, or used protective clothing; and
 - (3) maintain and provide upon request by the commission, a departmental standard operating procedure regarding the use, selection, care, and maintenance of protective clothing which complies with NFPA 1851, Standard on Selection, Care, and Maintenance of Structural Fire Fighting Protective Ensembles.

Results

- Proximity Firefighting (Defined per NFPA 1851)
 - Specialized firefighting operations that can include the activities of rescue, suppression, and property conservation, at incidents involving fire producing high levels of radiant heat as well as conductive and convective heat.
- No Standard or State Code exists that specifically states "Airport Firefighters must wear Proximity Clothing" whether responding to or standing by in the movement area.
- NFPA 1500 states that a risk assessment as specified in NFPA 1851 shall be performed to determine selection of protective clothing (structural, proximity, wildland, CBRN, etc).
- Proper Protective Clothing meeting NFPA 1971 and suitable for the task that the individual is expected to perform will provide the greatest safety for all firefighters.



Recommendation

- Allow Fire Departments in the State of Texas to make decisions related to the selection and purchase of **Protective Clothing** through:
 - The results of the Risk Assessment as specified in the most current Edition of NFPA 1851.

9. Discussion and possible action on future meeting dates, locations and agenda items.

10. Adjourn meeting.