OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REGULATIONS FOR FIRE INVESTIGATORS©

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The following information should be reviewed by Fire Investigation Unit Managers and considered in the development of policies and procedures for investigative operations at fire and explosion scenes. The Occupational Safety and Health Act [*Public Law 91-596, December 29, 1970 as amended by Public Law 101-552, November 5, 1990*], sets forth duties and responsibilities for fire investigators with respect to workplace safety and health and grants the Occupational Safety and Health Administration (OSHA) enforcement authority for violations of provisions of the Act. In most states, Occupational Safety and Health agencies generally follow the minimum federal standards with respect to the enforcement of occupational safety and health laws.

Generally, the Act requires that all personnel and their employers be reasonably diligent regarding safety and health requirements. For example, Section 5 of the Act requires employers to protect employees from recognized hazards likely to cause serious harm or death and to comply with all applicable mandatory safety and health standards. In addition, Section 17 of the Act stipulates that a serious violation is deemed to exist where there is substantial probability that serious physical harm or death could result, unless the employer did not, or could not, with the exercise of reasonable diligence, know about it.

Enforcement activity by OSHA officials has dramatically increased at fire and explosion scenes involving federal, state, and local investigative agencies. The basis for these actions is noncompliance with various OSHA safety and health regulations and standards. Since many fire departments and law enforcement agencies are not aware of, or familiar with, the impact of OSHA regulations on their operations, employers may be subject to civil and/or criminal citations for violations.

Generally, when OSHA investigates an employer for potential violations of its regulations, the investigation and subsequent activities are governed by civil proceedings. In a large number of cases, employers do not contest OSHA citations. When they do contest them, proceedings are conducted before the Occupational Safety and Health Review Commission and the federal courts. To prove a violation of an OSHA standard, the agency (i.e., OSHA), must initially show that the following four factors are present:

- The cited standard applies to the employer;
- The requirements of the standard were not complied with;
- The employees had access to the conditions that were violations; and
- The employer knew, or with reasonable diligence, could have known of the violative conditions.

Showing that the terms of these standards were violated typically involves showing that the conditions were hazardous or unreasonably hazardous to employees. In addition, establishing what was not *"reasonably diligent"* about an employer's behavior is often a critical part of the case. Fire departments and law enforcement agencies may demonstrate compliance (show *"reasonable diligence"*) by establishing effective safety and health programs, policies and

procedures that adequately address the potential safety and health hazards that their personnel may be exposed to at fire and explosion scenes.

OSHA procedures dictate that although there may be a violation of the requirements of an OSHA standard, no citation will be issued when one of the following circumstances exists:

- An employer **complies with the clear intent of the standard** but deviates from its particular requirements in a manner that has no direct or immediate relationship to employee safety or health;

- An employer **complies with a proposed standard or amendment or a consensus standard** (e.g., NFPA 472, NFPA 921, NFPA 1500, etc.) rather than with the standard in effect at the time of the inspection and the employer's action **clearly provides equal or greater employee protection** or the employer complies with a written interpretation issued by OSHA; and

- **An employer's workplace is "state of the art"** which is technically beyond the requirements of the applicable standard **and provides equivalent or more effective safety or health protection than the applicable OSHA standard**.

Therefore, demonstrating compliance with the safety and health guidelines of recommended practices or nationally recognized standards and guidelines such as NFPA 921 - *Guide for Fire and Explosion Investigations* and NFPA 1033 - *Standard for Professional Qualifications for Fire Investigators,* could be important in showing *"reasonable diligence"* regarding the safety and health requirements for investigators.

Many fire investigation unit managers have been surprised to learn of the potential civil and criminal liability associated with investigative personnel entering fire and explosion scenes without exercising proper safety precautions as required by OSHA regulations. In general terms, OSHA can issue civil fines for noncompliance with the provisions of its standards, and in some situations such as the willful death of an employee, the agency can refer cases to the United States Department of Justice for criminal prosecution.

The level of enforcement activity and interpretation of the requirements of OSHA regulations on the part of federal and state OSHA compliance officers often varies from state to state, thereby making it difficult for managers to understand and comply with the provisions of the regulations on a consistent basis.

Most incidents that investigators respond to do not generally involve hazardous materials or hazardous wastes, however, there are certain situations that may pose safety and health hazards, or the potential for exposure to hazardous substances. In these instances, the scenes may qualify as hazardous materials incidents as defined by Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*).

This regulation is commonly referred to as "HAZWOPER." HAZWOPER specifies performance-based requirements for emergency planning, safety and health programs, site safety practices, training, medical surveillance, personal protective clothing and equipment, decontamination procedures and implementation of an incident command system. HAZWOPER also requires that all personnel, including fire investigators, engaged in hazardous waste site operations or response activities at locations where hazardous substances are present, must be

properly trained and certified prior to engaging in such activities. These requirements must be followed for all operations conducted at sites where an uncontrolled release of a hazardous substance has occurred, or is likely to occur, that could pose a potential safety and/or health hazard to personnel working at the scene.

In addition, the regulation requires organizations to address the following subject areas in their *Emergency Response Plans* and standard operating procedures:

- Emergency planning
- Safety and health programs
- Site safety practices
- Training
- Medical surveillance
- Personal protective clothing and equipment
- Decontamination procedures
- Incident Command System

According to OSHA, *"a response to a fire is considered an emergency response to the release of a hazardous substance if the material on fire can be classified as a hazardous substance before it ignited."* For example, OSHA does not consider electrical wiring insulation and PVC pipe hazardous substances unless they are ignited and generate hazardous decomposition products such as hydrogen chloride and chlorine. Therefore, in these situations, the provisions of HAZWOPER would apply and employers would need to provide, among other things, proper emergency response planning, training, and medical surveillance for investigators engaged in incident operations.

According to OSHA, a hazardous substance incident is essentially *"any incident without regard to location, where there is a release or potential release of a hazardous substance."* ***This distinction is important because OSHA regulations with respect to hazardous materials training requirements (i.e., HAZWOPER) do not apply to personnel working at sites where there is no potential safety or health hazard and no risk of exposure to hazardous substances***. However, based on OSHA's definition, virtually any fire or explosion scene could be considered a potential hazardous materials or hazardous waste site incident within the scope of 29 CFR 1910.120, and appropriate precautions should be taken by investigators to conduct fire or explosion investigations.

The assessment of the potential hazards at the scene of a fire or an explosion is a case-by-case or substance-by-substance evaluation when determining whether a site potentially contains hazardous conditions/substances. The potential for **Immediately Dangerous to Life and Health** (IDLH) conditions resulting from high vapor pressure, toxicity, or oxygen displacement properties is a primary concern.

NOTE: An *Immediately Dangerous to Life and Health (IDLH)* atmosphere refers to an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life, or would cause irreversible or delayed adverse health effects, or would interfere with an individual's ability to escape from a dangerous atmosphere.

HAZWOPER does not normally cover incidents involving routine structure fires and burning of houses, wood, etc., since other OSHA standards apply to these activities. For example, the OSHA *Fire Brigade Standard, 29 CFR 1910.156*, contains requirements for organization, training, selection of personal protective equipment (PPE) and pre-planning during emergencies

for private or industrial fire departments. Although directed primarily at industrial fire departments, in state OSHA jurisdictions, the fire brigade standard may also apply to state, county and municipal fire departments.

As a result of these regulations, investigators that participate in activities at scenes where potential safety and/or health hazards exist, must comply with all of the applicable HAZWOPER requirements at their level of participation (*e.g., First Responder Awareness, First Responder Operations, Hazardous Materials Technician, etc.*).

Investigators (and their organizations) involved in operations conducted at scenes where hazardous substances and/or hazardous wastes are present in violation of the OSHA standards are subject to citations for non-compliance. The potential for explosive concentrations during a release and the proximity to ignition sources are important considerations at scenes where flammable or combustible materials are present. *Corrosivity* and other potential hazards that may cause bodily impairment or damage would also necessitate evaluation of the hazard potential of fire and explosion scenes.

In some instances, the most prudent action may be to wait until the scene is *"safe"* and no IDLH conditions or potential safety or health hazards exist as confirmed by atmospheric monitoring. This approach assumes that investigators are able to wait and that evidence will not be destroyed, contaminated or lost. However, this approach will not work for all situations since some hazardous substances will continue to present safety and/or health hazards for extended periods of time due to their hazardous properties. Investigators will need to assess the hazards on a case-by-case basis to determine the safest and most prudent course of action.

Fire investigators must answer the following three key questions to determine whether their activities might fall within the scope of the federal hazardous materials training regulations, and to identify the applicable requirements that will govern their operations:

1. Does the fire or explosion scene present hazards that may pose a potential threat to the safety and health of investigators (*i.e., does a risk of exposure exist*)?

2. Have federal, state or government officials declared the incident a hazardous materials incident or a hazardous waste site incident?

3. Is the *emergency* phase of the incident still in progress, or has the individual-in-charge of the site terminated the emergency and *post-emergency response* operations are being performed?

This assessment process is essential in that it determines the appropriate training requirements for personnel entering the site. It is crucial that investigators recognize a fire or explosion incident as a potential hazardous materials / hazardous waste incident so that the appropriate procedures and guidelines can be followed. This will also help investigators from being barred from entering the site, prevent potential serious injury and avoid potential liability for noncompliance with applicable OSHA regulations.

Fire investigators typically encounter materials at the sites of fires and explosions that technically qualify as hazardous substances (i.e., hazardous materials and/or hazardous wastes) as defined by OSHA, and therefore, are subject to regulation. These situations include:

- Scenes where releases may cause high levels of exposure to toxic substances;

- Situations that are life or injury threatening;

- Incidents requiring employee evacuation of the area; and

- Releases that pose for *Immediately Dangerous to Life and Health* (IDLH) conditions, fire and explosion hazards [exceeds or has the potential to exceed 25% of the Lower Explosive Limit (LEL)], the release requires immediate attention because of danger, or presents an oxygen deficient condition.

OSHA requires a minimum number of persons to be present in certain emergency situations when an IDLH or potential IDLH atmosphere is present before entry into hazardous areas can commence. 29 CFR 1910.120 (q)(3)(v) requires that a minimum of four (4) persons be present during an emergency response to the release of hazardous substances. This is based on OSHA's reference to the *"buddy system"* which means that at least two persons must enter the hazardous area and at least two additional persons must standby outside of the area with equipment ready to provide assistance or rescue if necessary. This does not necessarily mean that four investigators must be present at all scenes where hazardous substances may be present. However, the standard does require that at least four individuals are present at the site before entry operations can begin.

NOTE: In most situations, the most practical means to satisfy this requirement is to coordinate scene activities with a Hazardous Materials Response Team (HMRT), provided one is available. If not, four (4) appropriately trained investigative personnel must be present to conduct incident operations, or operations cannot be conducted. In many jurisdictions, a HMRT will either already be present at the scene or will be requested to respond to support on-scene operations if the presence of hazardous materials are suspected. A safe and effective operation will require a coordinated effort between all agencies present at the incident scene (*e.g., fire department, HMRT, law enforcement, government officials, etc.*).

SCOPE OF 29 CFR 1910.120 ("HAZWOPER")

The primary OSHA regulation that governs the actions of investigators at fire and explosion scenes is the *Hazardous Waste Operations and Emergency Response Rule* - 29 CFR 1910.120. The issuance of federal hazardous materials training regulations was required under the authority of Section 126 of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title I -- also referred to as the *Emergency Planning and Community Right-to-Know Act*), which was signed into law on October 17, 1986).

This regulation required OSHA and EPA to promulgate identical regulations that would protect workers engaged in hazardous waste clean-up operations and emergency response activities involving hazardous substances. Section 126(a) of SARA requires that the Secretary of Labor shall, pursuant to Section 6 of the *Occupational Safety and Health Act of 1970*, promulgate standards for the health and safety of employees engaged in hazardous waste operations. These standards were published by OSHA on March 6, 1989, and went into effect on March 6, 1990. The final rule, *Hazardous Waste Operations and Emergency Response*, is codified as 29 Code of Federal Regulations (CFR) 1910.120 and is commonly referred to as **HAZ**ardous **W**aste **OP**erations and **E**mergency **R**esponse (HAZWOPER).

Key requirements of the regulation cover the following areas:

- *Hazardous Waste Operations at Uncontrolled Hazardous Waste Sites* -- 20 CFR 1910.120, paragraphs (a)-(o)

- *Emergency Responses to Uncontrolled Releases Hazardous Substances Without Regard to Location*--29 CFR 1910.120, paragraph (q).

- *Emergency Response Plan* -- 29 CFR 1910.120, paragraph (q)(2)

- *Incident Command System* -- 29 CFR 1910.120, paragraph (q)(3)

- *Emergency Response Procedures*, including the establishment of an Incident Management System, the use of a buddy system with back-up personnel, and the establishment of a Safety Officer -- 29 CFR 1910.120, paragraphs (q)(3) (v), (vi) and (vii)

- *Specific Training Requirements*, covering response personnel for both initial and refresher training -- 29 CFR 1910.120, paragraph (q)(6) (iii) and 29 CFR 1910.120, paragraph (q)(8)

- *Post-Emergency Response Operations* -- 29 CFR 1910.120, paragraph (q)(11)

The applicable training requirements for investigators depend on which of the above listed operations personnel are involved in. The categories of individuals these regulations ultimately cover include firefighters, police officers, public safety and industrial hazardous materials response teams, private clean-up contractors, and federal, state, and local government inspectors and investigators conducting inspections or initial and post-emergency response investigations at hazardous materials and hazardous waste sites. The regulations establish minimum guidelines for the protection of personnel and require that they be protected during preliminary site evaluations and initial site entry to final closure of the site.

SARA Section 126(f) required the Administrator of the EPA to issue standards for hazardous waste operations and emergency response that are identical to the OSHA standards. The EPA regulations were originally published on June 23, 1989, and incorporated the OSHA standards by reference. The EPA regulations were officially issued on March 6, 1990 (*the same effective date as the OSHA standards*), and are codified at 40 CFR Part 311, *Worker Protection Standards for Hazardous Waste Operations and Emergency Response*.

Although the EPA and OSHA worker protection standards for hazardous waste operations and emergency response contain identical substantive provisions, the regulations differ with respect to their scope of coverage. The OSHA standards apply directly to private employees and to federal employees through Executive Order 12196. OSHA has no authority to enforce regulations protecting state and local government employees. The Occupational Safety and Health Act encourage states to develop and administer their own safety and health programs. States with plans approved under Section 18(b) of the *Occupational Safety and Health Act*, must adopt standards and enforce requirements that are at least as stringent as those outlined in the federal requirements.

Through its review and approval authority, OSHA requires states to extend occupational safety and health protection to all state and local government employees, as well as to private sector employees within the state's jurisdiction. Although Federal OSHA *recommends* that states

with delegated programs define "employee" to include both compensated and uncompensated workers, not all states have followed this recommendation.

Federal OSHA regulations generally do not apply to state and local governments. When these regulations were originally developed, Congress intended for all workers to be covered, including firefighters, law enforcement personnel and emergency medical services personnel. In states *without* an OSHA-approved plan, Federal OSHA standards protect all private sector and Federal employees engaged in hazardous waste operations and emergency response activities.

The EPA's authority extends to state and local government employees conducting hazardous waste operations and emergency response activities in states that *do not* have in effect an OSHA-approved state plan. Currently, 25 states are OSHA-plan states; 23 of these states administer plans that cover both public (state and local government) and private sector employees; and two states, Connecticut and New York, cover public employees only. OSHA-plan states must adopt standards comparable to federal OSHA requirements within six (6) months of the promulgation of federal standards.

The EPA regulations cover both compensated and uncompensated state and local government employees engaged in hazardous waste operations and emergency response activities. Therefore, the EPA regulations protect volunteers, such as volunteer firefighters who respond to hazardous substance emergencies, and the EPA worker protection standards protect *all* state and local government employees, except as noted above) including volunteer workers. In states *with* an OSHA-approved plan, the state programs cover all private sector employees, as well as state and local government employees (except as noted above), and Federal OSHA covers Federal employees.

Despite the fact that the OSHA and EPA regulations differ in their scope of coverage, both sets of regulations apply to three primary groups of personnel:

- Employees engaged in emergency response activities without regard to location;

- Employees engaged in routine hazardous waste operations at TSD facilities regulated under RCRA; and

- Employees engaged in mandatory or voluntary clean-up activities at uncontrolled hazardous waste sites, including corrective actions at TSD facilities.

HAZWOPER requires organizations to prepare a written organizational statement outlining the specific activities that its employees may be involved in, such as responding to scenes where the potential for exposure to hazardous substances exists. The HAZWOPER requirements for personnel engaged in hazardous waste operations and emergency response activities at uncontrolled hazardous waste sites are specified in 29 CFR 1910.120, paragraphs (a) through (o). The emergency response requirements in 29 CFR 1910.120(q) are specifically designed to protect personnel who respond to a variety of emergencies at different locations with various extenuating circumstances. Examples of emergency response operations that occur without respect to location could include a fire at a gasoline service station, a fire at a warehouse containing fertilizers and pesticides, and an explosion at an industrial facility.

The requirements of paragraphs (a) through (o) apply to all personnel, including fire investigators that perform activities at uncontrolled hazardous waste sites, and could potentially be exposed to hazardous substances. These provisions apply to any activities performed during

preliminary planning and assessment and site investigations. *In other words, all stages of an operation performed at a site where there is a potential for exposure to hazardous substances must be conducted in accordance with the worker protection standards specified in 29 CFR 1910.120, paragraphs (a) through (o).*

The standards **do not** apply those employees who will not be exposed to, or who do not have the potential to be exposed to, hazardous substances. For example, personnel who work at the perimeter of a hazardous materials incident or a hazardous waste site, who do not enter contaminated areas where hazardous materials are present and hazardous atmospheres exist, and who are not exposed to safety or health hazards, are not covered. Nonetheless, OSHA does require that these personnel be made aware of the organization's *Emergency Response Plan*.

The HAZWOPER emergency response requirements are codified in 29 CFR 1910.120 (q) and include the following:

(1) Emergency response plan
(2) Elements of an emergency response plan
(3) Procedures for handling emergency response
(4) Skilled support personnel
(5) Specialist employees
(6) Training
(7) Trainers
(8) Refresher Training Program
(9) Medical surveillance and consultation
(10) Chemical protective clothing
(11) Post-emergency response operations

EMERGENCY RESPONSE PLAN REQUIREMENTS

OSHA 29 CFR 1910.120 requires organizations to develop a written comprehensive *Emergency Response Plan* (*if the employer intends to have personnel respond to releases that would require an emergency response*) that outlines the emergency response capabilities appropriate for the particular situation. In developing this plan, organizations must consider the variety of possible emergency situations that could occur within their respective jurisdictions.

29 CFR 1910.120, Section (q)(2), *Elements of an Emergency Response Plan*, states, *"The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following to the extent that they are not addressed elsewhere"*:

- Pre-emergency planning and coordination with outside parties
- Personnel roles, lines of authority, training, and communication
- Emergency recognition and prevention
- Safe distances and places of refuge
- Site security and control
- Evacuation routes and procedures
- Decontamination procedures
- Emergency medical treatment and first aid
- Emergency alerting and response procedures
- Critique of response and follow-up
- PPE and emergency equipment

This information must be included in the organization's *Emergency Response Plan,* and all personnel must receive training in the elements of the plan prior to the commencement of emergency response operations. In addition to these elements, the *Emergency Response Plan* must include procedures for establishing an *Incident Command System* (ICS), identify the chain of command that will be in operation during an emergency, and clearly delineate the lines of authority and procedures to be followed. Essentially, all personnel who may encounter a release that requires an emergency response should be addressed in the *Emergency Response Plan,* and these individuals must understand to who they are to report.

In addition to the planning requirements specified in *29 CFR 1910.120(q)*, SARA Title III specifies a multitude of planning requirements that address emergency response planning for a community. The goal of the Title III planning requirements is to protect the public in the event of an emergency involving an extremely hazardous substance. Emergency response organizations may use the local emergency response plan or the state emergency response plan (or both) as part of their *Emergency Response Plan* to avoid any unnecessary duplication of information.

For organizations without existing plans, an option for developing one rather easily is to contact other fire departments or law enforcement agencies to obtain copies of their plans and use them as a guideline in developing an organization-specific *Emergency Response Plan*. An organization's *Emergency Response Plan* is not only essential to comply with the law, but it also serves as a pre-planning document that defines the roles, responsibilities, and operational procedures for personnel operating at an emergency *before* an incident occurs.

The key question that must be answered to determine whether organizations must comply with the OSHA standard is *"what is expected of investigators during an incident that involves a fire or an explosion?"* Are all personnel who are expected to respond:?

- Adequately trained for their individual job duties?
- Properly equipped for the intended tasks?
- Capable of responding in a safe manner?
- Managed by competent leaders?

OSHA's compliance directive states that the key to compliance with the requirements of 29 CFR 1910.120 is the organization's Emergency Response Plan. Some of the requirements of an *Emergency Response Plan* may not be applicable to a particular organization; therefore, organizations should review their duties, responsibilities, and policies and procedures that govern on-scene operations to determine to what extent these provisions apply to their activities.

In evaluating an organization’s response to an incident, some key questions that OSHA considers are:

- Were the emergency response procedures followed?
- Was there an ICS established?
- Was a single individual in charge of the incident from beginning to end?

KEY TRAINING PROVISIONS OF HAZWOPER

The purpose of the HAZWOPER training requirements is to provide employees with the requisite knowledge and skills to participate in an emergency response operation with minimal risk to their own health and safety, as well as the safety and health of other personnel.

Personnel that respond to incidents may become exposed to hazardous substances, with the risk of exposure varying with each incident. As a result, the amount and type of training required under the standard for investigators engaged in on-scene operations is linked directly to an individual's potential for exposure to hazardous substances and to other health hazards while conducting an investigation.

The underlying requirement for hazardous materials emergency response training in 29 CFR 1910.120 paragraph (q) is that each investigator must be sufficiently trained to carry out their duties and responsibilities in a safe manner based on the expected level of participation in scene operations. The skills and knowledge levels required for personnel must be conveyed to them through training *before* they are permitted to take part in actual incident operations. The specific training requirements for individuals who perform emergency response operations without regard to location are specified at 29 CFR 1910.120(q)(6).

An investigator's certified level of training is extremely critical since an individual's training level defines the specific actions that can be performed, as well as the limitations of the individual. For example, an individual trained to the *First Responder Awareness* level cannot enter the hazardous area (i.e., hot zone), while an individual trained to the *Hazardous Materials Technician* level is permitted to do so.

29 CFR 1910.120 paragraph (q) does not delineate specific procedures for certifying investigators as trained; however, the language contained in paragraph (q) implies that the employer shall provide written certification to all personnel who have successfully completed the training for each and all of the various responder levels defined in 29 CFR 1910.120 (q)(6).

NOTE: Regardless of the level of training, the employer has the ultimate responsibility to document and certify an investigator's specific level of training.

Job responsibilities define training requirements; training does not define job responsibilities. Therefore, if an individual has not been trained in a specific procedure and/or informed that they will be asked to perform that procedure during an emergency, the individual cannot perform that task regardless of their level of training.

All personnel working at fire or explosion scenes where hazardous substances are present, or where the potential exists for a hazardous condition, must be familiar with the appropriate action(s) to take. Investigators must be trained to the proper level, which depends on the procedures that the organization expects that individual to perform. The organization must determine the job duties and responsibilities for all personnel and train them accordingly. Training must be based on the duties and functions to be performed by each individual in the organization. Organizations must consider an investigator's expected job duties, not their job titles, and the safety and health risks associated with their activities when determining the appropriate level of training.

TRAINING PROGRAMS

Organizations have a number of options available to satisfy the minimum training requirements outlined in 29 CFR 1910.120. These options include a variety of training courses offered by a number of private training institutions and colleges, fire department hazardous materials response training institutions, and federal, state and local government agencies. Organizations may also refer to *29 CFR 1910.120, Appendix E – Training Curriculum Guidelines*

(Non-mandatory) for a summary of the generic guidelines that may be used to develop specific training programs for investigators that meet the requirements of the OSHA standard.

Two of the most popular courses that have been endorsed by OSHA and EPA as meeting the training requirements for investigators that conduct site investigations are the *Emergency Response to Hazardous Substance Releases Course* (OSHA Course No. 335) offered by the OSHA Training Institute and the *Hazardous Materials Incident Response Operations Course* (EPA Course No. 165.5) offered by the EPA.

OSHA's HAZWOPER Compliance Directive (OSHA Instruction CPL 2-2.59, *Inspection Procedures for the Hazardous Waste Operations and Emergency Response Standard*) requires that for all inspections on a site where an ongoing emergency is not occurring, but where HAZWOPER applies because it is reasonable to anticipate an emergency (i.e., where 29 CFR 1910.120 (q) would apply), personnel must be knowledgeable of the following:

- Potential hazards personnel may encounter;
- Site-specific procedures to be followed in the event of an emergency;
- Signs and symptoms of overexposure to hazardous substances, and the use of appropriate monitoring equipment; and
- The appropriate PPE to be worn. Each investigator that is expected to use PPE shall be trained in the proper care, use, and limitations of the PPE.

For all investigative activities at a site where personnel are investigating an incident or providing technical assistance that involves hazardous substances, personnel must be knowledgeable of the above elements, and in addition, must:

- Have the appropriate training required by 29 CFR 1910.120 prior to entering areas where safety and health hazards exist;
- Be knowledgeable of the contents of OSHA Instruction CPL 2.94 (*OSHA Response to Significant Events of Potential Catastrophic Consequences)*; and
- Participate in exercises or drills that emphasize the role of investigators during emergency response operations.

To meet these training objectives for its safety and health compliance officers, OSHA offers a four-day *Emergency Response to Hazardous Substance Releases Course* (OSHA Course Number 335). This course is offered by the OSHA Training Institute in Des Plaines, lllinois, and is designed to increase an individual’s knowledge of hazardous materials incident operations, all facets of emergency response procedures, safety and health hazards and hazard and risk assessment processes.

Topics include:

- OSHA *Hazardous Waste Operations and Emergency Response Rule* (29 CFR 1910.120)
- Training requirements
- Personal protective clothing and equipment
- Decontamination

- Incident Command System
- Air monitoring
- Site safety plans
- Site operations

The course also includes a hazard and risk analysis workshop and a field exercise in which participants have the opportunity to don chemical protective clothing. Additional information, including course registration, can be obtained by contacting the OSHA Training Institute at (847) 297-4913 or through OSHA's Internet Web Site (http:\\www.osha.gov).

The EPA has also developed a similar course titled *Hazardous Materials Incident Response Operations* (EPA Course Number 165.5). This 40-hour course is offered by the EPA (*under the auspices of Halliburton NUS Corp.*) at various training sites across the country. The course is designed for personnel involved in the investigation and remediation of uncontrolled hazardous waste sites, and to a lesser extent, for response to an incident involving hazardous materials. It provides basic information that meets the minimum training requirements of 29 CFR 1910.120.

Upon successful completion of the course, personnel will be able to:

- Identify methods and procedures for recognizing, evaluating, and controlling hazardous substances;

- Identify concepts, principles, and guidelines to properly protect site personnel;

- Discuss regulations and action levels to ensure the safety and health of personnel;

- Discuss fundamentals needed to develop an organizational structure and standard operating procedures;

- Select and use personal protective clothing and respiratory equipment; and

- Demonstrate the use, calibration, and limitations of direct-reading air monitoring instruments.

Subject areas stressed during this five-day course include hazardous waste site operations, team functions, personnel health and safety procedures, and the operation of field monitoring equipment. Additional information, including course registration, can be obtained by contacting the U.S. Environmental Protection Agency at (513) 251-7669. At the present time, the federal Bureau of Alcohol, Tobacco and Firearms (ATF) requires successful completion of this course for members of its National Response Teams (NRT) and its *Certified Fire Investigator* (CFI) Program.

Organizations may also consider providing training to investigators through fire department hazardous materials response team training programs. For example, in Montgomery County, Maryland, all investigators have successfully completed a twenty-four (24) hour *Hazardous Materials Technician*-level training program based on the requirements of 29 CFR 1910.120 (q)(6)(iii).

NOTE: Selected members of the Bureau of Alcohol, Tobacco and Firearms (ATF) *Certified Fire Investigator* (CFI) *Program* have also received this training in a train-the-trainer format.

The following is an outline of a model OSHA / NFPA-compliant training program that is based on the *Fire Investigator Hazardous Materials Technician Training Program* implemented in Montgomery County, Maryland that can be used by organizations as a guide in developing an organization-specific training program for investigators:

- Overview of Applicable Regulations
- The Hazardous Materials Problem/Hazardous Materials Identification for Fire Investigators
- Hazardous Materials Chemistry/Hostile Properties of Hazardous Substances
- Health and Safety Considerations
- Standard Operating Procedures (*Eight Step Process©*)
- Incident Management System (*i.e., Incident Command System*)
- Hazard and Risk Assessment
- Personal Protective Clothing and Equipment (PPE)
- Monitoring and Detection Equipment
- Decontamination Procedures

OSHA does not certify individuals as being *"trained";* the employer must show by documentation or certification that an investigator's work experience and/or training meets the requirements of 29 CFR 1910.120. A written document must clearly identify the individual, the person certifying the individual, and the training and/or past experience that meets the requirements. One option is to include this information in the individual's personnel file; however, the preferred method is to include this information on a separate certificate for each investigator.

VOLUNTARY CONSENSUS STANDARDS

In addition to the OSHA regulations, the National Fire Protection Association's *Recommended Practice for Responding to Hazardous Materials Incidents* (NFPA 471), *Standard for Professional Competence of Responders to Hazardous Materials Incidents* (NFPA 472), *Guide for Fire and Explosion Investigations (NFPA 921),* and *Standard for Professional Qualifications for Fire Investigator* (NFPA 1033), also contain provisions affecting the activities of fire investigators conducting fire and explosion investigations.

These standards are widely used within the fire investigation and emergency response communities as the basis for their organizational training programs. A brief summary of these standards is provided below:

- ***Recommended Practice for Responding to Hazardous Material Incidents*** **(NFPA 471) --** This standard covers planning procedures, policies, and application of procedures for incident levels, personal protective clothing and equipment, decontamination, safety, and communications. The purpose of NFPA 471 is to outline the recommended practices that should be considered when dealing with responses to hazardous materials incidents, and to specify operating guidelines. NFPA 471 offers guidance in identifying the minimum competencies a responsible authority should attain before responding to a hazardous materials incident, and it also specifies operating guidelines for a response.

- ***Standard for Professional Competence of Responders to Hazardous Material Incidents* (NFPA 472)** -- The purpose of NFPA 472 is to specify *minimum competencies* for individuals who respond to hazardous materials incidents. The overall objective is to reduce the number of accidents, injuries, and illnesses during response to hazardous materials incidents, and to prevent exposure to hazardous materials to reduce the possibility of fatalities, illnesses, and disabilities affecting emergency responders. NFPA 472 is a competency-based standard for personnel who respond to hazardous materials incidents. NFPA 472 training criteria differ from those in the OSHA standard in that the former do not establish specific minimum, hourly training requirements for emergency response personnel. While the OSHA standard outlines the objectives emergency response personnel need to achieve, NFPA 472 contains detailed information on the specific competencies personnel must have to achieve those objectives.

NOTE: These documents are used as the basis for state and local environmental response laws, and are frequently referenced by OSHA compliance officers to evaluate the adequacy of an organization's hazardous materials training program. Fire Investigation Unit Managers should also refer to the latest edition of the National Fire Protection Association (NFPA) *Standard on Fire Department Safety and Health Program* (NFPA 1500) for guidance concerning applicable OSHA requirements and in developing safety and health programs.

- ***Guide for Fire and Explosion Investigations* (NFPA 921)** -- NFPA 921 establishes guidelines and recommended practices for the safe and systematic investigation or analysis of fire and explosion incidents. The document is designed to assist individuals who are charged with the responsibility of investigating and analyzing fire and explosion incidents by providing a systematic, working framework or outline by which effective fire investigation and origin and cause determinations can be accomplished.

- ***Standard for Professional Qualifications for Fire Investigator* (NFPA 1033)** -- NFPA 1033 specifies, in terms of job performance requirements, the minimum standards required for service as a fire investigator in both the public and private sectors. In addition to the NFPA hazardous materials response standards, NFPA 1033 requires investigators to meet the requirements of sections 2-2.1 through 2-2.3 contained in NFPA 472.

NOTE: OSHA has stated that employees of emergency response organizations who follow the NFPA standards should generally be in compliance with the requirements of 29 CFR 1910.120 (OSHA Compliance Directive CPL 2-2.59A, *Inspection Procedures for the Hazardous Waste Operations and Emergency Response Standard,* April 1998). *Copies of this compliance directive as well as a compliance guide may be downloaded from OSHA's Internet web site at http://www.osha.gov*.

There are several other important OSHA standards impact the activities routinely performed by fire investigators at fire and explosion scenes. The most significant regulations include:

- Personal Protective Equipment (29 CFR 1910.132 through 1910.138)
- Respiratory Protection (29 CFR 1910.134)
- Electrical Safety (29 CFR 1910.331 through 1910.335)
- Bloodborne Pathogens (29 CFR 1910.1030)

The following is a brief summary of these standards:

Personal Protective Equipment (PPE), (29 CFR 1910.132 through 1910.138), requires employers to provide and require use of appropriate personal protective equipment made necessary by hazardous conditions. The standard requires employers to determine the nature of the hazards present or likely to be present. The selection of safe, appropriate equipment and training for all personnel expected to work in potentially hazardous environments is required. Effective performance standards for eye and face protection, respirators, head, foot and hand protection are also established. Written certification of the hazard assessment and training must be documented and maintained by the employer. An effective PPE training program consisting of both classroom exercises and practical, hands-on field exercises should contain:

- The proper selection and use of various types of PPE, including capabilities and limitations.
- The nature of the hazards and the consequences of not using PPE.
- Human factors influencing PPE performance.
- Instructions on inspecting, donning, doffing, checking, fitting and using PPE.
- Practical use of PPE in a *"clean"* environment for an extended period of time, followed by an evaluation in a test environment.
- The buddy system and entry procedures.
- Emergency procedures and self-rescue for PPE failure.
- The user's responsibility for decontamination, cleaning, maintenance and repair of PPE.

In those situations where self-contained breathing apparatus (SCBA) or any other respiratory protective equipment is required to be used by investigators, 29 CFR 1910.134 (*OSHA Respiratory Protection Standard*) applies. Employers are required to implement an acceptable program that includes, at a minimum, the following elements:

- Written standard operating procedures for the selection and proper use of approved respiratory protection equipment.
- Hazard assessment and continued surveillance of hazards at the scene.
- Inspection and evaluation of the program.
- Instruction, training and fit testing of equipment.
- Cleaning and disinfection of equipment.
- Proper storage, inspection and maintenance of equipment.
- An appropriate medical evaluation of the investigator's health status and physical ability to wear respiratory protection equipment.

Wearing personal protective equipment, including protection for the head, eyes and face, body, hands and feet is recommended at fire and explosion scenes. Additionally, investigations at scenes where flammable substances are present require the use of flame retardant protective clothing. Where falling objects are present, or objects may pierce the sole of shoes, suitable head and foot protection is necessary.

Shoes that completely cover and protect the foot are essential. Protective footwear should be used at all scenes when there is a danger of foot injuries due to falling or rolling objects or to objects piercing the sole and when feet are exposed to electrical hazards. The standard recognized by OSHA for protective footwear is the *American National Standard for Personal Protection—Protective Footwear, ANSI Z41-1991*. In some situations, non-permeable shoe covers can provide barrier protection to shoes and prevent contamination outside of the scene.

In certain scenes, such as bombings where structural damage can occur, protective helmets should be worn. The standard recognized by OSHA for protective helmets is *American National Standard Institute's Requirements for Industrial Head Protection, ANSI Z89.1-1997*.

Hand protection should be selected on the basis of the specific class or type of material being handled and the hazards associated with the material. Detailed information can be obtained from the manufacturer.

The following is general information regarding the types of glove materials and their functions:

- *Nitrile* provides protection from acids, alkaline solutions, hydraulic fluid, photographic solutions, fuels, lubricants, aromatics, petroleum, and chlorinated solvents. It also offers some resistance to cuts and snags.

- *Neoprene* offers resistance to oil, grease, acids, solvents, alkalies, bases, and most refrigerants.

- *Polyvinyl chloride* (PVC) is resistant to alkalies, oils, and limited concentrations of nitric and chromic acids.

- *Latex* (natural rubber) resists mild acids, caustics, detergents, germicides, and ketonic solutions. Latex will swell and degrade if exposed to gasoline or kerosene. When exposed to prolonged, excessive heat or direct sunlight, latex gloves can start to degrade causing the glove materials to lose their integrity.

- *Powder-free gloves with reduced protein content* will lower the risk of developing latex allergies. Personnel allergic to latex can usually wear *nitrile* or *neoprene*.

<u>Guidelines for glove use</u>:

- Prior to donning, inspect the gloves for holes, punctures, and tears. Remove rings or other sharp objects that can cause punctures.

- When working with heavily contaminated materials, it is prudent to wear a double layer of gloves.'

- Change gloves when torn or punctured or when their ability to function as a barrier is compromised.

- To avoid contamination of unprotected skin or clothing, remove disposable gloves by grasping the cuffs and pulling them off inside out. Disposable gloves should be discarded in designated containers and not reused.

Appropriate eye protection, such as safety glasses and goggles, should be worn when handling biological, chemical, and radioactive materials.[1,9] Face shields offer better protection to the face when there is a potential for splashing or flying debris. Face shields must be worn in combination with safety glasses or goggles because face shields alone are not considered appropriate eye protection. Contact lens users should wear safety glasses or goggles to protect the eyes. In the event of a chemical splash into the eye, it can be difficult to remove the contact lens to effectively irrigate the eye.
For personnel who wear prescription glasses, protective eyewear is available that can be worn over prescription glasses.

Electrical Safety Work Practices Standard (29 CFR 1910.331 through 1910.335) requires that investigators be properly trained and qualified to perform their work where electrical hazards may be present. Where energized parts and conductors are not guarded, investigators must be protected through the use of appropriate personal protective equipment, insulating barriers, or by de-energizing the hazardous equipment and locking or tagging out.

Bloodborne Pathogens (29 CFR 1910.1030) applies where there is a potential for occupational exposure to blood and other potentially infectious materials (*e.g., victims at fatal fire or explosion scenes*). Occupational exposure is defined as *"reasonably anticipated skin, eye, mucous membrane, or parental contact with blood or other potentially infectious materials that may result from the performance of an employee's duties."* Fire investigators involved in activities at incidents where blood, body fluids and/or contaminated equipment are present, where there have been traumatic injuries, or where investigators assist in handling human remains or body parts, may be potentially exposed to infection. Organizations are responsible for ensuring that their personnel are properly informed and adequately protected at the scene.

Where exposure is likely, the standard mandates a comprehensive program involving the following activities:

- Exposure determination
- Exposure control plan
- Communication of the hazards to employees
- Hepatitis B vaccination availability
- Universal precautions methods
- Engineering and work practice controls
- Personal protective equipment
- Housekeeping
- Labeling
- Post exposure evaluation, follow-up and recordkeeping

Fundamental to the standard is the concept of *Universal Precautions*. This concept is the primary mechanism for infection control. It requires personnel to treat all human blood, body fluids, or other potentially infectious materials as if infected with bloodborne diseases such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).

The following protective measures should be taken to avoid direct contact with these potentially infectious materials:

- Use barrier protection such as disposable gloves, coveralls, and shoe covers when handling potentially infectious materials. Gloves should be worn, especially if there are cuts, scratches, or other breaks in the skin. Change gloves when torn, punctured, or when their ability to function as a barrier is compromised.

- Wear appropriate eye and face protection to protect against splashes, sprays, and spatters of infectious materials.

- Prohibit eating, drinking and smoking where human blood, body fluids, or other potentially infectious materials are present.

- Wash hands after removing gloves or other PPE. Remove gloves and other PPE in a manner that will not result in the contamination of unprotected skin or clothing.

- Decontaminate equipment after use with a solution of household bleach diluted 1:10, 70% isopropyl alcohol, or other disinfectant. Non-corrosive disinfectants are commercially available. Allow sufficient contact time to complete disinfection.

SUMMARY

The ability of investigators to safely and effectively investigate fire and explosion incidents depends on their level of training and expertise, the level of available resources, the implementation of a structured system, and adherence to a standardized set of practical and realistic standard operating procedures consistent with OSHA requirements. Investigators who respond to fire and explosion scenes must be appropriately trained in accordance with the duties they are expected to perform and based on their level of participation at an incident. Fire Investigation Unit Managers should familiarize themselves with the applicable OSHA requirements that apply to the safety and health of personnel conducting fire and explosion investigations.

Compliance with the applicable OSHA regulations is essential to ensure that organizations have the ability to safely conduct investigations into the origin and cause of incidents without the fear of receiving citations for violations of federal regulations, and the possibility of civil or criminal penalties for noncompliance. It is critical to the safety of investigators and other personnel operating at scenes where potential safety and/or health hazards exist that they be adequately trained and equipped to take prompt action to protect themselves and others.

The development and implementation of a comprehensive *Risk Management Program*, standard operating policies and procedures and OSHA / NFPA-compliant training programs, will serve to reduce the likelihood of serious injury and an organization's susceptibility to civil/criminal citations for noncompliance with federal and state safety and health regulations.

REFERENCES

1. John T. Bentivoglio, *OSHA Compliance - Fireground Commanders Cited for Violations of Safety Laws*, Firehouse, May 1995, pp. 58-61 and p. 90.

2. Wayne Brewer, *Traditional Policing and Environmental Enforcement*, FBI Law Enforcement Bulletin, May 1995, pp. 6-13.

3. Bruce A. Brown, *A Model Emergency Response Plan*, Professional Safety, January 1995, pp. 24-27.

4. Daniel L. Churchward, *OSHA and the Fire Investigator*, Fire and Arson Investigator, September 1995, pp. 11-13.

5. Michael L. Donahue, H*azardous Materials Awareness Training for Fire Service Personnel*, Firehouse, October, 1993, pp. 82-86.

6. Michael L. Donahue, *Hazardous Materials Awareness Training for Law Enforcement Personnel*, FBI Law Enforcement Bulletin, Volume 62, Number 11, October, 1991, pp. 1-6.

7. *Guidelines for the Cleanup of Clandestine Drug Laboratories*, U.S. Drug Enforcement Administration/U.S. Environmental Protection Agency/ U.S. Coast Guard Joint Federal Task Force, Washington, D.C., March 1990.

8. *Hazardous Materials Response Handbook*, 2nd Edition, National Fire Protection Association, Quincy, MA., 1992.

9. Stephen L. Hermann, *Writing an OSHA-Required Emergency Response Plan*, Fire Engineering, June, 1990, pp. 109-115.

10. Stephen L. Hermann, *Forming a Clandestine Drug Laboratory Unit*, The Police Chief, October, 1991, pp. 112-117.

11. Joseph P. Howicz, *Occupational Safety and Health Issues for Arson Investigators*, Paper presented at the Federal Bureau of Investigation International Symposium on the Forensic Aspects of Arson Investigation, George Mason University, Fairfax, Virginia, July 31, 1995.

12. *Inspection Procedures for the Hazardous Waste Operations and Emergency Response Standard*, 29 CFR 1910.120, Paragraph (q): Emergency Response to Hazardous Substance Releases, OSHA Instruction CPL 2-2.59, Occupational Safety and Health Administration Office of Health Compliance, October 25, 1993.

13. Randolph D. James, *Hazards of Clandestine Drug Laboratories*, *FBI Law Enforcement Bulletin*, April 1989, pp. 17-21.

14. *NFPA 471, Recommended Practice for Responding to Hazardous Materials Incidents*, National Fire Protection Association, Quincy, MA., August 14, 1992, pp. 6-14.

15. *NFPA 472, Standard for Professional Competence of Responders to Hazardous Materials Incidents*, National Fire Protection Association, Quincy, MA., August 14, 1992, pp. 8-9.

16. *NFPA 921, Guide for Fire and Explosion Investigations*, 1995 Edition, National Fire Protection Association, Quincy, MA., February 7, 1995, pp. 74-76.

17. *NFPA 1033, Professional Qualifications for Fire Investigator*, 1993 Edition, National Fire Protection Association, Quincy, MA., February 12, 1993, pp. 6-9. Gregory G. Noll and Michael S, Hildebrand, "Managing the Incident," Firehouse, October, 1988, pp. 32-37.

18. Gregory G. Noll, Michael S, Hildebrand, James G. Yvorra, *Hazardous Materials Managing the Incident*, Second Edition, Fire Protection Publications, Oklahoma State University, Stillwater, Oklahoma, 1995.

19. William H. Stringfield, *The Risks of Hazardous Materials Noncompliance*, Firehouse, July, 1990, pp. 32-36.

20. William H. Stringfield, *The Final Rule*, Fire Command, May, 1989, pp. 14-19.

21. Charles E. Wittig, *Hazards for the Fire Investigator*, Fire Engineering, January, 1991, p.48.

22. *Handbook of Forensic Services: Crime Scene Safety*, United States Department of Justice, Federal Bureau of Investigation, 1999, pp. 1-6.