Industrial Hygienists’ Role and Responsibilities in Emergency Preparedness and Response

White Paper
Executive Summary

Industrial hygienists are a vital resource for governmental agencies, private response organizations, emergency management departments and disaster management committees, local emergency planning committees (LEPCs), and community emergency response teams (CERTs). The industrial hygienist (IH) provides a wide range of health, safety, and environmental health expertise to responders, support staff, and the surrounding community.

The Incident Command System (ICS) was developed by an interagency group in Southern California called FIRESCOPE (FIrefighting RESources of California Organized for Potential Emergencies). This group developed a system to support wildland fire management. The reason was that when they had multiple fires and multiply agencies responding to these wildfires, they needed a system everyone could understand and speak a common response language. In addition, the system allowed them to utilize critical resources effectively and efficiently. This system evolved into all-risk, all-hazards system with far greater applicability than simply wildland fires. ICS has been successfully implemented across a myriad of incidents and events, enabling responders to speak a common language and more effectively handle crises.

ICS includes the Safety Officer under the general staff of the Incident Commander. This position has traditionally been responsible to enforce safety policies. The focus was on physical hazards that could cause acute injuries and not those hazards that could develop into chronic injury and illnesses. What has been needed is exposure assessments that can provide the control to the hazards and prevent negative health outcomes from the emergency response.

This paper will look at the key phases of an emergency. We will discuss the mitigation as part of the continuity of operations, preparedness in the emergency planning and exercises, the response, and finally the recovery operations.

The IH's broad professional experience, training, and educational background benefit emergency planners, incident commanders, recovery managers, continuity program managers and community leaders. The IH delivers effective methods to identify, manage, and ultimately control risks associated with disasters—whether they result from natural, manmade, or technical hazards. Such hazards include flooding and weather events, earthquakes, hazardous material spills, terrorist events, and pandemics.

Background

To comprehensively address worker health and safety, AIHA has developed formal alliances with OSHA, NIOSH, and other organizations. These relationships are key to protecting both responders and the community in response to a significant emergency.

Under the National Response Framework (NRF), Framework Purpose and Organization (DHS, 2018), the focuses on the capabilities necessary to save lives and protect the health and safety of the public, responders, and recovery workers. An IH provides vital expertise to meet this priority through their daily professional experience in anticipating, recognizing, evaluating, and controlling workplace hazards.
NIOSH and the Rand Corporation conducted joint research on ways to protect emergency responders in response to the events of September 11, 2001 (NIOSH/RAND, 2004). In volume 3 of this report, several key recommendations were made, which directly call on the unique skills and academic backgrounds of industrial hygienists:

1. Develop assessment methods, checklists, guidelines, and standards to assist in hazard monitoring among multiple agencies.
2. Develop credentialing systems better suited to major disaster response operations.
3. Develop minimum standards for safety and health training for all responders involved in disaster response operations.
4. Develop guidelines for selecting protective equipment to use in the early phase of a response.
5. Develop guidelines for estimating the safety equipment requirements for disaster response operations.
6. Effectively address the issue of safety implementation at a response as part of a multiagency effort.
7. Provide on-site safety training.
8. Improve long-term surveillance of responders’ health following a major response.
9. Build an integrated safety function into an incident command system.
10. Develop a group of highly trained safety managers to facilitate coordination at a major incident.
11. Improve joint exercises and training by incorporating realistic safety and health issues.
12. Develop a common terminology for disaster safety and health issues and processes for use during response operations.

The National Incident Management System (NIMS) and National Response Framework (NRF) address a number of these items. Additionally, agency documents such as OSHA 3172 (OSHA, 2001), written for marine oil spill response employers, describe the training employees need in the Code of Federal Regulations under 29 CFR 1910.120, the Hazardous Waste Operations and Emergency Response standard (CFR, 2013).

Under the Occupational Safety and Health Act of 1970, (OSHA, 1970) an employer is responsible for providing a healthy and safe work environment for its employees. In a response, the incident commander is the employer with a significant responsibility to a large number of "employees," from various private sector and governmental agencies, to ensure that they are properly protected from very often uncharacterized and dangerous environments. With this act and a variety of health and safety regulatory standards and industry consensus guidelines, an IH can provide technical subject matter expertise to help ensure that the risks of the operations are effectively managed.
In an incident response, industrial hygienists are expected to function within the designated incident command system, as specified by NIMS. Incident commanders (ICs) are liable for decisions made under their command. In this capacity, they rely on the safety officer designated within the Incident Command system to keep them informed of safety requirements and to protect the IC from making decisions that would increase this personal liability. Depending on the nature and scope of the incident, IHs can support the IC in this capacity by serving in the role as the safety officer, or in a support position such as assistant safety officer or technical specialist.

When more than one employer operates at a single site, OSHA considers it a multiemployer worksite (OSHA, 1999). The incident commander needs to understand that they are in charge of a multiemployer worksite and that all entities need to know their responsibilities, assigned roles, and accountability for employee health and safety.

A comprehensive operational response safety and health plan is key to mitigating the hazards faced by responders. The incident safety officer develops and maintains the incident safety plan and coordinates multiagency safety efforts. The other agencies, organizations, or jurisdictions that contribute to joint safety management efforts do not lose their individual responsibilities or authorities for their own programs, policies, and personnel. Rather, each contributes to the overall effort to protect all personnel involved in the incident.

**Industrial Hygienists’ Role in Emergency Planning**

Emergency planning takes place on many levels.

1. Federal government agencies participate in planning in support of the National Response Plan. Planning also takes place at the state level in support of state emergency plans, as well as within local jurisdictions and agencies in order to prevent, protect against, mitigate the effects of, respond to, and recover from threats and hazards. Private employers and nongovernmental organizations may play a role in this planning in support of the National Response Plan. Planning guidance recognizes the importance of including the “whole community” in planning efforts.

2. Local emergency planning committees (LEPCs) develop community emergency response plans to respond to chemical releases. They provide citizens with information about chemicals in the community.

3. Employers are required to meet industry-specific planning requirements, such as requirements under the Process Safety Management of Highly Hazardous Chemicals standard (OSHA, 2013) and Hazardous Waste Operations and Emergency Response (HAZWOPER) (OSHA, 2013).

4. The United Nations Environment Programme (UNEP), Awareness and Preparedness for Emergencies at Local Level (APELL) Programme recommends consolidating emergency plans into a single plan that meets applicable requirements. (UNEP, 2015)

National Fire Protection Association (NFPA) 1600, Standard on Continuity, Emergency, and Crisis Management (NFPA, 2018) is a voluntary standard that agencies and employers may follow to facilitate emergency planning efforts. NFPA 1600 recognizes the importance of worker health and safety, emphasizing the importance of considering worker safety in emergency planning. We recommend that agencies and employers adopt NFPA 1600, and in particular the provisions for worker safety and health planning.
Industrial hygienists can participate in emergency planning in the following capacities:

- as employee or management representatives on employer lead emergency planning teams
- as representatives of the whole community on local agency or jurisdictional emergency planning teams
- as members of LEPCs

The AIHA Incident Preparedness and Response Working Group (IPRWG) developed a Technical Framework, Role of the OEHS Professional in Emergency Planning (AIHA, 2021). This framework provides an overview of emergency planning while specifying the knowledge, skills and abilities that the occupational and environmental health and safety (OEHS) professional needs to integrate into the process—regardless of whether the OEHS professional is leading the planning effort or supporting another planning lead.

## Industrial Hygienists’ Role in Incident Response

Many governmental agencies and private organizations provide unique assets and support to a response operation. Therefore, industrial hygienists employed by these agencies or private entities are required to meet their organization's mission and goals relating to emergency preparedness and response.

To contribute successfully to the strategic and tactical objectives of an incident, industrial hygienists must be highly flexible in their technical competencies and have broad professional experience. The IPRWG developed a Technical Framework, Emergency Preparedness and Response for the Industrial Hygienist (AIHA, 2018). It defines an individual's core knowledge and skills for effective performance in a specific practice or expertise. It should be used as a resource for individuals either looking to expand or refresh their knowledge or skills or, within an organization, developing a new training program in emergency response.

Below are key roles that industrial hygienists may fill in a response or planning role:

1. Safety officer
2. Assistant safety officer
3. Safety coordinator – joint field office (JFO) coordination staff
4. Technical specialist – industrial hygienist
5. Technical specialist – air monitoring group supervisor/member
6. Technical specialist – field observer for safety officer
7. Technical specialist – health and safety trainer (e.g., HAZWOPER)
8. Technical specialist – respiratory protection program manager
10. Other applicable responsibilities as assigned by the incident commander.
Specific Incident Command Functions Industrial Hygienists Can Fill in Emergency Response

A. Develop and implement exposure assessment methods to identify and prioritize hazards during the incident response and consequence management phases of an operation.

Industrial hygienists understand the importance of studying various processes, identifying the various health and safety hazards (e.g., chemical or physical hazards) associated with those processes, and prioritizing the risks.

The Exposure Assessment Strategies Technical Committee of AIHA (AIHA, 2015) has developed a textbook method for the IH practitioner to use in identifying and prioritizing various hazards and, ultimately, characterizing responders and support staff in the form of similar exposure groups (SEGs).

Using SEGs, IHs can effectively monitor those hazards and establish controls in a response and planning mode to minimize or prevent those hazards from affecting incident response personnel.

Exposure assessment methods should include the use of various mathematical models to estimate worker exposure at an incident (e.g., box method), and the use of dispersion models (e.g., Cameo, EPICODE, HOTSPOT) to determine community exposures adjacent or downwind of an incident. Other mathematical models should be used to determine appropriate ventilation requirements in enclosed spaces, including purge times and minimum air volume rates to control chemical releases.

B. Develop and implement monitoring methods to track response personnel's exposures during the incident response and consequence management phases of an operation.

Industrial hygienists use various air, bulk, dermal, biological, and direct-reading instrumentation (DRI) monitoring methods to characterize hazardous exposures as well as to apply controls to hazards encountered by response and support personnel.

In developing these monitoring methods, there are many environmental, legal, and scientific criteria to consider. These criteria are familiar domains for industrial hygienists. For example, certain chemical exposures may be best characterized using direct-reading instrumentation. However, to form a legal basis for actual human exposures, personal breathing zone (PBZ) methods may have to be used.

In addition, the behavior of airflow and the existence of other contaminants can determine the appropriate monitoring and analytical methodology to use.

Industrial hygienists understand the capabilities and limitations of chemical, biological, and radiological direct-reading instrumentation. DRI is prone to false readings due to interferences, or cross-reactivity with similarly structured chemical or biological agents. In addition, DRI can be affected by temperature, humidity, and moisture presence, which are likely factors in an incident site.
Industrial hygienists understand the correct application and use of various types of biological monitoring methods and the significance of toxicological and metabolic pathways in assessing exposure and absorption of chemicals into the body.

Finally, industrial hygienists are capable of using a variety of dermal exposure monitoring methods to characterize the exposure of responders to toxic chemicals by skin contact. Skin disorders, due to industrial chemical or particulate agents, remain one of the leading occupationally reported illnesses in general industry because the skin is the largest organ in the body. Therefore, the risk for skin exposure is significantly higher than inhalation or ingestion.

**C. Interpret data from sampling activities and from direct-reading instrumentation appropriately.**

Data in the field cannot or should not be taken at face value without proper analysis. Exposure data from a response operation should be interpreted in light of current toxicological data; the specific activity during which the exposure data were obtained; current exposure compliance levels; current recommended exposure guidelines; and the potential for long-term health effects.

Industrial hygienists can determine, after consulting with various governmental and consensus standards organizations, the appropriate exposure guidelines to use in interpreting the field data. Four sets of guidelines are:

1. Emergency Response Planning Guidelines (ERPGs) established by AIHA (AIHA, 2020)
2. Acute Exposure Guideline Levels (AEGLs) established by the Environmental Protection Agency in cooperation with the Centers for Disease Control and Prevention
3. the occupational exposure limits (OELs) of federal and state OSHA agencies
4. threshold limit values (TLVs) that professional organizations such as the American Conference of Governmental Industrial Hygienists have recommended

The data from all of these organizations are reviewed by an IH in order to determine the appropriate standard to use for comparison. This comparison, then, becomes the basis for determining whether responder and support staff are significantly exposed to various chemical and physical agents.

**D. Advise, develop, and implement the appropriate elimination controls of chemical, biological or physical hazards, based on the hierarchy of controls (elimination, substitution, engineering, administrative, and personal protective equipment).**

Based on the exposure data, industrial hygienists can advise the command staff, general staff, and the incident commander on ways to ideally eliminate or reduce the hazards at an incident. These characterized hazards could be the consequence either of the incident type (e.g., natural disaster or terrorism) or of hazards brought into the incident from response organizations. An example of eliminating a hazard in an incident response would be identifying and substituting safer chemicals for use in decontaminating personnel or equipment.
Industrial hygienists can assist in providing suitable substitute for a hazardous material that would expose the responder to less severe hazards. An effective review of the substitute is required to ensure the new material does not create a new hazard.

Engineering controls can be a challenge in the response environment. They can include modifying equipment or the workspace, using protective barriers, and designing ventilation.

In the response environment there is a heavy reliance on administrative controls. The controls include established work practices that reduce the duration, frequency, or intensity of exposure to hazards. Other controls are workplace training, work/rest cycles, and limiting access to hazardous area or machinery based on qualifications.

Personal protective equipment (PPE) is the least preferred control, since it relies on the employee to wear it correctly and consistently. However, in the response environment this control is often utilized. The industrial hygienist can aid the success of the PPE program by providing workplace hazards assessment, selecting the proper PPE, and assisting with inspection and training. Finally, the IH can be instrumental in monitoring the continued effectiveness of the PPE.

**E. Advise, develop, and implement the appropriate engineering controls to minimize exposure to chemical, biological, or physical agent hazards.**

If industrial hygienists determine, after proper staff coordination with the planning and operations sections, that certain hazards cannot be eliminated from an incident site, then engineering controls such as barriers, general ventilation, or local exhaust ventilation should be considered.

In industrial operations, IHs are attentive to these types of controls for a variety of processes.

**F. Advise, develop, and implement appropriate safe work practices and administrative controls to minimize exposures.**

In many incidents, chemical, biological, or physical hazards are not easily eliminated or reduced to safe levels in areas of responders’ activities. Therefore, IHs must develop effective work practices for responders and support staff to protect everyone from these hazards.

In addition, IHs can work effectively with operations and planning section chiefs on administrative controls such as specific training prior to commencing work, or developing a work shift that minimizes the amount of time that personnel are exposed to those hazards.

In developing work practice and administrative controls, planning considerations should include the toxicological properties, the routes of exposures, the quantitative exposure levels, and the long-term health effects associated with those chemical, biological, or physical agents.
G. Advise, develop, and implement the appropriate PPE to minimize exposures.

Industrial hygienists continue to conduct research and consult with many industrial and standards organizations on the appropriate PPE to be worn to protect against chemical, biological, and physical agents. For chemical hazards, industrial hygienists understand the importance of chemical permeability and durability of protective clothing.

To maximize the PPE's protective characteristics requires training, a maintenance program, and a set of guidelines. Industrial hygienists implement these types of programs daily in many occupational settings.

H. Advise, develop, and implement personnel decontamination procedures.

Depending on the type and extent of a chemical, biological, or physical agent release, decontamination procedures can vary significantly from one response to another.

An IH can advise, develop, and implement decontamination procedures for response personnel based on the type of agent(s) involved, the level of contamination at an incident, the type of response operation involved, and the exposure risks to response personnel and the surrounding area. AIHA, for example, is working on a new decontamination guideline for PPE.

I. Advise, develop, and implement remediation activities for a facility.

During the consequence management phase of an operation, a priority is to remediate facilities and adjacent properties affected by a chemical, biological, or physical agent. The question “How clean is clean?” has environmental, legal, and public health consequences both to the surrounding community and to the workers normally operating in that facility.

Industrial hygienists use various types of exposure monitoring, sampling methodologies, mathematical modeling, and risk assessment techniques. In this way they can develop and implement effective remediation plans for the cleanliness and safety of a facility to address both a facility owner and a community’s concerns after major recovery operations.

In addition, remediation activities require an assessment of the type of PPE to use, which may be differ significantly from the emergency response phase. An IH can advise on the different PPE requirements for remediation activities.

J. Advise, develop, and implement a respiratory protection program.

One of the key lessons learned from September 11, 2001, was the lack of standard respiratory protection among the various response organizations. No consistent incident command site safety plan was developed prior to 9-11 to address or enforce one set of respiratory protection guidelines.
Based on characterized or uncharacterized atmospheres, industrial hygienists can develop one effective program applicable to an entire incident site. September 11, 2001, showed that many laborers on site had not been issued or trained on respiratory protection. IHs can develop an appropriate training program on site, to include proper qualitative or quantitative fit-tests and fit-checks.

**K. Effectively develop site safety plans and execute key incident command staff functions.**

Site safety plans—critical within the first few hours of an incident response—apprise responders and support staff of significant hazards and ways to control them. IHs develop such plans of varying complexity as part of various occupational settings.

As professionals, many IHs are knowledgeable about the types of meetings (e.g., tactical, planning, and operations briefs) associated with executing an effective National Incident Management System. Based on the characterized hazards or unknown factors in an incident, IHs can advise the unified command, general staff, and command staff of those hazards and ways to incorporate health and safety practices into an incident action plan.

Within a NIMS, IHs can act as a technical liaison with medical and designated technical specialists on safety and occupational health issues. This liaison activity encompasses advising on environmental health issues such as potable water, foodservice sanitation, berthing sanitation, and waste management—particularly when responders and support staff must live in less-than-ideal living conditions while engaged in a prolonged response operation.

**L. Perform health and safety field compliance actions.**

Many industrial hygienists’ duties include serving as on-site safety officers or compliance officers of federal and state OSHA agencies. The IH’s experience lends expertise to the IC in ensuring safe work operations.

Compliance actions should be based on standardized safety and health guidelines specific to that incident, as outlined in a site safety plan.

IHs may be called on to advise the incident commander on the enforcement issues of federal OSHA or state agencies, related to health and safety issues on site.

**M. Perform a variety of health and safety trainings on site.**

On-site safety and health training educates response and support staff to recognize the current, specific hazards and the required controls for a particular incident.

The IH with expertise in recognizing, characterizing, and evaluating the various hazards in an incident can excel at training current or new response personnel, prior to commencing work, on those hazards and ways
to control them. This includes conducting "tailgate" safety briefings with various divisions, groups, or strike teams, as required.

That said, on-site safety and health training is no substitute for preemergency training skills such as 24-hour emergency response technician or specialist training.

**N. Effectively communicate risks based on complex scientific and field data.**

Industrial hygienists understand that communicating risks to response and support personnel as well as to the media is key. Because most IHs are field practitioners, they are skilled in relating laboratory and DRI results to workers and their supervisors. In an incident response operation, they use the media to communicate the exposure risks to the community. This risk communication is important to address the immediate community's concerns as well as to mitigate concerns from the surrounding community. Fulfilling these functions may lead an IH to develop other monitoring methods to characterize hazards of particular public concern.

**O. Perform incident investigations involving safety or acute chemical, biological or physical agent exposures.**

During either a response or consequence management phase of an operation, responders or support staff may experience mishaps related to safety hazards or acute short-term exposures to various agents at the site.

IHs are trained to conduct these investigations, possibly as part of a forensics investigation, because of their advanced training in sampling, familiarity with industrial processes, and experience in dealing with cause-and-effect forms of analysis. Their training has also addressed health and safety regulations and recommended guidelines.

**Guidance on Minimum Qualifications and Professional Competencies for Industrial Hygienists to Perform in Emergency Planning and Response**

AIHA recommends that, at a minimum, industrial hygienists involved in emergency planning and response should meet minimum competency requirements in the skill areas of IH specialty, safety specialty, emergency response/planning, and individual professional skills. These requirements specifically include the following areas:

**IH Specialty Skills**

1. Plan and conduct exposure assessment to include the determination of SEGs based on health hazard and risk ratings.
2. Plan, advise, and evaluate adequacy of ventilation controls.
3. Plan and conduct air sampling for both area and personal breathing zone monitoring in accordance with NIOSH and OSHA sampling methodologies.
4. Determine adequacy of chemical protective clothing (CPC) based on the type of chemical(s) involved, the environmental conditions in which the CPC will be used, and interpretation and evaluation of manufacturers' permeation data.

5. Properly select, train, and fit-test response personnel on various respiratory protection devices in accordance with OSHA regulatory standards.

6. Describe toxicological effects and reference recognized and approved guidance on immediate medical treatments involving common toxic industrial chemicals, chemical warfare, biological warfare, and radiological agents.

7. Correctly interpret laboratory and field DRI data involving airborne chemical levels at the incident by comparing them to the appropriate emergency response guideline level (e.g., AIHA Emergency Response Planning Guideline, EPA Acute Exposure Guideline Levels (AEGLs), or OSHA PEL, or ACGIH TLV).

8. Describe the capabilities and limitations of various DRIs for chemical and radiological agents.

9. Describe the capabilities and limitations of biological agent sampling technologies such as immunoassay, and polymerase chain reaction.

10. Describe various biological and dermal exposure monitoring methods and their capabilities and limitations.

11. Recognize traditional building material hazards (asbestos, lead, mold, etc.).

**Safety Specialty Skills**

1. Understand the basics of fall protection requirements.
2. Understand the basics of trenching safety requirements.
3. Understand and be able to implement permit confined space entry requirements.
4. Understand the basic safety requirements involving demolition and construction.
5. Understand the basics of traffic safety plans at an incident area.
6. Understand the basic safety requirements involving material handling, particularly involving heavy lifting equipment.

**Environmental Health Specialty Skills**

1. Understand basics of drinking water quality methods and standards.
2. Understand basics of waste management requirements (e.g., medical waste, hazardous waste, and human waste management).
3. Understand basics of living and berthing sanitation issues.
4. Understand basic foodservice sanitation.
Emergency Response and Planning Skills
1. Describe and effectively apply the National Incident Management System.
2. Describe and implement the NIMS process of developing an incident action plan.
3. Describe and implement the method of effectively developing a site safety plan.
4. Describe aspects of the National Response Plan and applicable state and agency response plans.

Individual Professional Skills
1. Provide a standard of care in the professional practice of OEHS that incorporates best risk-management practices whenever feasible. Implement a continuous improvement strategy that identifies and addresses gaps between current and state-of-the-art OEHS practices. Improve exposure judgment accuracy in order to make effective occupational exposure risk decisions.
2. Be able to physically and mentally work long hours at an incident after traveling many hours.
3. Exhibit effective computer skills with word processing, spreadsheet, and internet software.
4. Be able to organize a deployment kit, which includes personal items (e.g., clothing, toiletries) and professional items (e.g., reference books and CDs, laptop, required IH monitoring equipment if needed).
5. Be detail-oriented, with good organizational skills such as accurate filing of important documents (e.g., air monitoring logs).
6. Possess effective communication skills to relay complex scientific data into understandable terms for the incident staff, response personnel, and the public.
7. Be resourceful and take initiative.

Industrial Hygienists’ Role in Recovery
Recovery refers to the necessary capabilities to assist communities affected by an incident to recover effectively. Following a response, local communities and governments may have limited resources and are often forced to make complex recovery decisions. These decisions may have unintended consequences that may not be realized immediately. The consequences of these decisions may impact the safety of workers and residents for years to come.

The NRF Emergency Support Function (ESF) #14 (DHS, 2019) is for long-term community recovery. It provides a mechanism for coordinating federal support to state, tribal, regional, and local governments, nongovernmental organizations, and the private sector to enable community recovery from the long-term consequences of extraordinary disasters.
ESF #14 is closely linked with all six recovery support functions of community planning and capacity building, economic, infrastructure systems, health and social services, natural and cultural resources, and housing. The National Disaster Recovery Framework (NDRF) establishes a common platform and forum for how the whole community builds, sustains, and coordinates delivery of recovery measures necessary to ensure that the capabilities are available when needed.

The roles and responsibilities of the IH do not inherently change during the recovery phase, due to the ongoing need to ensure the safety and health of personnel and the public. However, the pace of operations, the types of work to be completed, and the hazards associated with the work do change.

Risk and risk tolerance also change. The level of acceptable risk is lower during the recovery phase, once time-critical objectives are met and the work becomes more routine. At this point, safety resources are more readily available, and controls can be implemented. The challenge is to avoid complacency, as all is not yet “normal.”

After an incident, recovery personnel and the public may face many uncharacterized hazards, requiring the IH to conduct hazard risk assessments. Hazard evaluation (and reevaluation) and controls can now proceed at a more deliberate pace. Likewise, after an incident there may be additional hazards from restarting industrial processes; moreover, existing engineering controls may no longer perform to specifications.

**Industrial Hygienists' Role in Continuity of Operations**

Presidential Policy Directive PPD-21, Critical Infrastructure Security and Resilience (PPD, 2013), requires critical infrastructure sectors to continue operations during emergencies and develop continuity of operations plans (COOPs). Even if development of a COOP is not specifically required, a business can elect to develop and implement one to demonstrate good business practices.

Elements of continuity of operations in which an IH should play a role include:

1. **Essential functions.** An organization must identify the functions that are essential to operation. Planning assumptions anticipate that employees who normally are responsible for performing essential functions may not be able to come into work as a result of the disaster. If primary personnel are unavailable, the COOP must identify backup personnel to perform essential functions. If this work includes exposures to hazards, the IH must work with these personnel to communicate known exposures, evaluate new exposures occurring as a result of the disaster, conduct training as needed, and implement controls.

2. **Alternative work facilities.** If the facilities in which work is normally conducted are not available, alternative facilities may be used for workers who must perform essential functions. The IH must identify whether these alternate facilities create additional hazards for workers. Emergency action plans must also be developed for alternate facilities.
3. **Mutual aid agreements.** To ensure that essential functions are maintained, workers from other jurisdictions or employers may be brought in to the disaster site. At any multiemployer worksite, the IH should ensure that all workers are protected from safety and health hazards. Making sure everyone on site understands the safety and health rules and requirements. (OSHA, 1999)

4. **Recordkeeping.** Retention requirements apply to exposure evaluations, medical records, safety data sheets, and other data developed in a safety and health management system. The IH must coordinate with COOP planners and managers to ensure that safety and health data is incorporated into the COOP recordkeeping system.

5. **Reconstitution.** As the disaster incident resolves, continuity operations devolve and operations return to normal—or, more likely, the new normal. The IH bears many responsibilities as operations return to this new normal.

PPD-21 identifies 16 critical infrastructure sectors:

1. Chemical
2. Commercial facilities
3. Communications
4. Critical manufacturing
5. Dams
6. Defense industrial bases
7. Emergency services
8. Energy
9. Financial services
10. Food and agriculture
11. Government facilities
12. Healthcare and public health
13. Information technology
14. Nuclear reactors, materials, and waste
15. Transportation systems
16. Water and wastewater systems
Summary

Industrial hygienists play a significant role in protecting the lives of the United States’ response personnel, their support staff, and the surrounding community. IHs’ technical expertise in occupational and environmental health and safety issues applies to a variety of natural disasters; hazardous chemical, biological, or radiological releases; and terrorism events. IHs can effectively identify and control risks during the preplanning, emergency response, and consequence management phases of an incident.

References


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