National Institute of Environmental Health Sciences

NIEHS Wildfire Response Orientation

# Protecting Yourself While Responding to Wildfires

## Safety and Health Awareness for Responders to Wildfires

WORKER TRAINING PROGRAM

September 2014

## This book is provided by:

**ICWU Center for Worker Health and Safety Education**

http://www.healthandsafetyeducation.org

513-621-8882

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*http://tools.niehs.nih.gov/wetp*

## How to Use this Orientation

- This orientation is **an awareness-level health and safety resource for "skilled support personnel"** who will participate in a wildfire assessment and cleanup.
- This orientation will help workers understand at an awareness level: characteristics of what a wildfire and a wildfire response is and how to protect against and control hazards associated with the response, assessment and cleanup activities associated with a wildfire.
- Trainers may use this orientation to aid in the development of a wildfire awareness level course or other awareness level materials (fact-sheets, table-top activities, etc.).

## Advanced/Additional Training Required for Those Involved in a Wildfire Response

- This orientation does not replace fire fighting specific training, additional duty specific training or PPE specific training requirements.
- Regardless of work scope, there are many topics covered in this awareness orientation that have corresponding OSHA standards which must be met in order to safely and legally perform associated job duties.

Contact the NIEHS National Clearinghouse for Worker Safety and Health Training (202-331-7733) for information regarding advanced training for wildfire response.

# Table of Contents

## Employer and Worker Responsibilities

Employers and workers have responsibilities under the OSH Act.

- The Occupational Safety and Health Act requires employers to provide a safe and healthful workplace free of recognized hazards and follow OSHA standards. Employers' responsibilities also include providing training, medical examinations and recordkeeping.
- Workers must follow the employer's safety and health rules and wear or use all required gear and equipment; follow safe work practices for their job, as directed by their employer; report hazardous conditions to a supervisor; and report hazardous conditions to OSHA if employers do not fix them.

# Module 1

## Wildfire Characteristics and General Response Procedures

## What is a Wildfire?

A wildfire is an unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

**Most likely will have multiple wildland/urban interface areas**

**If not controlled, wildfires will destroy whatever is in their path**

**May create its own weather pattern**

## What Makes Wildfires Unique?

- Can move at extremely high rates of speed.
- May have flames anywhere from a few feet high to 200 plus feet high.
- Affected by environmental conditions (fuel, lay of the land, wind, humidity, etc.).
- Potential to produce large amounts of debris.
- May require enormous resources to control and clean up.
- May produce many hazards of which skilled support personnel must be aware.
- Potential to produce fire tornados causing fire to spread.

# Risk Factors for Wildfires

**At no time should support personnel be in an active fire location. Low or moderate risk may become high risk when working near an active fire.**

**Moderate risk areas include:**

- Thick continuous grasses, weeds, shrubs, or brush.
- Continuous thin layer of pine needles and scattered pine trees.
- Scattered palmettos or shrubs up to 3 feet tall separated by patches of grass or sand.
- Limited view into or across the undeveloped area.
- Stacked fire wood.
- Combustible outside furniture.
- A clear view into or across undeveloped area (*this is not a risk but what you want*).

**High to Extreme risk areas include:**

- A thick bed of pine needles and many pine trees.
- Continuous palmettos, shrubs, or saw-grass more than 3 feet tall.
- Vines and small-to-medium trees or palms beneath taller pine trees.
- Impenetrable shrubs, brush, or young pines.
- No clear view into the undeveloped area because of dense growth.

See NFPA standard 299 checklist for wildfire risk characterization

## Working the Fire

- Only certified workers should be allowed to work fire control lines. Areas throughout the U.S. have their own unique fire hazards and require special training. Requests to assist in controlling fires should come from the fire command.

## Fire and Smoldering Debris

- 25% of fire related deaths in the United States are caused by smoldering related fires.
- Smoldering debris may remain for weeks and could reignite if combined with combustible materials or if oxygen becomes available (i.e. disturbing debris during cleanup operations).

- Be aware of the state of the debris you are handling.
- Watch where you step. Hot debris may be under the surface.

## National Incident Management System (NIMS)

- NIMS is designed to:
  - provide a framework for incident management
  - "One mission, one team..."
- Used for ALL types of incidents (mass casualty, planned events).
- First standardized approach to incident management and response.
- Establishes uniform set of procedures to be used by emergency responders at all levels of government to conduct response operations.

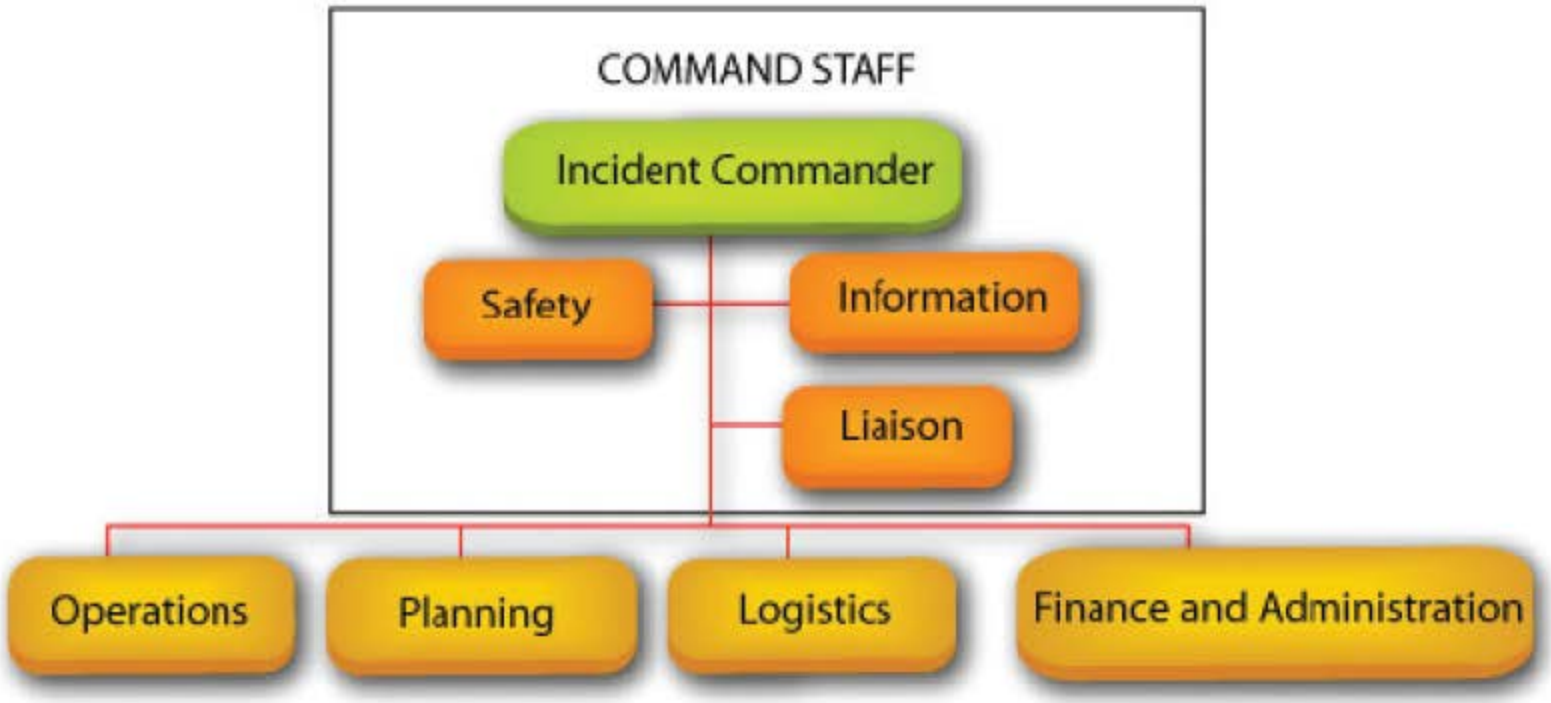
## Core Elements of NIMS

- Incident Command System (ICS)
- Preparedness (planning, **training**, exercises, **qualifications** and **certifications** of all personnel involved in incidents)
- Communications and Information Management
- Joint Information System
- NIMS Integration Center

## Incident Command System (ICS)

- The incident command system
  - will be used to effectively manage
  - emergency situations such as wildfires.
- ICS uses:
  - Unity of command (one person in charge)
  - Span of control to manage personnel (3 - 7 people under one supervisor)

  - Common terms so everyone understands what is being communicated
  - A modular system to manage resources (a system that can expand and contract with the emergency event)
  - Life safety code


COMMAND STAFF
Incident Commander
Safety
Information
Liaison
Operations
Planning
Logistics
Finance and Administration

## Emergencies in the Field

- Ask what first aid support is available during your briefing and be sure you understand where it is located.
- For minor injuries or health concerns go to:
  - Local hospitals or clinics
  - First Aid, EMT or nurse station
- For serious emergencies call 911
  - Know your exact location. Be aware of cell reception area.
- Notify your supervisor about all injuries and emergencies.

# Module 2

## Controlling Hazards Created by Wildfire

## Physical Environment

- The Land
  - Steep hills to flat and coastal areas
  - Low grass to full canopy tree areas
- The Climate
  Arid, dry climate
  - Strong wildfire risk factors

## Health and Safety Plans (HASP)

OSHA has set regulations that require Health and Safety Plans (HASP) to protect workers involved in national response operations.*

The HASP serves as a guide for employers and workers to follow during their daily operations to prevent the spread of contamination, injury, and death. Review your HASP before you start work!

*OSHA, 29 CFR 1910.120, HAZWOPER

## HASP (continued)

This document covers some HASP sections that will be used on the worksites during a wildfire cleanup. The site safety section includes general information from several of the HASP sections listed below.

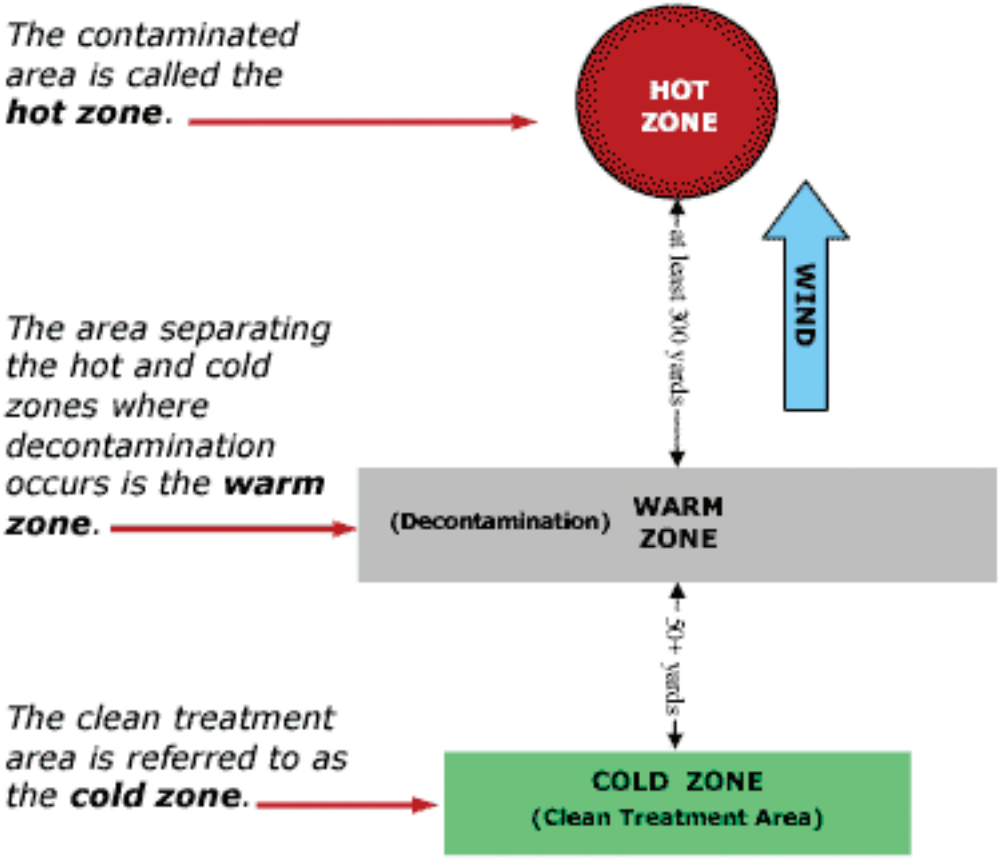
**Any HASPs must cover all of the following:**

- Introduction
- Key Personnel
- Hazard Assessment
- Training
- PPE
- Temperature Extremes
- Medical Surveillance
- Exposure Monitoring and Air Sampling
- Site Control
- Decontamination
- Emergency Response/ Contingency Plan
- Emergency Action Plan
- Confined Space Entry
- Spill Containment

# Site Control

Site control consists of the following components:

- Control zones (*see image to right*)
- HASP
- Communication
- Emergency Plan
- Site Map
- Use of "Buddy System"



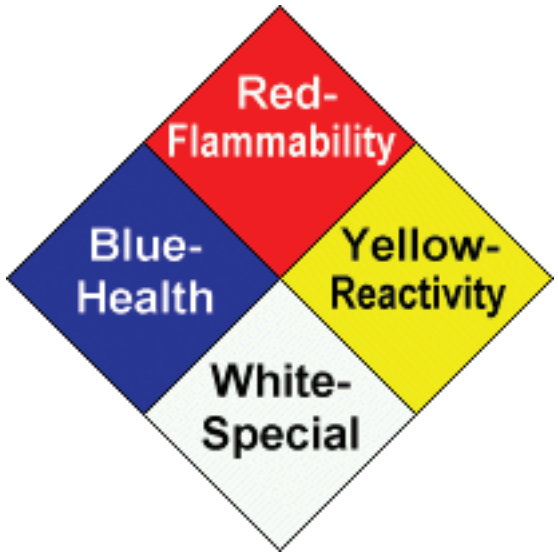
## Hierarchy of Controls

When dealing with health and safety hazards try to control them by using the hierarchy of controls:

- Eliminate hazard (move a loud generator away)
- Engineering controls (use wet methods to control dust)
- Administrative controls (perform heavy work during the cooler parts of the day, follow safe work practices)
- PPE (respirators, gloves, steel toe and sole footwear)

## Hazardous Materials and Hazard Communication

- Due to the fire, you may find dislodged or damaged tanks, drums, pipes, and equipment which may contain hazardous materials.
- Do not handle unidentified or damaged containers-report these to your supervisor.
- Understand Department of Transportation (DOT) placards and labels and their related hazards.
- Understand Safety Data Sheets (SDS). Follow where appropriate.
- NFPA 704M warning labels may also be useful in the field.
- Specific Hazard Communication training is required for any potential chemicals that you may come in contact with.





DOT

OSHA

## Hazardous Materials Associated with Commercial and Residential Wildfire Debris

- Asbestos
- Ash
- Compressed gas cylinders and propane cylinders
- Gasoline cans (and other fuel containers)
- Bulk chemicals & chemical containers
- Lead acid batteries
- Paints and thinners
- Bulk pesticides
- Bulk fertilizers
- Moldy materials
- Munitions
- Laboratory equipment
- Lead
- Electrical Transformers
- Air conditioners
- Large metal appliances and equipment
- Automobiles
- Fire retardants
- Transformers
- Other particulate matter

## Fire Retardants

In general, fire retardants reduce the flammability of materials by either blocking the fire physically or by initiating a chemical reaction that stops the fire.

- The human health effects from fire retardants are not well known.
- Some ingredients may cause cancer.
- Fire retardants may persist in the environment for weeks to months.
- Reduce exposure - use the hierarchy of controls.

## Dusts Containing Fire Retardant, Ash, Asbestos, Silica and Other Toxins

- Try to apply the following engineering controls in addition to wearing a respirator:
  - Wet methods
  - Ash approved HEPA vacuum
- Minimize particulate matter (dust) production:
  - Do not use a vacuum that is not approved for ash and that does not contain a HEPA filter
  - Do not aggressively dry sweep
  - Avoid walking in single file lines-those behind the leader may become covered in particulate matter

*Wetted debris during clean up of 2007 Angora wildfire*

# Dusts Containing Fire Retardant, Ash, Asbestos, Silica and Other Toxins (continued)

- **Wearing NIOSH-approved respirators:**
  - **If in doubt about respirators, see your supervisor**
  - An N-95 or greater respirator may be acceptable for some activities
  - Use an elastomeric, half-mask respirator with N,R, or P-100 series filters if asbestos, ash or fire retardants may be present
  - If airborne contaminants are causing eye irritation, full-face respirators with P-100 organic vapor/acid gas (OV/AG) combination cartridges should be used
  - Surgical masks should not be used because they do not provide adequate protection
  - Replace filters when breathing becomes difficult or you detect an odor through organic vapor cartridges

*½ face respirator with P-100/OV/AG cartridges*

## Special Rules for Respirators

- Make sure you are medically cleared to wear your chosen respirator.
- Make sure you received the required training.
- Make sure you are fit tested for your respirator.
- Inspect your respirator each time you put it on and take it off.
- Perform a user seal check each time you put it on.
- Clean your elastomeric respirator at least once a day in accordance with manufacturers recommendations.
- Store elastomeric respirators in a clean bag.
- If your respirator becomes damaged or fails to function, stop work and retrieve a new one.

OSHA respiratory protection standard, 29 CFR 1910.134

# Electrical Hazards

- Four main types of electrical injuries seen in fire cleanup:
  - Electric shock
  - Burns
  - Falls caused by contact with electricity
  - Electrocution
- Avoid working with electricity in wet environments. If this must be done, use equipment approved for wet conditions.
- Electrical cords and outlets must meet OSHA standards.
- Use double insulated tools.
- Use Ground Fault Circuit Interrupters (GFCIs) on all power tools and cords as close to the panel as possible.
- Do not re-energize electrical systems or use electrical equipment that has been in a fire or wet until it has been evaluated by a qualified electrician.

*Portable GFCL*

## Electrical, Overhead Power Lines, Downed Electrical Wires, Cables

- Treat all power lines and cables as energized until proven otherwise.
- Use appropriately grounded low-voltage equipment.
- Stay clear of downed and damaged electrical lines.

## Hazardous Utilities

- Look for overhead power lines and buried power line indicators. Post warning signs.
- Contact utilities for buried power line locations.
- Stay at least 10 feet away from overhead power lines.
- Unless you know otherwise, assume that overhead lines are energized.
- Get the owner or operator of the lines to de-energize and ground lines when working near them.
- Other protective measures include guarding or insulating the lines.
- Use non-conductive wood or fiberglass ladders when working near power lines.

## Structural Integrity

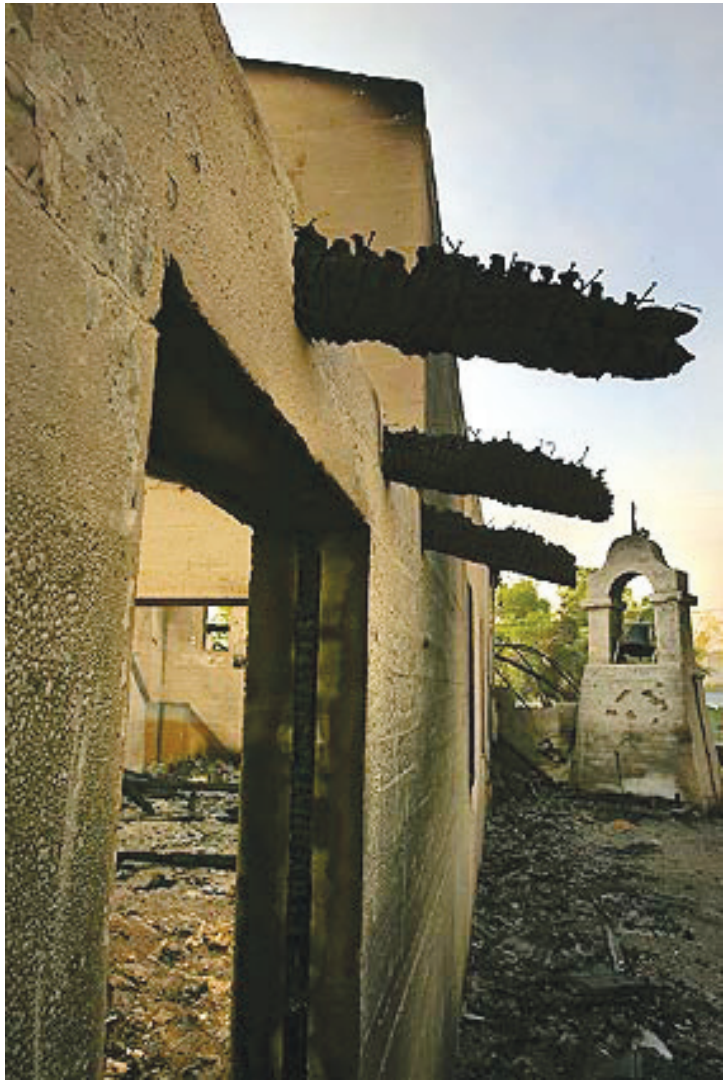
- Fires can rearrange and damage many types of structures.
- Never assume that fire-damaged structures or ground are stable - have it **certified safe** by a registered professional engineer or architect.
- Assume all stairs, floors and roofs are unsafe until inspected.
- Watch out for unstable ground or flooring that could give way to smoldering embers.

*Leave immediately if you hear shifting or unusual noises—*

*A COLLAPSE MAY BE OCCURRING*

## Structural Integrity (continued)

- OSHA requires walls or floor to be shored or braced before demolition if workers are within structure. Cut off, cap or control all service utility lines outside the building before demolition work is started. Notify appropriate utility company in advance.
- If it is necessary to maintain any utilities during demolition, such lines shall be temporarily relocated and protected.
- Determine if any hazardous substances have been on the property. Remove any found hazardous substance before demolition.
- Do not cut or remove any structural or load-supporting members on any floor until all stories above such a floor have been demolished and removed.



## Debris Piles and Unstable Surfaces


- Only walk and work on surfaces you know are stable.
- Look for smoldering material on or beneath the surface.
- Use other ways to get to work surfaces, such as bucket trucks.
- Erect scaffolding and park lift equipment on stable surfaces and anchor it to stable structures.
- Wear protective equipment provided, including hard hats, safety glasses, leather gloves and safety shoes with slip resistant soles.
- Use fall protection with lifelines tied off to suitable anchorage points, including bucket trucks, whenever possible.
- Watch for fall hazards to other levels.

# Confined Spaces


**What is a Confined Space (CS)?**

- Space with limited access and egress
- Large enough for bodily entry
- Not designed for occupancy
- Examples: boiler, pit, septic tank, utility vault, well, basement and trench

**What hazards make it a permit required CS?**

- Oxygen deficiency
- Entrapment
- Engulfment
- Hazardous atmosphere
- Any other recognized, serious health or safety hazard

**Your Safety Officer Must Approve Confined Space Entry!**

## Confined Spaces (continued)

**Before you enter a confined space your supervisor must:**

- Entry permit should be developed and signed by the supervisor.
- Make sure you and the attendant are trained.
- Ventilate and monitor for hazardous atmosphere.
- Lock out or tag out all energy sources in the space.
- Issue appropriate PPE, possibly including self-contained breathing apparatus (SCBA).
- Establish barriers to external traffic such as vehicles and pedestrians.
- Provide ladders or similar equipment for safe entry and exit in the space.
- Provide good communications equipment and alarm systems.
- Have rescue equipment and trained rescue personnel nearby.

**If caused by structural collapse, have space certified safe by a registered professional engineer or architect before you enter!!!**

## Flying Debris and Material Handling

- Wear personal protective equipment, including hard hats, safety shoes, eye glasses, and work gloves.
- Do not walk under or through areas where cranes and other heavy equipment are being used to lift objects.
- Make sure that you have an up-to-date tetanus immunization.

# Carbon Monoxide (CO) Exposure

**Carbon Monoxide has no warning properties; it is a colorless odorless gas**

**CO may be present with:**

- Any activity using gasoline, diesel or propane-powered machinery
- Work near operating equipment
- Debris reduction sites
- Work near hot work (cutting, welding) especially in confined spaces

**To control CO exposures:**

- Wear CO monitoring equipment
- Do not use gas/diesel powered equipment indoors or in enclosed areas
- Use forced air ventilation

**Symptoms:** Headache, dizziness, drowsiness, or nausea progressing to vomiting, loss of consciousness. Prolonged or high exposure can lead to coma or death. If you experience any of these symptoms where CO may be present - **LEAVE AREA IMMEDIATELY**

# Portable Generators

**Hazards include:**

- Carbon monoxide poisoning
- Electrocution from backfeed

If it is necessary to use a portable generator, follow manufacturer's recommendations and specifications:

- Use a qualified electrician to assist in installation and start-up activities
- If using gasoline- and diesel-powered portable generators, switch the main breaker or fuse on the service panel to the "off" position before starting the generator
- Do not use on or in wet surfaces
- Do not operate in rain unless the generator can be kept dry
- When refueling, turn off and wait for motor to cool or use appropriate funnel to prevent spills onto hot engine
- Do not use indoors or in temporary or permanent shelter

## Ergonomics

Ergonomics is the arranging of the work environment and task methods to reduce injury and fatigue in workers. An example is using roller conveyors on which objects can slide to eliminate unnecessary lifting.

**To help prevent injury during a wildfire response, if possible:**

- Use proper machinery to assist in lifting materials
- If proper equipment is not available, use teams of two or more to move bulky objects
- Avoid lifting any material that weighs more than 50 pounds per person
- Avoid repetitive motions
- Avoid use of excessive force
- Avoid awkward postures
- Avoid excessive heat or cold

# Heat Stress

**Common signs and symptoms workers experience if they have any of these conditions.**

### Heat Stress

- Headache
- Thirst
- Profuse sweating
- Muscle aches

### Heat Exhaustion

- Headache
- Dizziness
- Confusion
- Nausea
- Sweating-pale, clammy skin
- Cramps in legs and abdomen
- Rapid, weakening pulse and breathing

### Heat Stroke

- Headache
- Dizziness
- Restlessness
- Confusion
- Hot, flushed dry skin
- Body temp above 104°F
- Unresponsive/ disoriented

## Heat Stress (continued)

- Drink when thirsty. Drink sports drinks, if available. Avoid alcohol, caffeinated drinks, and heavy meals.
- Know the signs of heat-related illnesses.
- Monitor yourself and coworkers, use the buddy-system. Use monitoring such as aural temperature readings.
- Block out direct sun or other heat sources and shelter in shaded areas.
- Use cooling fans/air-conditioning and rest regularly.
- Wear lightweight, light-colored, loose-fitting clothes and a hat if available. Get medical help for symptoms such as altered vital signs, confusion, profuse sweating, excessive fatigue, or rapid heartbeat.

## Cold Stress

When the body is unable to warm itself, serious cold related illnesses and injuries may occur, and permanent tissue damage and death may result.

**Hypothermia** can occur when ***land temperatures*** are above freezing or ***water temperature***s are below 98.6°F/ 37°C.

Cold related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.

**Workers Are at Increased Risk When...**

- They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
- They take certain medication (check with your doctor, nurse, or pharmacy and ask if any medicines you are taking affect you while working in cold environments).
- They are in poor physical condition, have a poor diet, or are older.

## Heavy Equipment Use

The following are the types of heavy equipment that may be used during a wildfire cleanup:

- Front end loaders
- Excavators/backhoes
- Forklifts
- Bobcats
- ATVs
- Tractors
- Cranes
- Trailers
- Dump trucks

## Heavy Equipment Use (continued)

- OSHA requires machinery to be inspected by a qualified worker before each use.
- Be alert to the activities around you.
- Do not direct equipment unless trained to do so.
- Do not walk under or through areas where heavy equipment is lifting objects or behind equipment.
- Do not climb onto or ride loads being lifted or moved. Do not ride on equipment or in bucket.
- Pay attention to extremely sloped terrain.
- Do not exceed the load capacity of lifting equipment.

## Debris Removal Equipment

**Hazards include:**

- Overhead power lines
- Traffic issues
- Congested, bottle-neck areas
- Worker on top of potentially unstable load
- Modified trailer used to haul oversized load debris
- No traffic control (direction)
- Low visibility from smoke and/or ash

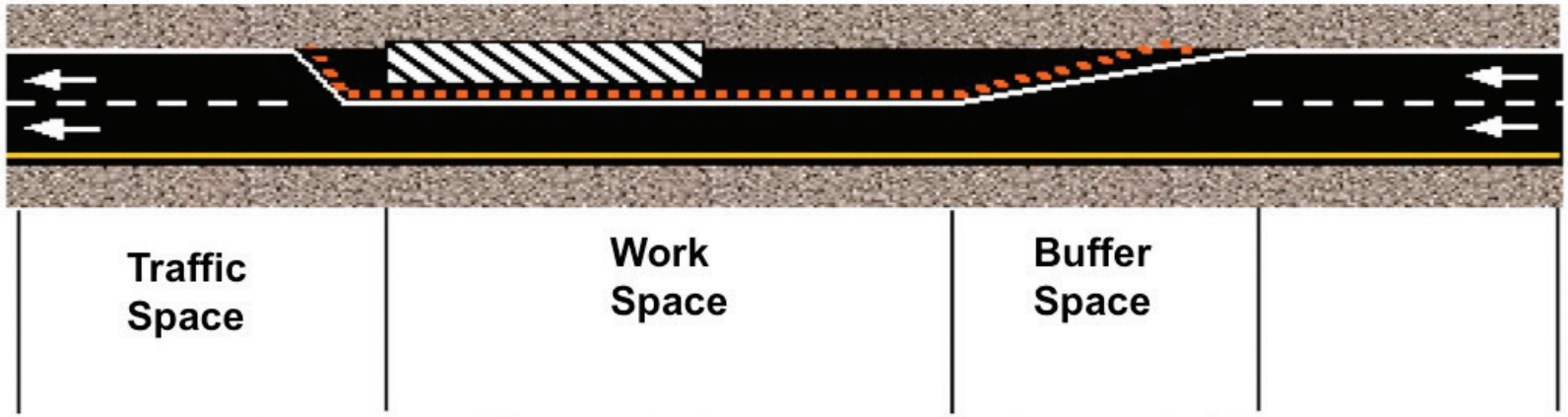
## Driving and Traffic Issues

- Worksites must be posted with legible traffic signs at points of hazard. Flag persons or Flaggers are used when signs, signals, and barricades do not provide adequate protection for workers. Traffic issues workers may experience include:
  - Heavy traffic
  - Inexperienced or poor drivers
  - Poor visibility due to smoke and ash


- Those working near traffic should wear high visibility clothing or PPE.

## Road Work Zone Safety

- There must be a traffic control plan for the movement of vehicles.
- Traffic Control Devices should be used inside the work zone.
- Flaggers and others providing temporary traffic control should wear high visibility, reflective clothing.
- Flagger stations should be illuminated.
- Flaggers should be trained/certified and use the signaling methods required by the authority in charge.



# Module 3

## Controlling other Task-specific Hazards During a Wildfire Cleanup

## Operating a Chain Saw

- Operate, adjust, and maintain the saw according to manufacturer's instructions.
- Properly sharpen chain saw chains and properly lubricate the bar and chain with bar and chain oil.
- Operator should periodically check and adjust the tension of the chain saw blade to ensure good cutting action.
- Choose the proper size of chain saw to match the job.
- Include safety features such as a chain brake, front and rear hand guards, stop switch, chain catcher and a spark arrester.

## Operating a Chain Saw (continued)

- **Wear the appropriate protective equipment:**
  - Hard hat
  - Safety glasses
  - Hearing protection
  - Heavy work gloves
  - Cut-resistant legwear (chain saw chaps)
- **Always cut at waist level or below.**
- **Avoid contact with power lines.**
- **Bystanders or coworkers should remain at least:**
  - 2 tree lengths (at least 150 feet) away from anyone felling a tree
  - 30 feet from anyone operating a chain saw to remove limbs or cut a fallen tree

# High Pressure Washers

**Associated hazards include:**

- Chemical burns
- Lacerations
- Thermal burns
- Contusions
- Back and shoulder strains
- CO production
- Chemical Penetration
- Projectile Production
- Electric shock

**Safe use guidelines include:**

- Inspection of washer
- Training and proper use
- PPE (including insulating rubber boots)
- Hazcom for cleaning agents
- Use with GFCI and proper electrical safety

# Hand and Portable Power Tools

## Hand Tools

- Inspect tools in accordance with manufacturer's specifications
- Take damaged tools out of service
- Use only sharp tools

## Portable Power Tools

- Inspect tools in accordance with manufacturer's specifications
- Use with sharp blades
- Use with GFCI
- Use with proper gauge electric cord
- Use double insulated tools
- Always wear eye protection

## Personal Protective Equipment (PPE)

**Depending upon your work site's PPE program and assigned job task, any of the following PPE may be required:**

- Protective clothing ranging from standard coveralls to a chemical resistant suit with hood and booties.
- Respirator ranging from an N-95 to a PAPR for high exposure and strenuous work. In rare cases a supplied air respirator may be required.
- Protective footwear with steel toe and insole. A chemical resistant boot or outer boot may be required for some work.

## PPE (continued)

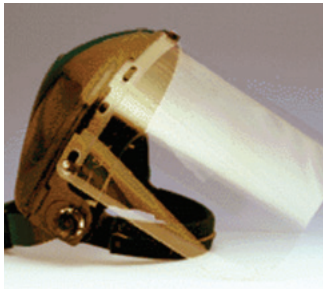
- Disposable cut/abrasive resistant work glove. A chemical resistant glove may be required for some work.
- Fully enclosed goggles (better for ash) or safety glasses.
- Ear protection in noisy areas.
- Head protection if in construction or demolition zones.
- If you are working near downed power lines:
  - Nomex clothing compliant with NFPA 1500, rubber gloves, dielectric overshoes and insulated tools
- Be sure to follow your work site's PPE program.

The OSHA PPE standard (29 CFR 1910 Subpart I) must be followed when selecting and implementing PPE.

## PPE Examples

*Safety glasses*

*Safety goggles*



*Face Shield*

*Level C PPE with tyvek splash suit and APR respirators*

*Leather gloves*
*Courtesy Kirkwood*

*Nitrile gloves*
*Courtesy Kirkwood*

*N-95 respirator*

*1/2 face APR*

*Full face APR*

*PAPR*

# Decontamination (Decon)

**Depending on your job task, you may come in contact with hazardous materials which will require you to be decontaminated**

- Decon is the process of removing, destroying, or reducing the activity of materials such as ash, asbestos, or toxic chemicals that could endanger an individual or the environment.
- Prevents spreading contamination to other locations (like your vehicle or home).
- Site workers who use the site's SOPs are less likely to be contaminated than site workers who do not use these practices.

## Decontamination (continued)

- A decontamination plan should include:
  - Training
  - Location and layout of decontamination stations and areas
  - Decontamination methods
  - Required decontamination equipment
  - Standard Operating Procedures (SOPs) to minimize worker contact with contamination during decontamination
  - SOPs for decontamination line personnel
  - Procedures for collection, storage and disposal of clothing equipment and any other materials that have not been completely decontaminated
  - Disposal of PPE and decon solutions as contaminated waste
  - Adequate personal washing stations

## Prevent the Spread of Contamination to Your Family and Home

- Bringing home contaminated work clothes or equipment may contaminate your home and place your family at risk.
- Bring a clean change of clothes to the work site.
- Wash work clothes separately. Preferably in an employer provided location.

## Animals, Insects and Plants

- **To protect yourself from mosquitoes:**
  - Use screens on dwellings
  - Wear long pants, socks, and long-sleeved shirts
  - Use insect repellents that contain DEET or Picaridin
- **Beware of wild or stray animals:**
  - Avoid wild or stray animals; call local authorities to handle animals
  - Get rid of dead animals according to local guidelines
  - Wear and clean proper protective clothing when handling carcasses

## Animal, Insects and Plants (continued)

- **Be on the alert for snakes that may be hiding in unusual places.**
- If you are bitten:
  - Seek immediate medical attention
  - Try to identify the snake so that if it is poisonous, you can be given the correct antivenin
  - Do not cut the wound or attempt to suck the venom out; contact your local emergency department for further care

**Be aware of poisonous or harmful plants in your work area-protect your skin appropriately**

## General Safety Tips

- Be careful and use safety measures outlined in your worksite's HASP at all times.
- Walking/working surfaces may be wet, slippery and unstable. Spread sand and wear slip resistant footwear if possible, to reduce slips and falls.

## General Safety Tips (continued)

- Walking over and handling debris that is unstable can cause cuts, scrapes, bruises, sprains, etc.
- Make sure you have had a current tetanus vaccination.
  - Revaccinate for a dirty wound if current vaccination is over 5 years old
  - If you will be performing direct patient care or otherwise expect to have contact with bodily fluids, get the Hepatitis B vaccine series
- Avoid contact with stagnant water:
  - If exposed to stagnant water, wash and decontaminate yourself and any contaminated equipment immediately
- Use steel toe insole, non-slip footwear.
- Use durable outer gloves when handling debris.
- Wear ear protection for noisy environments.

## Bloodborne Hazards

- Use disposable nitrile or similar gloves when handling human remains or assisting those with injuries.
- Replace gloves if punctured or torn.
- Do not handle human remains or assist those with injuries if you have skin cuts or punctures.
- Use goggles or face shield and mask for handling human remains, recovering deceased. Make sure to wear a respirator.
- Transport human remains in closed, leak-proof, labeled containers.


OSHA Blood Borne Pathogen Standard: 29 CFR 1910.1030

# Excavation Hazards

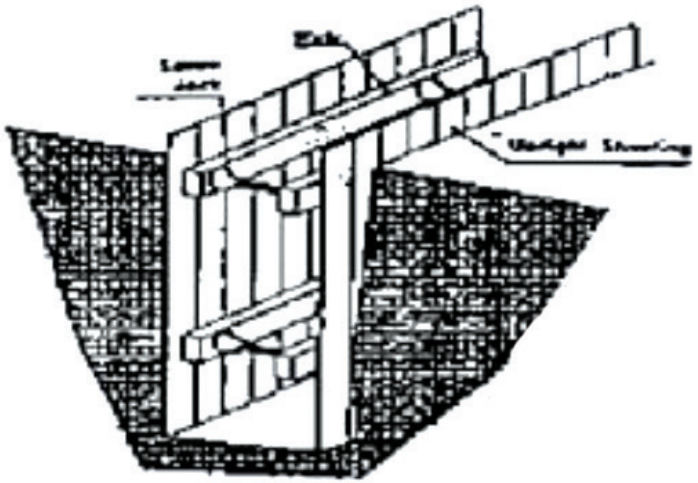
**Search and rescue, structural repair and cleanup operations may require excavation.**


- Excavations can create many hazards which must be controlled to safely work around and in them.
- An excavation is any man-made cut, hole, trench, or depression in the earth formed by earth removal.
- A trench is defined as a narrow below-ground excavation that is deeper than it is wide, and is no wider than 15 feet.
- The following are potential excavation hazards:
  - Cave in
  - Falls, falling loads
  - Hazardous atmosphere
  - Incidents involving mobile equipment

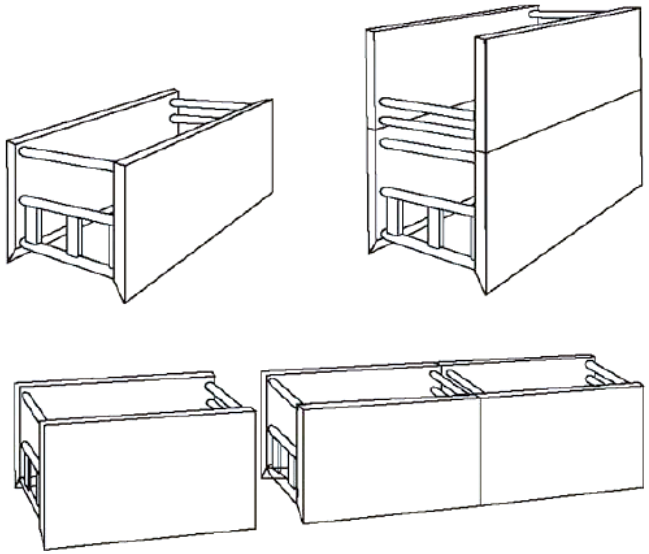
## Excavation (continued)

- A competent person must evaluate soil for excavation safety. All excavations/trenches should have safe means for entering and exiting (ladders, safe design, etc.). DO NOT enter an unsafe excavation!
- If an excavation is over 4 feet deep, an emergency exit route/device (i.e.ladder) must be provided which may not be the sides of the excavation. Distance to egress must be 25 feet or less.
- If an excavation is five feet deep or more, one of the following engineering controls must be used:
  - Shoring
  - Shielding
  - Sloping

## Controlling Excavation Hazards



*Shoring*



*Shielding*


*Sloping*

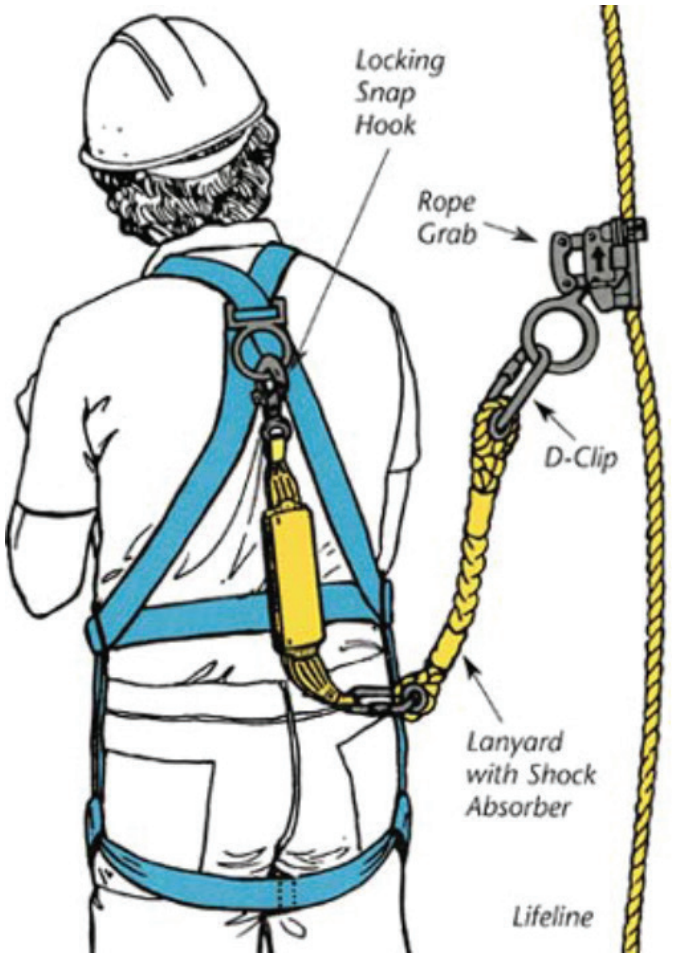
## Aerial Lifts

**Vehicle-mounted devices used to get a worker to an elevated position, (also called "cherry pickers," or "boom trucks").**

- Only trained and authorized people may operate the lift.
- Read and understand the safety and operating instructions including all warning decals or labels.
- Check for overhead objects before use.
- Stay far from debris piles, drop-offs, and floor openings.
- Never use near electric lines unless they are deenergized or adequate clearance is maintained.
- Refuel tanks only when the unit is off and charge batteries in a well ventilated area away from open flames.
- Elevate the lift only when it is on a firm and level surface.
- Whenever working out of an aerial lift, a full body harness must be worn and properly attached to the basket.
- Never drive the aerial lift when it is elevated above the limit the manufacturer considers safe.

## Falls from Heights Six Feet and Higher

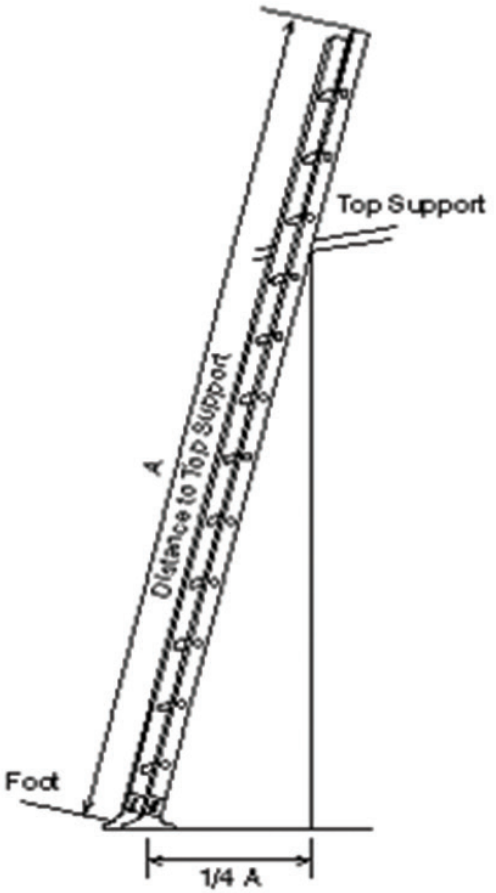
- Employees shall be protected from falls greater than six feet to a lower level.
  - Guardrail Systems
  - Safety Net Systems
  - Fall Arrest Systems (less effective than guardrail and safety net systems)
  - Cover or guard any openings or floor holes as soon as they are created
  - Make sure floor hole covers support two times the weight of employees, equipment, and materials
  - Be careful when stepping into areas that are unstable/uneven or where the surface cannot be visualized (i.e., if covered by water).
- Workers should prevent items from falling onto people below.



## Ladder Safety

**Ladders can create a falling hazard. Make sure your ladder is secure:**

- Position portable ladders so the side rails extend at least 3 feet above the landing.
- Secure side rails at the top to a rigid support and use a grab device when 3 foot extension is not possible.
- Do not apply more weight on the ladder than it is designed to support and make sure that the weight on the ladder will not cause it to slip off its support.
- Before each use, inspect ladders for cracked, broken, or defective parts.
- Use only ladders that comply with OSHA standards.



## Noise Exposure

- Wear appropriate hearing protection in noisy work environments.
  - Examples: chainsaws, heavy equipment and blowers
- A worksite is considered noisy if you have to shout to be heard within three feet.
- The OSHA PEL for noise is 90dB.

*Ear plugs*

*Ear muffs*

## Traumatic Stress

- A traumatic event is a shocking and emotionally overwhelming situation in which an individual perceives actual or threatened death or serious injury.
- Workers responding to a wildfire may experience traumatic stress.
- Reactions to traumatic events will vary, ranging from relatively mild to severe.
- It is common for people to experience anxiety, terror, shock, and upset, as well as emotional numbness and personal or social disconnection.[1]

*Pay attention to co-workers and how they are being affected by traumatic stress*

[1] International Society For Traumatic Stress Studies

## Traumatic Stress (continued)

**Symptoms and negative effects of Traumatic Stress include:**

- Physical illness (headaches, fatigue)
- Unable to function normally on the job
- Depression
- Anxiety
- Making efforts to avoid reminders of a traumatic event
- Marital and family conflict
- Hostility and aggression
- Death through suicide as a reaction to overwhelming stress

## How to Cope With Traumatic Stress

**Some useful techniques to reduce stress when participating in a response are:**

- Take a break from the news.
- Pace yourself and take frequent rest breaks.
- Watch out for each other.
- Be conscious of those around you. Responders who are exhausted, feeling stressed, or even temporarily distracted may place themselves and others at risk.
- Maintain as normal a schedule as possible.
- Drink plenty of fluids such as water and juices.

**Individuals with prolonged traumatic stress (anxiety, depression, etc.) that disrupt their daily functioning should consult with a trained and experienced mental health professional.**

## Coping With Traumatic Stress (continued)

- Try to eat a variety of foods and increase your intake of complex carbohydrates (breads, muffins made with whole grains).
- Whenever possible, take breaks away from the work area. Eat and drink in the cleanest area possible.
- Recognize and accept what you cannot change - the chain of command, organizational structure, waiting, equipment failures, etc.
- Talk to people when YOU feel like it. You decide when you want to discuss your experience. Talking about an event may be reliving it. Choose your own comfort level.
- If your employer provides you with formal mental health support, use it!
- Give yourself permission to feel rotten: you are in a difficult situation.
- Recurring thoughts, dreams, or flashbacks are normal - do not try to fight them. They will decrease over time.
- Communicate with your loved ones at home as frequently as possible.

## Protecting Your Family During a Wildfire

Create an emergency response preparedness kit containing:

- Water
- Non-perishable food (at least three days worth)
- First aid supplies
- Medications
- Battery powered radio
- Flashlight
- Tools
- Duct tape
- Cash/traveler's checks
- Clothing
- Bedding
- Toiletry items
- Special needs items
- Important documents (i.e. birth certificate, passport, etc.)

## Summary

- Proper training is a key component of a safe response.
- The dusts and other chemicals left after a wildfire can be hazardous to human health.
- The hazards and issues covered in this orientation are dynamic and require vigilance and flexibility.
- The key to a safe response is attention to the safety issues of your work environment.
- In addition to the similar physical hazards of a construction or demolition site, there is the added factor of a fire reigniting, toxic dusts and heat stress.

## Information Sources

**This orientation is based on recommendations from:**

- National Institute of Environmental Health Sciences (NIEHS)
- National Institute for Occupational Safety and Health (NIOSH)
- Occupational Safety and Health Administration (OSHA)
- Center for Disease Control and Prevention (CDC)
- Environmental Protection Agency (EPA)
- USDA, Forest Service
- U.S. Fire Administration, FEMA

Factsheets from these agencies and other wildfire resources are available on the NIEHS National Clearinghouse for Worker Safety and Health Training website, http://tools.niehs.nih.gov/wetp/.

## Why This Orientation Was Created

This orientation was created by the NIEHS National Clearinghouse for Worker Safety and Health Training under contract no. 273201000083U from the National Institute of Environmental Health Sciences Worker Training Program (WTP). WTP has trained more than two million emergency responders and hazardous waste workers since 1987 to do their jobs safely. WTP is part of the Department of Health and Human Services, which is a cooperating agency under the Worker Safety and Health Support Annex of the National Response Plan. As part of the coordinated effort, WTP created this orientation for those who may be involved in a wildfire cleanup response.

## Notes