Safe Cleanup of Fire Ash

The recent fires have deposited large amounts of ash on indoor and outdoor surfaces in areas near the fire. Questions have been raised about possible dangers from contact with the ash and safe disposal procedures. The ash deposited by forest fires is relatively nontoxic and similar to ash that might be found in your fireplace. However, any ash will contain small amounts of cancer-causing chemicals. In addition, fire ash may be irritating to the skin, especially to those with sensitive skin. If the ash is breathed, it can be irritating to the nose and throat and may cause coughing. Exposure to ash in air might trigger asthmatic attacks in people who already have asthma. Therefore, in order to avoid possible health problems the following is recommended.

- Do not allow children to play in the ash.
- Wash ash off children's toys before children play with them.
- Clean ash off house pets.
- Wear gloves, long sleeved shirts, and long pants and avoid skin contact.
- If you do get ash on your skin, wash it off as soon as possible.
- If you have a vegetable garden or fruit trees, wash the fruit or vegetables thoroughly before eating them.
- Avoid getting ash into the air as much as possible. Do not use leaf blowers or take other actions that will put ash into the air.
- Shop vacuums and other common vacuum cleaners do not filter out small particles, but rather blow such particles out the exhaust into the air where they can be breathed. The use of shop vacuums and other non-HEPA filter vacuums is not recommended. HEPA filter vacuums could be used, if available.
- Well fitting dust masks may provide some protection during cleanup. A mask rated N-95 or P-100 will be more effective than simpler dust or surgical masks in blocking particles from ash. In general, many ash particles are larger than those found in smoke; thus, wearing a dust mask can significantly reduce (but not completely eliminate) the amount of particles inhaled.
- Persons with heart or lung disease should consult their physician before using a mask during post-fire cleanup.
- **Gentle** sweeping of indoor and outdoor hard surfaces followed by wet mopping is the best procedure in most cases. A damp cloth or wet mop may be all that is needed on lightly dusted areas.
- The Regional Water Control Quality Board has asked the public to avoid washing ash into storm drains whenever possible.
- If ash is wet down, use as little water as possible.
- Collected ash may be disposed of in the regular trash. Ash may be stored in plastic bags or other containers that will prevent it from being disturbed.

Ash and debris inside burned structures may contain more toxic substances than forest fire ash because of the many synthetic and other materials present in buildings. Older buildings in particular may contain asbestos and lead. A more cautious approach should be taken in the removal of ash and other debris from inside burned structures. A NIOSH Interim fact sheet addressing burned structure clean up safety is attached.

INTERIM FACT SHEET

NIOSH Warns of Hazards during Cleanup Work Following Forest Fires

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The National Institute for Occupational Safety and Health (NIOSH) warns workers and volunteers of the potential dangers involved with cleanup operations following the devastation caused by forest fires. Because the level of experience varies among these workers, cleanup crews must work together and look out for one another to ensure safety. NIOSH urgently requests your assistance in disseminating the following warnings to all those involved in cleanup work following forest fires. The potential work-related hazards listed here are described below in greater detail: Fire, Electrical Hazards, Carbon Monoxide, Musculoskeletal Hazards, Thermal Stresses, Heavy Equipment, Structural Instability, Hazardous Materials, Confined Spaces, Power Line Hazards, Agricultural Hazards, Stress and Fatigue. Additional key resources on health and safety hazards related to fire fighting can be found on the NIOSH web site under the "spotlights" section titled "Fighting Wildfires" (http://www.cdc.gov/niosh/topics/firefighting/).

General Considerations

Before cleanup operations are initiated, local and State government emergency policies and guidelines should be checked to determine if any restrictions exist (e.g., water use, discharge of waste water, disposal of debris).

POTENTIAL DANGERS INVOLVED IN CLEANUP OPERATIONS

Fire

Heat sources may remain as a result of smoldering wood or other debris that could reignite if contact is made with a combustible material or if oxygen becomes available. Workers and employers must therefore take extra precautions. At least two fire extinguishers, each with a UL rating of at least 10A, should be provided at every cleanup activity.

Electrical Hazards

NIOSH has investigated several work-related electrocution deaths following natural disasters. To prevent future electrocutions, NIOSH urges those involved in cleanup activities to take the following steps:

- If water has been present anywhere near electrical circuits and electrical equipment, turn off the power at the main breaker or fuse on the service panel. Do not turn the power back on until electrical equipment has been inspected by a qualified electrician. Never enter flooded areas or touch electrical equipment if the ground is wet, unless you are certain that the power is off. **NEVER** handle a

downed power line. No not use electrical equipment that has been exposed to heat from the fire until checked by an electrician.

- When using gasoline and diesel generators to supply power to a building, switch the main breaker or fuse on the building service panel to the "off" position prior to starting the generator. This will prevent inadvertent energization of power lines from backfeed electrical energy from the generators, and help to protect utility line workers from possible electrocution.

- If clearing or other work must be performed near a downed power line, contact the utility company to discuss de-energizing and grounding or shielding of power lines; maintain a safe distance from the power lines until they have been de-energized. Extreme caution is necessary when moving ladders and other equipment near overhead power lines to avoid inadvertent contact. If you are working on or near power lines, refer to the additional recommendations provided in that section below. Be aware of possible fire damage to poles and other structures carrying overhead power lines.

Unstable Work Surfaces

Cleanup activities may involve walking on unstable surfaces such as construction debris, trees and other vegetation. Piles of debris and other unstable work surfaces create a risk for traumatic injury from slips, falls, puncture wounds from nails and sharp objects, and collapsing materials. Extreme caution is necessary when working on these surfaces. Protective equipment, such as hard hats, safety glasses, leather gloves, and steel toe boots should be considered to minimize the risk of injury.

Carbon Monoxide

Cleanup activities may involve the use of gasoline- or diesel-powered pumps, generators, and pressure washers. Because these devices release carbon monoxide, a deadly, colorless, odorless gas, operate all gasoline-powered devices outdoors and **never** bring them indoors. It is virtually impossible to assess adequate ventilation. NIOSH has investigated several carbon monoxide poisoning deaths in the past caused by the use of gasoline-powered engines indoors or in confined spaces. Be aware that high levels of carbon monoxide may occur in confined spaces from the fires.

Musculoskeletal Hazards

Cleanup workers are at risk for developing serious musculoskeletal injuries to the hands, back, knees, and shoulders. Special attention is needed to avoid back injuries associated with manual lifting and handling of debris and building materials. To help prevent injury, use teams of two or more to move bulky objects, avoid lifting any material that weighs more than 50 pounds (per person), and use proper automated-assist lifting devices.

Thermal Stresses

Heat: Cleanup workers are at serious risk for developing heat stress. Excessive exposure to hot environments can cause a variety of heat-related problems, including heat stroke, heat exhaustion, heat cramps, and fainting. To reduce the potential for heat stress, drink a glass of fluid every 15 to 20 minutes and wear light-colored, loose- fitting clothing. Additionally, incorporate work-rest cycles into work routines, work during the cooler hours of the day, when possible, or distribute the workload evenly throughout the day. When air conditioning is unavailable, open windows and use fans.

Cold: If standing water is present from fire fighting be aware that working in water which is cooler than 75 degrees F (24 degrees C) will remove body heat more rapidly than it can be replaced, resulting in hypothermia. To reduce the risk of hypothermia, wear high rubber boots, ensure that clothing and boots have adequate insulation, avoid working alone, take frequent breaks out of the water, and change into dry clothing when possible.

Heavy Equipment

Only those properly trained should operate heavy equipment such as bulldozers, backhoes, and tractors. If you are operating this type of equipment, make sure you turn it off and block it against motion when not in use. Operators should be aware of the activities around them to protect other workers on foot from being struck by moving equipment. Heavy equipment operators should not exceed the load capacity of cranes and other lifting equipment and ensure that workers do not walk under areas where cranes and other heavy equipment are being used to lift objects.

Structural Instability

Fires can rearrange and damage natural walkways, as well as sidewalks, parking lots, roads, and buildings. Never assume that fire-damaged structures or ground are stable. Buildings that have been burned may have suffered structural damage and could be dangerous. Don t work in or around any building damaged by fire until it has been examined and certified as safe for work by a registered professional engineer or architect. Assume all stairs, floors, and roofs are unsafe until they are inspected. Leave immediately if you hear shifting or unusual noises as this may signal a possible collapse.

Hazardous Materials

Fires to commercial and residential buildings and water used to fight the fire can dislodge tanks, drums, pipes, and equipment, which may contain hazardous materials such as pesticides or propane. Containers may be damaged by fire and heat. Do not attempt to move unidentified dislodged containers without first contacting the local fire department or hazardous materials team. If working in potentially contaminated areas, avoid skin contact or inhalation of vapors by wearing appropriate protective clothing and respirators.

Contact NIOSH for more information on the proper safety equipment. Frequently and thoroughly wash skin areas that may have been exposed to pesticides and other hazardous chemicals.

PREVENTION MEASURES

First Aid

First aid, even for minor cuts and burns, is extremely important. Immediately clean out all open wounds and cuts with soap and clean water. Most cuts, except minor scratches, sustained during cleanup activities will warrant treatment to prevent tetanus. If you are injured, contact a physician to determine the necessary type of treatment.

Protective Equipment

For most clean-up work activities, you will need the following personal protective equipment: hard hats, safety goggles, heavy work gloves, and watertight boots with steel toe and insole (not just steel shank). For information on what equipment you need for protection, contact your local OSHA office or NIOSH.

Excessive noise from equipment such as chain saws, backhoes, tractors, pavement breakers, blowers, and from heavy equipment (e.g., earth moving equipment, helicopters) may cause ringing in the ears and subsequent hearing damage. If working with any noise that you must shout over to be heard, you should wear earplugs or other hearing protection devices.

Working in Confined Spaces

If you are required to work in a boiler, furnace, pipeline, pit, pumping station, septic tank, sewage digester, storage tank, utility vault, well, silo, or similar enclosed structures, you should be aware of the hazards of working in confined spaces. A confined space has one or more of the following characteristics:

- limited openings for entry or exit;
- unfavorable natural ventilation; or
- is not designed for continuous worker occupancy.

Toxic gases, a lack of oxygen, or explosive conditions may exist in the confined area, resulting in a potentially deadly atmosphere. Because many toxic gases and vapors cannot be seen or smelled, never trust your senses to determine if safe entry is possible. Never enter a confined space unless you have been properly trained, even to rescue a fellow worker! If you need to enter a confined space and do not have the proper training and equipment, contact your local fire department for assistance.

Working On or Near Power Lines [Recommendations for Utility Workers-ONLY]

Several workers have died of electrocution following natural disasters. Workers and employers must take extreme caution while attempting to restore power or clear areas near downed power lines. In one instance, a worker lost his life while removing trees from a de-energized power line that had been knocked down by a storm. While inspecting the completed work, the man stepped on the line and was electrocuted by "feedback" energy from a portable backup generator at a nearby gas station. Feedback energy occurs when a de-energized line becomes energized by a secondary power source.

Another worker died cleaning branches from a power line, following a storm. He was electrocuted after falling from a tree onto a line thought to be de-energized. Although the workers had opened a fused switch on a transformer, the line remained energized through another transformer.

If you are working on or near power lines, the following steps may save your life:

- Treat all power lines as energized until you have followed the required procedures for personally de-energizing and testing them with an appropriate testing device. Do not rely on "fuzzing" to determine if a power line has been de-energized.
- Verifying that a line is not energized may not ensure your safety. You must also ground lines on both the load and supply sides of the work area. Grounding is necessary to protect you from the hazards of feedback electrical energy from a secondary power source, such as a portable generator.
- When restoring power in underground vaults, added precautions are necessary to avoid explosion hazards. As vaults containing electrical connections are drained or pumped out, and energized, potentially explosive gases may form. If you are required to work in a utility vault, refer to the Confined Spaces section of this Fact Sheet.

RESPIRATORY HAZARDS

If you are involved in cleanup efforts you may be exposed to ash, soot and fire decomposition products that may cause irritation and other respiratory effects. Spoiled and/or wet vegetation and other organic/agricultural materials often grow large amounts of bacteria and mold during warm weather. Breathing these organisms and the organic dust produced may cause lung disease. Use proper engineering controls to exhaust and replenish adequate fresh air if working indoors. A high efficiency particulate air (HEPA)-type vacuum is recommended when cleaning surfaces contaminated with dust. The use of a typical household vacuum should be avoided since it will re-suspend the collected dust into the air. When exposure to dusts cannot be controlled or avoided, exposure can be reduced by routine use of a well-fitted NIOSH-certified air-purifying respirator (such as an N-95 or more protective respirator).

STRESS, LONG HOURS, AND FATIGUE MAY INCREASE THE RISKS FOR INJURY AND ILLNESS

Continued long hours of work, combined with emotional and physical exhaustion and losses from damaged homes and temporary job layoffs, can create a highly stressful situation for cleanup workers. Workers exposed to these stressful conditions have an increased risk of injury and emotional crisis, and are more vulnerable to stress-induced illnesses and disease.

Emotional support from family members, neighbors, and local mental health professionals can help to prevent more serious stress-related problems in the difficult months ahead.
People working in all phases of cleanup work can reduce their risks of injury and illness in several ways:

- Set priorities for cleanup tasks and pace the work over several days (or weeks). Avoid physical exhaustion.
- Resume a normal sleep schedule as quickly as possible. Get plenty of rest and take frequent rest breaks BEFORE exhaustion builds up.
- Take advantage of disaster relief programs and services in your community.
- Be alert to emotional exhaustion or strain. When family members and neighbors are unavailable for emotional support, consult professionals at community health and mental health centers.

For more information about these or other occupational safety and health topics contact NIOSH at:

1-800-35-NIOSH (1-800-356-4674)
Fax: 513: 533-8573
E-mail: pubstaft@cdc.gov
www.cdc.gov/niosh