Rhode Island Committee on Occupational Safety and Health

RICOSH has been an advocate for occupational and environmental health for four decades. RICOSH was in the forefront of campaigns on chemical Right to Know, the asbestos abatement controls, childhood lead poisoning, healthy schools, and impact of climate change. This anthology, our third, pulls together several recent RICOSH policy proposals and projects and factsheets that we have published in our newsletter recently. Some have been revised to update the topic or theme involved. If there is a common thread throughout it is the integration of occupational and environmental health.

After a Storm: Worker Safety During Recovery Work

The National Oceanic and Atmospheric Administration (NOAA) predicts sea level rise in Rhode Island will increase upwards of nine feet by 2100. Rising seas increase the risk of storm surge, which leads to increased coastal damage. The inland areas of the state are also more vulnerable as instances of intense precipitation are on the rise. Over the past 80 years, Rhode Island and southern New England have experienced a doubling of the frequency of flooding and the magnitude of flood events. Intense rainfall events have increased by 71% since 1958.

After a severe storm passes, cleanup and recovery become high priorities. Usually highly trained and specialized crews are assigned to restore power, communication and transportation. However, pressure to get things back to normal rapidly can result in employing service crews and workers who have neither the training nor proper equipment to work around many of the hazards the storm left behind. (The dangers of working in and around collapsed structures include a range of respiratory hazards, electrocution from power lines and recovery equipment, using heavy equipment and chainsaws, carbon monoxide poisoning from portable generators, biological hazards from animal and insect vectors and water pollution, and personal security. Navigating transportation hazards can be a major issue. Workers may require vaccines and other medical assessments. Other priorities for safety include, insect controls, waste disposal, bloodborne precautions and basic hygiene.

Below is a brief summary of some hazards faced during recovery work after a major storm.

Electrical and Power Sources

After a severe storm, workers face downed power lines and stationary electrical equipment. An individual doesn’t have to be in direct contact with a high energy power line to be hit with its power. A powerful electrical discharge can jump across a distance of more than ten feet, especially when the atmosphere is moist or the worker is wet. Stationary equipment, cars, poles and even tree limbs, can become energized. Workers should assume a line or equipment is live (energized) until tested by the proper company or agency, and given an all clear.

Without electric power, most equipment including lights will be run by gasoline, propane or diesel powered generators; and most equipment, such as high-pressure washers, gasoline powered saws, compressors, and welding equipment will exhaust carbon monoxide (CO), a deadly poison. All equipment and generators should be operating properly and exhausted to the outdoors. Some models contain innovations such as fuel injection and electronic control technologies that reduce CO emissions. Use in place or handheld CO detectors to monitor potentially dangerous levels.

Traffic Safety and Heavy Equipment

Traffic work zones must be well marked and lighted. A key safety feature of a traffic work zone is the use of traffic calming barriers, cones, signs, and flaggers to warn and direct vehicles.

Workers should be trained to work around cranes, backhoes, bulldozers, front-end loaders, or dump trucks and other heavy equipment. The swing areas of the rotating superstructures or turrets are a major hazard around heavy equipment. Work under lifts or overhead loads should be prohibited. If high winds (in excess of 25mph) or lightning recur, all hoisting and rigging operations should stop. Cranes and aerial lifts, trucks, scissor lifts, etc., should be set on firm foundations and uniformly level.

Debris Removal

Debris removal includes picking up, clearing, separating, and removing debris. Hazards include cuts, punctures, noise, being struck by heavy equipment, electrocution, power tool injuries, contact with flammable liquids, heat/cold stress, insect bites/stings, mammal/snake bites, and vehicular traffic.

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Elements of Heat-Healthy Program for Workers:

- Download the APP-OSHA-NIOSH Heat Safety Tool. This is a real time heat index with hourly forecasts specific to your location and with safety recommendations from OSHA/NIOSH.
- Regular hydration (fluid intake) is vital.
- Water and sports drink intake alone will not prevent heat illnesses. It is also important to adjust the work environment and regimen.
- Take frequent rest breaks. If working outdoors, take these breaks in air conditioning or in a cool shaded area. The hotter it gets, take more and longer breaks.
- Schedule heavy work at cooler times.
- Use a buddy system to monitor for signs of heat stress.
- Workers and staff should have time to adjust to hot environments.
- Shield machinery or equipment that produces heat.
- Supply portable general ventilation and spot cooling in hot work areas.
- Providing cooling protective clothing such as water-cooled/air cooled garments, vests, cooling/wetted overgarments.
- Eat smaller meals and avoid sugar, caffeinated drinks, and alcohol.
- Provide training and select a crew or staff member for specific emergency medical training on handling cases of heat stroke.
- Review hazards and precautions when a heat wave is predicted.

Tree and Limb Removal

Power lines can become entangled in trees and limbs posing the threat of electrical dangers and fall hazards from heights and unstable surfaces. While working in trees, use fall protection systems equipment such as harnesses, lanyards, connectors, and suitable anchorage points.

Only adequately trained and authorized persons should operate an aerial lift. Aerial lift brakes should be set and outriggers used, boom and basket limits not be exceeded.

Chain Saw Safety

Workers should be provided and use safety glasses, gloves, ear protection, sturdy work shoes, and chaps cut-resistant leg wear.

- A chain saw should have safety features such as a chain brake, front and rear hand guards, stop switch, chain catcher and a spark arrester.
- Chains and bars should be properly lubricated.
- 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.
- Cut at waist level or below.
- Assisting coworkers should have the same protective equipment (see above) as the operator. When felling trees, safety zones should be created.

When heavy equipment such as wood chippers are in use, ensure that all safety devices and controls, such as emergency shut-off devices, are functioning properly and that workers are trained to operate chipper safety devices and safety controls.

Blue Tarping

Blue Tarping – the wrapping part of a structure as a temporary protection from the elements–has become a standard practice after a major storm and can pose hazards. (Two workers were killed during Hurricane Katrina recovery when they fell through holes in a roof they were tarping.)

- Cover or guard any openings. Visibly tag/mark structures that cannot support the weight of employees, equipment, and materials.
- Ladders should be tied off to prevent shifting and protected at the base from passing traffic. Ladders should extend three or more feet above the roof line landing surface.

Safe scaffolding practices involve fall protection (guardrails/harnesses, connectors, and suitable anchorage points), completely planked working levels, and braced and properly secured scaffolds. Tarping operations should cease in high winds.
Hazard of Flavoursing Compounds in Food Service Occupations

Flavours are often added to food products; butter flavouring chemicals are routinely added to microwave popcorn. Some flavouring chemicals are simple and consist of only one ingredient. Others are complex mixtures. It is clear, however, that workers who are employed to produce the flavouring compounds and workers who apply them in a range of food occupations are at risk of severe lung disease.

In the 1980s, workers exposed to flavouring chemicals in the baking industry were identified with an unusual debilitating obstructive lung disease. Later, workers in several microwave popcorn and flavouring plants developed permanent lung damage, including a disabling and potentially fatal lung disease called bronchiolitis obliterans. (In bronchiolitis obliterans, inflammation and scarring occur in the smallest airways in the lung and can lead to severe and disabling lung disease). The loss of pulmonary function associated with severe bronchiolitis obliterans is permanent and some patients have been placed on lung transplant waiting lists.

Investigations in the early 2000s by the National Institute for Occupational Safety and Health, (NIOSH) and the California Department of Public Health and the California Occupational Safety and Health Administration (Cal/OSHA) concluded the lung diseases(s) identified in these microwave popcorn plant workers (which became known as ‘Popcorn Lung’), were likely due to exposure to butter flavouring chemicals, such as diacetyl and 2,3-pentanedione. These findings prompted NIOSH to pursue ongoing investigations into flavouring exposures in other facilities.

‘Coffee Roasting Lung’

Similar lung disease profiles were subsequently found in coffee roasting facilities. Five former workers in a Texas coffee processing facility were diagnosed by a private doctor with the same irreversible lung disease – bronchiolitis obliterans.

NIOSH found an additional 11 cases of apparent disease among workers who roasted, ground and sometimes flavored coffee beans. These findings bolstered mounting evidence the same chemicals used in popcorn flavoring (diacetyl and 2, 3-pentanediol) pose a similar health hazard for commercial coffee roasters and grinders. Diacetyl and 2, 3-pentanediol, it turns out, are also formed naturally while roasting unflavored coffee and during grinding.

NIOSH, which is a part of the federal Centers for Disease Control and Prevention, (CDC) has published a range of recommendations and guidance to protect workers in these and related occupations. (BEST PRACTICES: Engineering Controls, Work Practices, and Exposure Monitoring for Occupational Exposures to Diacetyl and 2, 3-Pentanediol, DHHS (NIOSH) Publication No. 2015-197, available online at: www.cdc.gov/niosh/docs/2015-197/pdfs/2015-197.pdf) These include measures to method workplace exposures, medical surveillance for exposed workers and methods to control exposure. The stress is on controls that through some type of ventilation will reduce inhalation exposure to these chemicals can be effective (i.e. enclosures) and use of local and general exhaust ventilation to reduce inhalation exposure to these chemicals can be effective controls. In addition, a medical surveillance program that includes health questionnaires and breathing tests (e.g. spirometry) may be indicated to screen for respiratory symptoms or abnormalities in employees.

CO Poisoning

Carbon monoxide (CO) poisoning is also a highly significant respiratory hazard related to coffee roasting. OSHA investigated a near CO fatality in Maine when a worker entered a roasting tank and found CO levels in the tank reached 2500 ppm. Serious mental effects, including coma and death, can occur at CO levels of 700 ppm (for an hour or greater). NIOSH has concluded that a worker can be overcome or suffer permanent damage or death within 30 minutes at CO levels of 1200ppm.

Doctors reported five workers were hospitalized and a sixth worker died when they all entered a coffee storage tank in Japan where CO levels were detected in the range of 10,000 to 100,000ppm. OSHA has a comprehensive enforcement standard to protect workers in confined spaces and it is important to recognize that this would apply above and beyond the recommendations for exposures to flavouring compounds, especially when workers may enter large roasting or mixing tanks.

Examples of Exposure Controls for Flavouring Compounds

Use engineering controls such as closed systems, isolation, or local exhaust ventilation to reduce air concentrations of flavouring chemicals. When working with flavouring ingredients, the use of closed transfer procedures is the preferred control technique. However, when closed transfer is not feasible, simple, relatively low cost exhaust hoods provide a reasonably effective approach to reduce evaporative emissions from mixing tanks used in producing flavourings and flavored foods.

• Establish administrative controls such as good housekeeping and work practices to minimize exposure.
• Educate employers and employees to raise their awareness of potential hazards and train workers on proper procedures and use of engineering controls.
• Provide personal protective equipment where needed in addition to primary engineering or administrative controls. Respirators should protect against both organic vapors and particulate matter. Protection for acid mists may be required depending on what chemicals are utilized in production.
• Monitor occupational exposures and the status of workers’ health, tracking potential changes in lung function, symptoms or actual cases. Some states have programs that require such reporting, and others may have occupational health units in state health departments or independent occupational medicine programs

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More than 2,000 workers died from silicosis, a chronic, disabling lung disease as a result of inhaling crystalline silica between 1990 and 2013 in the US, even as many deaths from silicosis are undiagnosed and unreported. Between 3000 and 7000 new cases of silicosis arise each year. Exposure to crystalline silica can also cause lung cancer and Chronic Obstructive Pulmonary Disease (COPD) and kidney disease. Approximately 2.3 million workers might be exposed to respirable crystalline silica in the United States.

Silicosis has been associated with work in mining, quarrying, tunneling, construction, sandblasting, masonry, foundry operations, glass manufacture, ceramic and pottery production, cement and concrete production and working with certain materials in dental laboratories. Newly emerging occupations and tasks, including fabricating and installing quartz-containing engineered stone products like counter-tops and extracting natural gas by hydraulic fracturing also place workers at risk for silicosis.

Chronic silicosis can occur after 10-30 years of exposure to respirable crystalline silica dust at relatively low concentrations. Acute silicosis, however, may develop after exposures to very high levels of respirable silica in as little as a few weeks to five years post exposure (as occurred in the infamous Gauley Bridge tragedy see box below.) Accelerated silicosis is characterized by the same features as chronic classic silicosis except that the time from initial exposure and development of radiographic findings and symptoms and change in pulmonary function are much shorter. There is also a rapid progression to progressive massive fibrosis with severe respiratory impairment.

(Worke rs with silicosis are at higher risk for tuberculosis TB and atypical (non-tuberculosis) mycobacterial disease.)

Crystalline silica is found in sand, soil, granite, and concrete. The most common form of silica is quartz. Quartz in its natural form does not cause these diseases unless it is made into very small particles that can be inhaled. Exposure can occur whenever these media are drilled crushed, impacted, abraded.

High risk work activities include:
- Chipping, drilling, crushing rock.
- Abrasive blasting.
- Sawing, drilling, grinding, concrete and masonry.
- Demolition of concrete/masonry.
- Removing paint and rust with power equipment.
- Dry sweeping or air blowing of concrete rock sand dust.
- Jack hammering on concrete, masonry and other surfaces.

OSHA’s Silica Standard

OSHA’s silica standard for general industry and maritime went into effect in June 2018, and a comparable construction standard went on line in September 2017. (Visit the silica webpage for guidance on complying with the standard, as well as information on silica sampling and analysis, health effects of silica exposure, and answers to frequently asked questions.)

These standards reduce dust levels two to five times lower than the current OSHA permissible exposures and requires employers to use cost-effective measures to reduce silica dust, including wetting down and enclosing affected areas, and improved ventilation. Both standards could save nearly 700 lives and prevent approximately 1,600 new cases of silicosis per year, according to NIOSH.

The new silica rules cut permissible dust exposures in half for manufacturing and even more for construction workers. The new permissible exposure limit (PEL) is 50 micrograms per cubic meter as an 8-hour time-weighted average, replacing an outdated 1971 rule. The new standards require employers to: (1) establish a written exposure control plan, including designating a competent person who is responsible for implementing the standard’s mandates; (2) provide respirators where needed; (3) restrict housekeeping practices that expose employees to respirable silica; (4) provide medical surveillance to employees who are required to wear any respirator for 30 days or more a year (this is not to be confused with the OSHA requirement that a health professional must screen employees for respirator use prior to using a respirator); (5) maintain medical and exposure records; and (6) communicate the hazards of silica.

The timing is crucial, because silica-related lung disease is back in the news in two very different work settings. The continuing occurrence of silicosis deaths in young adults and reports of new occupations and tasks that place workers at risk for silicosis, including fabricators and installers of quartz-containing engineered stone products and workers employed to extract natural gas by hydraulic fracturing.

NMQSH has recently confirmed 416 cases of progressive massive fibrosis or complicated black lung in three clinics in central Appalachia from 2013 to 2017. “This is the largest cluster of progressive massive fibrosis ever reported in the scientific literature,” according to NIOSH.

Focusing on the Construction Rule

In the construction sector, if the work activities on the job site (listed above) produce exposures to crystalline silica, an employer has two options for controlling employee exposure: Follow specified exposure control methods listed in Table 1; or choose alternative exposure control methods.

OSHA provides a table that lists exposure control methods for construction tasks or equipment. A contractor can choose the specified exposure controls in Table 1. OSHA is confident that by following the protections outlined in Table 1 silica exposure...
will be below the OSHA PEL (50μg/m³) and below the Action Level of 25 μg/m³. Construction employers who fully and properly implement the controls in Table 1 will not be required to monitor silica exposure levels.

Construction employers can decide instead to adopt alternative exposure control methods. But they must then monitor silica exposure levels on the work site:

- Measure levels of respirable crystalline silica that employees are exposed to.
- Limit employee exposures to a PEL of 50 micrograms per cubic meter of air (50 μg/m³) as an 8-hour time-weighted average (TWA).
- Use engineering and work practice controls, to the extent feasible, to limit employee exposures to the PEL, and supplement the controls with respiratory protection when necessary.
- Keep records of employee exposure to respirable crystalline silica.

Regardless of which approach is chosen all construction employers must:

- Establish and implement a written exposure control plan.
- Designating a competent person to carry out the exposure control plan.
- Restrict housekeeping practices that expose employees to respirable crystalline silica where feasible alternatives are available.
- Offer medical exams to employees who will be required to wear a respirator for 30 or more days a year.
- Communicate hazards and train employees; and
- Keep records if exposure has been monitored and if respirators have been required.

Examples of Recommended Silica Dust Suppression Methods

1. Water spray dust control measures has been shown to reduce respirable crystalline silica dust during various construction and mining operations worldwide. Studies of airborne crystalline silica in various occupations have shown dramatic reductions in airborne dust concentrations by either wetting or spraying. The use of wet methods showed overall reductions in silica dust of 86% in the construction industry and 80% in manufacturing. Atomizing spray nozzles have been shown to reduce respirable particulate mass from brick cutting operations in the range of 63% to 79%.

2. Specially designed equipment removes respirable-size particles from the air, while general purpose sprinklers reduce the re-entrainment of settled dust on roadways and other areas. The proper design and placement of spray nozzles is key to effective dust suppression. Spray nozzles are characterized by pressure (high vs. low), spray patterns (circular cone vs. rectangular), and droplet size.

3. Wet dust suppression spray nozzles are selected according to the size of the desired area to be covered and the particle size of interest. Atomizing nozzles provide water droplets that maintain a high velocity over some distance, are useful when spray nozzles must be placed away from the point of dust generation, and are considered the most effective at reducing dust. These nozzles produce a fine mist in the range of 10 to 250 microns and are therefore useful for respirable dust control systems.

4. Dust Collectors. Dust suppression can be accomplished through containment measures and dust collectors. Dust is generally subject to wind and other weather conditions. In some cases, protective walls or “green belts” are used to limit off-site emissions, but do not address occupational exposures and likely increase occupational exposures.

Dust collection from local exhaust ventilation would be effective only if applied to enclosed or partially enclosed operations; though there are local exhaust methods that are acceptable if they meet air flow requirements of the standard. Further, to efficiently trap both respirable-size and larger particles from the emission stream, costly filtration would be required and properly maintained. Therefore, dry methods for dust suppression are not recommended.

Housekeeping activities: Prohibit dry sweeping and use of air pressure to cleanup. To reduce dust exposures, use an appropriate sweeping compound and assure that the persons doing the sweeping wear appropriate dust masks and that they are properly trained in their usage.

Contact RICOSH for additional resources, information or with any questions you may have.
Employers and workers need to be aware that heat stress can happen even when temperatures reach official limits for workplace safety. The “heat index” is a measure of how hot it really feels when humidity is taken into account. Traditionally many authorities warn that workers are at risk of heat stress when the index reaches 91 degrees Fahrenheit (32.8 degrees Celsius) or higher.

But an analysis of 25 incidents of outdoor worker illnesses and deaths shows that the risk can rise at a heat index of just 85 degrees F (29.4 C). Six deaths happened at heat indexes below 90 degrees F. “Heat-related illnesses can and do occur on days that aren’t particularly hot. An average summer day, with a temperature in the 80s, can fatally injure workers if proper precautions are not taken,” said lead author Dr. Aaron Tustin of the U.S. Department of Labor’s Occupational Safety and Health Administration (OSHA) in Washington, D.C. “When working in warm or hot weather, take precautions to avoid heat stroke,” Tustin “Don’t wait until the temperature is above 90.”

Heat’s Hidden Hazards

Hot weather can provoke several different illnesses, but one, heat stroke, is a major medical emergency. The body produces heat internally (metabolic processes) and receives it externally (sun, humidity, heat producing equipment, and high temperatures and activity). A cooling system has evolved to avert injury. This system is finely tuned to maintain core body temperatures by internally (metabolic processes) and receives it externally (sun, humidity, heat producing equipment, and high temperatures and activity). A cooling system has evolved to avert injury. This system is finely tuned to maintain core body temperatures by internally (metabolic processes) and receives it externally (sun, humidity, heat producing equipment, and high temperatures and activity). A cooling system has evolved to avert injury. This system is finely tuned to maintain core body temperatures by internally (metabolic processes) and receives it externally (sun, humidity, heat producing equipment, and high temperatures and activity). A cooling system has evolved to avert injury. This system is finely tuned to maintain core body temperatures by.

Heat stroke results from the breakdown of the body’s cooling system. The cooling system works by maintaining the body’s core temperatures at safe levels. But the cooling system can become overwhelmed when humidity and temperatures are constantly high as in a heat wave. When that happens a person will usually stop sweating altogether—though not always. Core body temperature escalates. Pulse is rapid and strong, throbbing headache and dizziness, nausea, confusion may all, or individually, be present. Kidney, brain and liver injury may result. And, death can result. Heat stroke is now classified as either classic heat stroke or exertional heat stroke which is more common in workplace settings. Characteristics of the individual (e.g., age and health status), type of activity (e.g., sedentary versus strenuous exertion), and symptoms (e.g., sweating versus dry skin) vary between these two classifications. It important to understand that it isn’t just temperature that is the factor into what constitute ‘hot weather’; humidity is also a major factor, as is it exertion in combination with exposure to sunlight and sources like equipment and machinery that generate radiant heat.

Some Elements of a Heat-Healthy Program for Workers:

When unacceptable levels of heat stress occur, there are several approaches to a solution. In a controlled environment, engineering controls, including increasing ventilation, bringing in cooler outside air, reducing the hot temperature of a radiant heat source, shielding the worker, and using air conditioning equipment can reduce threats from heat stress. Heat stress can also be administratively controlled through limiting the exposure time (e.g., work/rest schedules), reducing metabolic heat load, and enhancing heat tolerance (e.g., acclimatization). Additional preventive strategies against heat stress include establishing a heat alert program and providing auxiliary body cooling and protective clothing. A Heat Index of 85°F (29.4°C) could be used as an action threshold to implement a heat-healthy program. The following is a basic checklist for a heat-healthy program:-

- Regular hydration (fluid intake) is vital.
- But water and sports drink intake alone will not prevent heat illnesses. It is also important to adjust the work environment and regimen. Adjust how strenuous the work is, work clothing and equipment, the effects of direct sunlight and other conditions at the work site.
- Review hazards and precautions when a heat wave is predicted.
- Schedule heavy work at cooler times.
- Use a ‘buddy system’ to monitor for signs of heat stress.
- Workers and staff should have time to adjust to hot environments.
- Supply portable general ventilation and spot cooling in hot work areas.
- Providing cooling protective clothing (e.g. water-cooled/air cooled garments, vests, cooling/ wetted overgarments, etc).
- Eat smaller meals and avoid sugar, caffeinated drinks, and alcohol.
- Provide training and select a crew or staff member for specific emergency medical training on how to handle a victim of heat stroke.
- Download OSHA-NIOSH APP Heat Safety Tool. (Real-time heat index and hourly forecasts, specific to your location, with safety recommendations from OSHA NIOSH.)
- Regular hydration (fluid intake) is vital.
- But water and sports drink intake alone will not prevent heat illnesses. It is also important to adjust the work environment and regimen.
- Take frequent rest breaks. If you work outdoors try to take these breaks inside or in a cool shaded area. The hotter it gets, take more and longer breaks.
- Schedule heavy work at cooler times.
- Use a ‘buddy system’ to monitor for signs of heat stress.
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“Heat-related illnesses can and do occur on days that aren’t particularly hot. An average summer day, with a temperature in the 80s, can fatally injure workers if proper precautions are not taken.”
Solids, liquids and gases can flow into a vessel or a space while workers are in them. Industrial equipment such as saw blades, gears, rotating shafts, fans, cutting or bending devices, presses, ovens and dryers can be activated while workers are trying to clean or maintain them putting them at high risk for serious injury. Lockout is a procedure designed to protect workers while working on, in or near dangerous equipment.

If you install a light switch, you shut off the power at the fuse box and make sure no one accidentally turns it back on. The same is true in the workplace where the equipment and the power are far more dangerous. Lockout ensures that power sources are shut down, remain off and that equipment (blades, rotors, presses, etc.) cannot move.

A Lockout Checklist:

- Identify each hazardous energy source.
- Notify personnel that equipment will be shut down and locked out.
- Shut down each hazardous energy source and lock in “off” position.
- Lockout energy sources with each individual worker’s lock.
- Test to make sure sources are off.
- Check equipment: Use isolation or blocking devices so equipment will not run.
- Deplete potential energy sources in pipelines vat tanks by bleeding, blocking, grounding, etc.
- Before energy is unlocked and equipment turned on, ensure all workers are accounted for and it is safe to proceed.

What About Tags?

Sometimes tags are used instead of locks. While lockout physically blocks the energy sources, tags only alert workers not to start a source. Tags should be relied upon only when a locking mechanism is absolutely impossible. Tags must be highly visible and strategically placed in a way that best prevents anyone from starting up the equipment.

Most industrial equipment is run by electricity, but not all. There are also hydraulic (water pressure), pneumatic (air pressure), mechanical or chemical forms of energy. Stored energy may be present even though the source is down. A moving part may be in a raised position and the sheer weight of the object may make it drop on someone. So you need to look at energy stored in springs, electrical capacitors, and suspended parts.

While the federal Occupational Safety and Health Administration’s (OSHA) Lockout Rule (1910.147) is designed for maintenance activities, its procedures should be followed in many other situations, e.g. emergency response. Here is a brief summary of OSHA’s Lockout/Tagout rule.

OSHA’s Lockout/Tagout rule.

- A lockout plan should identify WHICH energy sources will be locked-out and how to lock them out. Restart procedures should also be outlined.
- BEFORE turning off the power, check that no one is operating the equipment. Inform operators before power is turned off.
- Each worker puts a lock on the equipment’s lockout device(s). Each lock remains on the equipment until the work is completed. Each lock will have individual workers’ identification on it. Each worker will have the ONLY key to remove the lock.
- Steam, air, and hydraulic lines should be bled, drained, and cleaned out. If complete draining is not possible use a Blinding Technique (inserting a circular disk into the line to block flow and then draining the blocked off portion). Release and block any mechanism under tension or pressure such as springs. If there is a ram, which could drop, support the ram with safety blocks or pins. Fully interlocked safety blocks are the safest.
- Test the main valve or main electrical disconnect to be sure that the power to the machine is off.
- Check electrical circuit(s) with proper and calibrated testing equipment. An electrical failure could energize the equipment even if the switch is in the off position. Stored energy in electric capacitors should be safely discharged.
- THE OSHA RULE MANDATES THAT EMPLOYERS AUDIT THEIR LOCKOUT/TAGOUT PROCEDURES.
The New England Consortium (TNEC) based at the University of Massachusetts/Lowell is sponsored by the National Institute of Environmental Health and Safety’s Worker Education Training program (NIEHS/WETP) to provide health and safety training relating to hazardous materials. TNEC is a New England regional partnership between the University of Massachusetts Lowell (UML) and RICOSH, CTCOSH, and NHCOSH, and (AFSCME) CSEA in New York.

Course Offerings:
- Hazardous Waste Site Workers Training (HAZWOPER)
- Emergency Responder Health and Safety Trainings
- OSHA 10 Hr Construction Safety Training
- Work and Construction Zone Safety
- Confined Space Training
- Refreshers

Contract courses can be specifically designed for and held at your facility.

(TNEC website for additional information)

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Check TNEC website for new programs:
www.uml.edu/tnec

Supporting resources can be found at the NIEHS (National Institute of Environmental Health Sciences) Clearinghouse website. NIEHS WETP (Worker Education and Training Program) program at: http://www.wetp.org/wetp.

CDC/NIOSH Guidance for Supervisors at Disaster Rescue Sites. The CDC has provided multiple sets of guidelines at: http://www.bt.cdc.gov/disasters/hurricanes/index.asp. Fact sheets on issues and hazards relating to recovery and cleanup efforts are available as well on the OSHA’s Natural Disaster Recovery page: www.osha.gov.

Increasing Risk of Biologic and Chemical Exposures

Water treatment plants and sewer systems may flood exposing workers to a wide variety of water-borne threats, including wild animals such as rats and venomous snakes.

Chemicals from industrial and commercial facilities and household chemicals may also be present in flood waters and sludge after waters recede.

Major chemical hazards may occur. For example, flood waters cut power to safety controls in the Arkema Chemical plant during Hurricane Harvey in 2017. For large facilities such as refineries and tank farms, the federal Chemical Safety Board (CSB) provides guidance in Precautions Needed During Oil and Chemical Facility Startup. “Facilities should pay particular attention to process safety requirements during this critical period to assure a safe and expeditious return to operation.”

Background

When a disaster strikes, FEMA activates the worker safety and health provisions (annex document) of the National Response Plan (NRP). The annex describes actions needed to ensure that threats to safety and health are recognized, evaluated and controlled consistently so that responders are properly protected during incident management operations. The activation of the Worker Safety and Health Annex gives the Occupational Safety and Health Administration (OSHA) the responsibility to coordinate a comprehensive response involving federal, state and local agencies and private sector organizations to ensure the safety and health needs of responders are met. OSHA will suspend enforcement actions as was done after hurricanes in recently in Texas Puerto Rico and Florida. OSHA has developed a comprehensive Disaster Site Worker Training that explores the importance of respiratory and other personal protective equipment (PPE), proper decontamination procedures and explains safety practices imbedded in the Incident Command System/NIMS and alerts workers to traumatic incident stress that can result when working in disaster conditions.