HTIS
Hazardous Technical Information Services
BULLETIN

VOL. 19 NO. 3 MAY – JUN 2009

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EPA Releases Strategic Plan for Evaluating a Chemical's Toxicity

By Ariel Rosa, Environmental Protection Specialist, HTIS

The U.S. Environmental Protection Agency (EPA) must evaluate the risks of adverse health effects resulting from exposure to chemicals in the environment. The traditional risk assessment approach relies heavily on data generated through the intentional dosing of experimental animals. While this approach has provided the EPA with sound science to support regulatory decision making over the past several decades, the EPA must address ever-increasing demands, including consideration of complex issues such as cumulative exposures, life-stage vulnerabilities, and genetic susceptibilities, not to mention the increasing number of chemicals and cost of toxicity testing. A new approach has been proposed to address these demands, an approach based on the application of advances in molecular biology and computational sciences to transform toxicity testing and risk assessment practices.

On March 25, the EPA announced the availability of the document "U.S. Environmental Protection Agency's Strategic Plan for Evaluating the Toxicity of Chemicals" (EPA 100/K-09/001).

This Strategic Plan describes an ambitious and substantive improvement in the efficiency and effectiveness of the process by which environmental pollutants are evaluated for toxicity and risk. Its purpose is to serve as a blueprint for the EPA in incorporating advances in molecular biology and computational sciences into toxicity

The HTIS Bulletin is designed to keep DOD personnel informed of technical and regulatory developments on the environmentally safe management of hazardous materials and wastes. For technical inquiries, call **DSN 695.5168** or commercial **804.279.5168** or toll free **800. 848.4847**

testing and risk assessment practices across the Agency. This Plan is centered on the following three interrelated components:

- The use of toxicity pathways identification and use of this information in screening and prioritization of chemicals for further testing;
- The use of toxicity pathways information in risk assessment; and
- The institutional transition necessary to implement such practices across the EPA.

Notable progress is being made within the EPA's Laboratories and Centers on the development and use of toxicity pathway models and the creation of prioritization schemes, toxicology knowledge bases, and systems biology models in the field of environmental science. The bringing together of relevant disciplines to share data and integrate models is critical to fully achieve increased efficiency in toxicity testing and a reduction in animal usage for both human health and environmental risk assessment. Consequently, the Agency will be implementing this strategy in a manner that addresses both human health and ecological risk assessment.

A workgroup of the EPA's Science Policy Council oversaw the development of this document, incorporating input obtained from an external peer review.

Future versions of the strategy will summarize progress made in advancing integrated testing and assessment capability and revisit remaining challenges.

Reference:
http://www.epa.gov/osa/spc/toxicitytesting/

The Revised Guidance Document for the Safe Transport of Lithium Batteries by Air

By Abdul H. Khalid, Chemical Engineer, HTIS

The February 2, 2009 revised Guidance Document for the Safe Transport of Lithium Batteries by Air is now available online. In its 2009-2010 Technical Instructions for the Safe Transport of Dangerous Goods by Air, the International Civil Aviation Organization (ICAO) made several revisions to the requirements for transporting lithium batteries. The guidance document has the following revisions:

- Development of new Packing Instructions 965, 966, 967, 968, 969 and 970 to clarify state requirements for the various types of lithium batteries.
- Incorporation of the requirements formerly in Special Provision A45 within the new packing instructions.
- Application of a new lithium battery handling label for certain lithium batteries.
- Enhanced packaging and revised quantity limits for lithium batteries as shown in Table 3-1 and in the new Packing Instructions.

This guidance document has four parts that include the attachment pertaining to lithium battery packing

instructions. Questions in each part relates to:

- Definition
- Transport Provisions
- Design Type Testing Provisions
- State and Operator Variations

This guidance document addresses only the baseline provisions of the ICAO Technical Instructions. The ICAO Technical Instructions also contain State and Operator variations which should be consulted to determine any additional requirements imposed by a particular State or Operator (See attachment 3 of the ICAO Technical Instructions "Notified Variations from the Instructions"). The full text of this document is available at: http://www.icao.int/anb/fls/DangerousGoods/ICAOLithiumBatteryGuidance/ICAOLithiumBatteryGuidance.pdf.

Reference: The 2009-2010 ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air; web site at: http://www.icao.int/anb/fls/DangerousGoods/ICAOLithiumBatteryGuidance/ICAOLithiumBatteryGuidance.pdf.

USACE Office of Safety and Occupational Health Releases it's New EM 385-1-1 Safety Manual

By Ariel Rosa, Environmental Protection Specialist, HTIS

After nearly two-and-a-half-years of revisions and receiving over 3,800 comments from within the Army Corps of Engineers (USACE) community, their sister agencies, contractors, the public, professional organizations, and others, the USACE finally released its newly revised EM 385-1-1, 2008 Safety Manual.

The manual provides the Corps with safety guidelines for construction, operations, maintenance, research and development, and other daily operations by all USACE employees and contractors. This 1,050-page document was updated to reflect current standards and requirements, is presented more logically, is better organized than before and has new sections, headers, topics and requirements.

The new manual became effective Jan. 12, 2009 and supersedes the November 2003 revision.

The manual can be downloaded free from the USACE Web site from www.usace.army.mil/CESO/pages/home.aspx

Reference: www.usace.army.mil/CESO/pages/home.aspx

Council on Environmental Quality's "Citizen's Guide to NEPA"

By Tom McCarley and Abdul Khalid, HTIS

The National Environmental Policy Act (NEPA) of 1970 is considered the cornerstone of the U.S Environmental Statutes. NEPA requires Federal Agencies to consider the impact of their actions on the environment. These looks at potential environmental affects can lead to what are termed Environmental Assessments (EA) which, in turn, can lead to full-blown studies called Environmental Impact Statements (EIS) or at the other extreme a finding of no significant impact (FONSI). A founding principal of NEPA is to allow for the citizenry to have input into Federal actions that affect their environment.

The White House Council on Environmental Quality (CEQ) released a guide to NEPA entitled "Citizen's Guide to the National Environmental Policy Act – Having Your Voice Heard". The 55 page document can be downloaded from the NEPA web site at http://www.nepa.gov/nepa/Citizens_Guide_Dec07.pdf.

The guide contains a discussion of the NEPA process and includes a handy flow-chart taking you through the process. Five appendices cover aspects of NEPA including NEPANet – the web site and points of contact.

As mentioned above, NEPA applies to Federal Agencies (Executive Branch) but not to the President, the Congress, or the Judicial Branch. In addition, NEPA contains a number of categorical exclusions that allow Agencies to carry out their work without having to go through the entire NEPA process. An example of a categorical exclusion would be minor facility renovations such as re-lamping for energy efficiency.

References: 1. "Citizen's Guide to the National Environmental Policy Act – Having Your Voice Heard", Council on Environmental Quality, December 2007, http://www.nepa.gov/nepa/Citizens_Guide_Dec07.pdf 2. Federal Register, Vol. 73, No. 29, pp 6043-4, February 12, 2008.

GSA Sets Stricter Smoking Policy for Federal Offices

By Ariel Rosa, Environmental Protection Specialist, HTIS

On December 22, 2008 the General Services Administration (GSA) issued a notice in the Federal Register that prohibits smoking in the courtyards of federal buildings or within 25 feet of doorways and air intake ducts.

The new policy also bans designated smoking rooms in federal buildings and is to be implemented within six months of the publication.

The bulletin cancels and replaces GSA Bulletin FPMR D–245, "Protecting Federal Employees and the Public From Exposure to Tobacco Smoke in the Federal Workplace" published in the Federal Register on October 20, 1997 (62 FR 54461). It also replaces an executive order signed by President Bill Clinton in 1997 that prohibited smoking in federal buildings but allowed smoking in designated rooms or outdoor areas.

Studies conducted since the issuance of GSA Bulletin FPMR D–245 have concluded that cigarette smoking is the number one preventable cause of morbidity and premature mortality worldwide. Studies also have shown that the harmful effects of smoking are not confined solely to the smoker, but extend to co-workers and members of the general public who are exposed to secondhand smoke as well.

Recognition of these facts is evidenced by the stricter laws on smoking enacted by several states over the past ten years. Twenty-six states have banned smoking entirely in all of their state government buildings and 19 have banned smoking in all private work places.

Exceptions to the general policy against smoking as described in EO 13058 and this bulletin are:

- Residential accommodations for persons voluntarily or involuntarily residing, on a temporary or long-term basis, in a building owned,

leased or rented by the Federal Government;

- Portions of federally owned buildings leased, rented or otherwise provided in their entirety to non-federal parties; and

- Places of employment in the private sector or in other non-Federal Governmental units that serve as the permanent or intermittent duty station of one or more federal employees.

The heads of executive agencies are encouraged to use existing authority to establish programs designed to help employees stop smoking. Cessation program materials for agencies interested in establishing a smoking cessation program for their employees are available from the Department of Health and Human Services, Centers for Disease Control and Prevention, Web site *http://www.cdc.gov/tobacco/quit_smoking/index.htm*.

Reference: Federal Register / Vol. 73, No. 246 / Monday, December 22, 2008 / Notices 78361.

EPA News

EPA Encourages the Use of Compact Fluorescent Light Bulbs

By Abdul H. Khalid, Chemical Engineer, HTIS

In a January 29, 2009, news release the U.S. Environmental Protection Agency (EPA) informed the public about the use of compact fluorescent light bulbs (CFLs) which use 75 percent less energy and last up to 10 times longer than incandescent bulbs but at the same time advised them to pay special attention to their proper disposal via recycling because CFLs contain a small amount of mercury. The EPA recommends the recycling of CFLs for proper disposal and proper clean-up in case of an accidental break of bulbs to prevent the release of mercury into the environment.

The issue of climate change is on everyone's mind today and people are looking for methods to reduce energy use. According to the EPA's electronics recycling specialist, Dan Gallo, the benefits of lower energy consumption outweigh the disadvantages of a mercury hazard. In situation like this, the EPA promotes and encourages the safe disposal of old CFLs to prevent the release of mercury into the environment. According to Gallo, "CFLs do contain mercury but, it is present in a trace amount of five milligrams, an amount that would cover the tip of a ballpoint pen," "It would take 100 CFLs to equal the amount of mercury contained in older thermometers, which is about 500 milligrams"

Switching from traditional incandescent bulbs to CFLs is effective and simple. Everyone can easily make this change now to help use less electricity at home and prevent greenhouse gas emissions that lead to global climate change. It is important to learn about CFLs, how to use them in a home and how to choose the right type. Follow the EPA's recommended steps carefully for clean-up and disposal. Dan Gallo's advise is to use an old glove or sock to protect hands and then wipe up any remaining residue with a moist paper towel. "If you break the bulb on a carpeted surface, you'll want to use sticky tape to blot up any residue. Put everything in a plastic bag

or a jar that can be sealed with a lid and dispose of it with the regular household trash." The EPA's web site provides useful information on this subject at: http://www.epa.gov/mercury/spills/index.htm#fluorescent.

Also, you can now take your old CFL bulbs to Home Depot, IKEA and Ace Hardware for recycling. Wal-mart is piloting a CFL recycling program at its stores in the Richmond, VA area. For more information on CFLs, mercury hazard, and recycling program, visit EPA's web site at: http://www.epa.gov/osw/hazard/wastetypes/universal/lamps/index.htm. For this news release contact Donna Heron, phone: 215-814-5113 or e-mail at: heron.donna@epa.gov/

Reference: EPA's News Release, January 29, 2009, "Compact Fluorescent Light Bulbs: Do Energy-savings Outweigh Mercury Hazard" at: http://www.epa.gov/newsroom/newsreleases.htm.

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Progress Continues in Cleaning Up Hazardous Waste Sites

Reprint submitted by Ariel Rosa, HTIS

The EPA continues to make significant progress in cleaning up America's most contaminated hazardous waste sites and making them ready for productive use. The EPA's annual summary of the Superfund program's accomplishments shows that construction was completed at 30 sites in 2008, for a cumulative total of 1,060 sites or approximately 67 percent of the sites on the National Priorities List. Superfund is the federal government program that cleans up the most serious hazardous waste sites across the country.

"The Superfund program met or exceeded every one of its goals for 2008, making significant progress in all aspects of site cleanup," said Susan Bodine, assistant administrator for EPA's Office of Solid Waste and Emergency Response. "We are not only completing construction projects, but we are also returning sites to communities for productive uses."

In 2008, 85 sites were designated as ready for anticipated reuse, meaning that all measures are in place to ensure that the sites are protective over the long term for current and planned future uses. The achievement of this milestone, for which there is a cumulative total of 343 sites, reflects the high priority that the EPA places on restoring contaminated properties so that they can be returned to productive use in communities across the country.

The EPA conducted or oversaw 681 ongoing construction projects at 423 sites, including projects led by the EPA, projects led by potentially responsible parties and federal facility sites. The EPA funded nearly $462 million for construction and post-construction projects, including $55 million for new work at 16 projects across the country. Superfund also continued to prepare for future cleanup efforts by listing 18 new sites and proposing 17 sites to the NPL.

The agency also conducted or oversaw 372 emergency response and removal actions to address immediate threats to communities, cleaning up

spills and accidental releases of hazardous material. All identified unacceptable human exposures were controlled at a net total of 24 additional sites, bringing the program's cumulative total to 1,306 sites under control.

The EPA secured private party commitments of $1.9 billion in fiscal year 2008 to fund cleanup work. Of this amount, potentially responsible parties agreed to conduct $1.6 billion in future response work, and to reimburse the EPA for $232 million in past costs. The EPA billed private parties $75.5 million for oversight costs.

Reference: Information on the Superfund's fiscal year 2008 accomplishments: http://www.epa.gov/superfund/accomp/numbers08.htm Released on November 17, 2008

EPA Permits Specific Exemption on Aircraft Halon-1301 Bottles Imported for Hydrostatic Testing

By Abdul H. Khalid, Chemical Engineer, HTIS

On March 10, 2009, the US Environmental Protection Agency (EPA) announced a final rule on the recordkeeping and reporting requirements for the import of Halon-1301 aircraft fire extinguishing vessels. **This final rule became effective on April 9, 2009.**

According to the EPA, the new law allows an entity to petition the EPA in order to acquire a specific exemption from requirements so that the entity can import used ozone-depleting substances. The law will be applicable to entities that import spherical pressure vessels containing Halon 1301 for aircraft fire extinguishing (aircraft halon bottles) for purposes of hydrostatic testing. The EPA states that this exemption will reduce the administrative burden on entities that are importing aircraft Halon bottles for the purpose of maintaining them to meet commercial safety specifications and standards set forth in airworthiness directives of the Federal Aviation Administration (FAA). **This action does not exempt entities that import bulk quantities of Halon-1301 in containers that are being imported for other purposes**

Halon-1301 is used in aircraft halon bottles that are components of larger fire suppression systems used on aircrafts. Halon bottles are pressurized containers that typically contain from one to one hundred pounds of a Halon-1301/nitrogen mixture. Because halon bottles are under high pressure in severe environments, they are at risk of leakage and their effectiveness may decrease over time. Hydrostatic testing of the bottles detects such leakage and determines whether the bottles are functioning properly. The EPA reminds importers of aircraft halon bottles that despite this exception they are still required to maintain import records, as set forth in 40 CFR 82.13 (g) (1) including but not limited to the following:

- The quantity of each controlled substance imported, either alone or in mixtures, including the percentage of each mixture that consists of a controlled substance.
- The quantity of those controlled substances imported that are used (including recycled or reclaimed).
- The date on which the controlled

substances were imported.

- The port of entry through which the controlled substances passed.
- The country from which the imported controlled substances were imported.
- The commodity code for the controlled substances shipped, which must be one of those listed in Appendix K to 40 CFR part 82, subpart A.
- The importer number for the shipment.
- A copy of the bill of lading for the import.
- The invoice for the import.
- The quantity of imports of used recycled or reclaimed class I controlled substances.
- The U.S. Customs entry form.

The EPA reminds importers of aircraft halon bottles that they are required to submit quarterly reports within 45 days of the end of the applicable quarter, in accordance with 40 CFR 82.13(g)(4). These quarterly reports include but are not limited to the following information:

- A summary of the records required in paragraphs 40 CFR 82(g) (1) (i) through (xvi) for the previous quarter;
- The total quantity imported in kilograms of each controlled substance for that quarter; and
- The quantity of those controlled substances imported that are used controlled substances.

Those who test and subsequently export aircraft halon bottles are also reminded that they must submit an annual report (45 days after the end of the calendar year, in accordance with 40 CFR 82.13(h)). The annual report must include but is not limited to the following information:

- The names and addresses of the exporter and the recipient of the exports,
- The exporter's Employee Identification Number,
- The type and quantity of each controlled substance exported and what percentage, if any, of the controlled substance is used, recycled or reclaimed,
- The date on which, and the port from which, the controlled substances were exported from the United States or its territories,
- The country to which the controlled substances were exported; (vi) The amount exported to each Article 5 country, and
- The commodity code of the controlled substance shipped.

The importer quarterly report form and the annual exporter report form may be found on the EPA's web site at: http://www.epa.gov/ozone/record/. This information is also available via the Ozone Hotline at (800) 296-1996.

Reference: 1.Federal Register, March 10, 2009, Vol. 74, No. 45, pages-10182-10188.
2. http://edocket.access.gpo.gov/2009/E9-5073.htm

EPA's Toxicological Review of Nitrobenzene

By Abdul H. Khalid, Chemical Engineer, HTIS

The US Environmental Protection Agency (EPA)'s National Center for Environmental Assessment (NCEA) provides guidance and risk assessments aimed at protecting human health and the environment. This guidance presents critical analyses and summaries of scientific consensus, evaluated through a rigorous peer review process on the risks of pollutants to human health and the natural environment.

On February 6, 2009, the EPA issued a final Toxicological Review of Nitrobenzene, CAS Registry No. 98-95-3. It is now available online at: http://www.epa.gov/ncea/iris/subst/0079.htm. This time the agency lowered certain "risk values" that were proposed in a draft review published in 2007. This document provides scientific support for the hazard and dose-response assessment in relation to chronic exposure to nitrobenzene.

The human health assessment information on a chemical substance is added to the EPA's "Integrated Risk Information System (IRIS) after a comprehensive review of toxicity data by the EPA's health scientists from several program offices, regional offices, and the Office of Research and Development. Sections I (Health Hazard Assessments for Non-carcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) presented their views and inputs in the assessment process to finalize this document.

Workers are exposed to nitrobenzene used in closed manufacturing systems to make other chemicals at their worksites. According to the EPA, the general population has the highest exposures to nitrobenzene (CAS No. 98-95-3) in drinking water, in the air to those who live near industrial or manufacturing facilities using this chemical, and/ or hazardous waste sites where the workers are managing hazardous wastes that contains nitrobenzene.

The Oral reference dose (RfD) is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The RfD is intended for use in risk assessments for health effects known or assumed to be produced through a nonlinear (presumed threshold) mode of action. It is expressed in units of mg/kg/day. The guidance document is referenced at: http://www.epa.gov/ncea/iris/backgr-d.htm for an elaboration of these concepts.

Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the guidance documents located on at http://www.epa.gov/ncea/iris/backgr-d.htm. The final toxicological review has been included in the EPA's IRIS, which is used around the globe. A summary of the EPA's Toxicological Review of Nitrobenzene along with a link to the full toxicological review is available at: http://cfpub.epa.gov/ncea/iris/index.cfm?fuseaction=iris.showQuickView&substance_nmbr=0079

For other general information about this assessment or other questions related to IRIS, DOD personnel can contact EPA's IRIS hotline at 202-566-1676, FAX: 202-566-1749 or

e-mail at: hotline.iris@epa.gov.

Reference: 1. EPA Research & Development, February 6, 2009, web site http://www.epa.gov/ord/htm/whatsnew.htm 2. EPA/635/R-08/004F at: http://www.epa.gov/iris

NIOSH News

NIOSH-Developed Methods for Detection and Removal of Lead and Toxic Metals from Skin are Commercialized

By Ariel Rosa, Environmental Protection Specialist, HTIS

In January 2009, the National Institute for Occupational Safety and Health (NIOSH) announced that a formulation developed by their own scientists for a safe and more effective way of cleaning lead and other toxic metal dusts or residues from the skin was entering the commercial marketplace.

The Handwipe Removal Method for Toxic Metals is a patent-pending technology developed and designed by NIOSH scientists to help protect, children, adults, soldiers and industrial workers who may have been exposed to products, surfaces, or toys that contain lead and other toxic metals. The technology has been licensed by the Centers for Disease Control and Prevention (CDC) to Hygenall Safety Products, a division of Mk-IX Technologies, Inc. in Dover, NH. Mk-IX has produced the first commercially available product under the brand name “Hygenall”.

During a health hazard evaluation performed at two lead battery manufacturing facilities NIOSH researchers measured skin contamination from lead exposure. Hand wipe samples revealed between 6,000 to 20,000 µg (micrograms) of lead contamination per pair of hands. After workers washed their hands with soap and water, contamination was reduced to an average of 530 µg but was far from eliminated. The quantity of lead on the workers’ hands after washing with soap and water was equivalent to the permissible exposure dose of lead for a full 8-10 hour work day. Furthermore, results from studies conducted on similar employees at a waste-to-energy plant and at a coal-fired power plant showed skin contamination from lead, chromium, arsenic, and nickel before and after washing as employees prepared to eat.

NIOSH studies clearly demonstrated that keeping minute amounts of contamination off the skin and skin contact surfaces can be quite challenging.

Concerned with the results of these studies, NIOSH scientists conducted human comparison testing of several products commercially advertised to remove lead and other toxic metals from the skin as part of development of a novel skin decontamination technique and product. Included in this evaluation was a new handwipe technique (then called *“Hands Off”)* that NIOSH developed for use in industrial settings. “We designed the Handwipe Removal Method as a "system" of toxic metal removal from skin that incorporated the critical elements of mechanical removal, surfaction, pH adjustment and chelation” said Eric J. Esswein a scientist with the CDC's National Institute for Occupational Safety and Health.

In the developing of the product, considerations were taken to use materials that do not harm the skin

and that could be used repeatedly. Therefore chelating agents such as EDTA, grits and irritating surfactants were ruled out.

According to NIOSH, statistically *"Hands Off"* demonstrated to be superior in removing not only lead but other metals including Ni, Cd, Sn, Hg, and As from the skin compared to all the other commercial cleanser tested. In 2008, the technology received a prestigious award for Excellence in Technology Transfer from the Federal Laboratory Consortium, Midwest Region as well as the Bullard-Sherwood Honorable Mention award (Technology Category) for NIOSH Research to Practice (R_2P).

"We (Esswein, Ashley and Boeniger of NIOSH) also developed a method of lead surface detection (designed for skin) that is both patented and multi-award winning" said Esswein. This method has a detection limit of 15 µg and has been commercially available for the past three years under the brand name *"Full Disclosure"* by SKC Inc.

Both the Handwipe Detection, and Removal Method were designed to work together to "close the loop on lead poisoning" through detection and decontamination. In the end, the removal method has proved to be effective in removing other toxic metal cations such as cadmium and is suitable for use alone as a cleaning method.

Although not currently available in the Federal Supply System, Mk-IX has pending versions of the removal technology called *"Field Wash"* and *"Field Wipes"* designed especially for the military, law enforcement, hunters, and anyone exposed to weapons firing, or battleground environments as described in the Hygenall Safety Product website.

Note: Mentioning company names or products does not constitute endorsement by DLA or HTIS.

Reference: NIOSH eNews Volume 6 Number 9 (January 2009) Preventing the Toxic Hand-Off by Eric Esswein and Mark F. Boeniger.

The Many Hazards to Outdoor Workers

Reprint submitted by Ariel Rosa, HTIS

Outdoor workers are exposed to many types of hazards that depend on their type of work, geographic region, season, and duration of time they are outside. Industry sectors with outdoor workers include agriculture, forestry, fishing, construction, mining, transportation, warehousing, utilities, and service. Outdoor workers include farmers, foresters, landscapers, groundskeepers, gardeners, painters, roofers, pavers, construction workers, laborers, mechanics, and any other worker who spends time outside. Employers should provide training to outdoor workers about their workplace hazards, including hazard identification and recommendations for preventing and controlling their exposures.

Physical hazards to outdoor workers may include extreme heat, extreme cold, noise, lightning, and ultraviolet (UV) radiation. Extreme heat conditions can cause heat stroke, heat cramps, heat exhaustion, heat rash, and other problems. Extreme cold conditions can cause hypothermia, frostbite, and other problems. Too much noise exposure may cause a temporary change in hearing or a temporary ringing in workers' ears (tinnitus). Repeated

exposures to loud noise can lead to permanent, incurable hearing loss or tinnitus. Lightning kills about 80 people in the United States each year and injures hundreds. Among construction workers, laborers, machine operators, engineers, roofers, and pipefitters have been struck by lightning most often on the job. UV radiation can cause problems such as sunburn and skin cancer.

Biological hazards include vector-borne diseases, venomous wildlife and insects, and poisonous plants. Vector-borne diseases may be spread to workers by insects, such as mosquitoes, or ticks. When a mosquito or tick bites a worker, it may transfer a disease-causing agent, such as a parasite, bacterium, or virus. Mosquito-borne diseases include West Nile virus, St. Louis encephalitis, eastern equine encephalitis, western equine encephalitis, and LaCrosse encephalitis. Tick-borne diseases include Lyme disease, babesiosis, ehrlichiosis, Rocky Mountain spotted fever, southern tick-associated rash illness, tularemia, tick-borne relapsing fever, anaplasmosis, Colorado tick fever, Powassan encephalitis, and Q fever.

Outdoor workers in the United States may be exposed to many types of venomous wildlife and insects. Venomous snakes, spiders, scorpions, and stinging insects can be found throughout various geographic regions. They are especially dangerous to workers who have allergies to stings or bites.

Anaphylactic shock is the body's severe allergic reaction to a bite or sting and requires immediate emergency care. Thousands of people are stung each year, and as many as 40–50 people in the United States die annually from severe allergic reactions.

Venomous U.S. snakes include rattlesnakes, copperheads, cottonmouths/water moccasins, and coral snakes. Stinging insects include bees, wasps, hornets, and fire ants. Venomous spiders include black widows, brown recluse spiders, and hobo spiders.

Poisonous plants found in the United States include poison ivy, poison oak, and poison sumac. These plants can cause allergic reactions if the leaves or stalks are damaged and come in contact with workers' skin. These plants can also be dangerous if they are burned and their toxins are inhaled by workers. Nearly one-third of forestry workers and firefighters who battle forest fires in California, Oregon, and Washington develop rashes or lung irritations from contact with poison oak, which is the most common poisonous plant in those states.

Outdoor workers may encounter other hazards in addition to the physical and biological hazards described here. They may be exposed to pesticides or other chemical hazards, traumatic injury hazards, or other safety and health hazards depending on their specific job and tasks. Employers should train outdoor workers about their workplace hazards, including hazard identification and recommendations for preventing and controlling their exposures.

Reference:
http://www.cdc.gov/niosh/topics/outdoor/

OSHA News

Vibration Hazards in Workplace are Occupational Health & Safety Risks

By Abdul H. Khalid, Chemical Engineer, HTIS

Exposure to vibration is possible in many

occupations where workers come in contact with vibrating equipment or machinery. Workers may suffer damage to their health from hand-arm and whole-body vibration. It is estimated that one third of the workforce are exposed to some kind of vibration on a daily basis while operating machinery or using some kind of vibrating equipment. In construction industry, nearly 50 % of workers are exposed to vibrations, a well known health risk in construction jobs.

Managing risks from vibration in the working environment is very important. Regular and repetitive exposure to vibration can cause conditions such as white finger and carpal tunnel syndrome, known as vibration syndrome. Hand-arm and whole-body vibration can cause back pain and make the workers life miserable.

At present, regulations related to vibration are not being enforced by the U.S. Occupational Safety Health Administration (OSHA). The American Conference of Governmental Industrial Hygienists (ACGIH) has developed the Threshold Limit Values (TLVs) as guidelines to help control such health and safety hazards. Employers, workers, safety and health representatives or specialists can reduce and control the risks from hand-arm and whole-body vibration by following the ACGIH guidelines. The DOD Instruction 6055.12 also provide noise and vibration control instructions in designing equipment and tools that can attenuate vibration exposures and the evaluation of health and safety hazards for all acquisition programs.

Workers who operate hand-held equipment such as chain saws, powered hammers, grinders, sanders, riveters, drill, pneumatic drills, chisels, and chipping hammers may suffer health risks due to exposure to segmental or hand-arm vibration. These vibrations may harm blood vessels in hand and fingers and can reduce the flow of blood and damage skin, nerves, and muscles. Hand-arm vibration syndrome is also known as vibration-induced white or dead finger or Raynaud's Syndrome. Some of the symptoms may include tingling finger, numbness, loss of grip strength or some type of coldness or pain in the hands.

Many workers, while sitting or standing on vibrating machineries or floors, are exposed to whole-body vibration. The whole-body vibration can affect the entire body and cause fatigue, insomnia, headaches, and shakiness during the exposure or after the exposure.

Workers should know whether vehicles and machines in the workplace have the right power, size and capacity to suit the work and ground conditions.

Vibration hazards can be controlled through redesigning jobs to minimize the use of hand-held vibrating tool, remote controls, mechanically isolating vibration sources, and using tools with built-in damping materials

Administrative controls such as providing work breaks, avoiding continuous vibrations, limiting time for workers on whole-body vibration, regular maintenance of tools to keep vibration to the minimum, providing anti-vibrating gloves or shock-absorbing footwear, as well as training and education for workers on the health effects and the signs and symptoms of vibration.

Reference: 1. American Conference of Governmental Industrial Hygienists (ACGIH) 2009, Threshold Limit Values

(TLVS) for Chemical Substances and Physical Agents & Biological Exposure Indices, web site at: http://www.acgih.org.
2. Health Hazards-Vibration at: http://www.osha.gov/SLTC/etools/sawmills/vibration.html

OSHA Releases New Respirator Selection Guidance

By Muhammad Hanif, Ariel Rosa, and Abdul Khalid, HTIS

In its recently released new guidance document *Assigned Protection Factors (APF)*, the Occupational Safety and Health Administration (OSHA), provides employers with vital information for selecting respirators for employees exposed to contaminants in the air.

The guidance focuses on mandatory respirator selection provisions added to existing Respiratory Protection standard. OSHA revised its existing Respiratory Protection standard in 2006 to add APFs and Maximum Use Concentration (MUC) provisions.

In a final rule on OSHA's Respiratory Protection standard, OSHA reserved the provisions incorporating APFs, MUCs, and the APF Table, for further rulemaking. (See 63 FR 1152; 29 CFR 1910.134; 71 FR 50122, August 24, 2006.) The APF final standard went into effect on November 22, 2006 (71 FR 50122). The rulemaking on the reserved sections of the Respiratory Protection standard have now been completed (71 FR 50122; August 24, 2006). These cover provisions for APFs and MUCs.

APF refers to the workplace level of respiratory protection that a respirator or class of respirators is able to provide to workers. The higher the APF number (5 to 10,000), the greater the level of protection provided to the user. APFs are used to select the appropriate class of respirators that will provide the necessary level of protection against airborne contaminants. Such exposures can come from particles or a gas or vapor.

MUC represents the limit at which the class of respirator is expected to provide protection. Whenever a hazard's exposure level exceeds MUC, employers should select a respirator with a higher APF. MUC refers to the maximum atmospheric concentration of a hazardous substance for which a worker can be expected to be protected when wearing a respirator.

"Proper respirator selection prevents exposure to hazardous contaminants and is an important component of an effective respiratory protection program," said Deputy Assistant Secretary of Labor for OSHA Donald G. Shalhoub. "This guidance document serves as another useful resource for protecting the health and safety of workers at risk for respiratory illnesses." This publication does not alter or determine compliance responsibilities which are set forth in OSHA standards, and the *Occupational Safety and Health Act*.

APF and MUC are mandatory respirator selection requirements that can only be used after respirators are properly selected and are used in compliance with the entire standard. The Respiratory Protection standard requires fit testing, medical evaluations, specific training and proper respirator use. The final Respiratory Protection standard (29 CFR 1910.134 and 29 CFR 1926.103) applies to

general industry, construction, longshoring, shipyard and marine terminal workplaces.

References: 1. OSHA News Release 2009 - 04/01/2009. 2. Federal Register, Vol. 71, No. 164, Thursday, August 24, 2006, page 50121.

Other News

Study Shows Sign Language Interpreters at High Ergonomic Risk

Reprint submitted by Ariel Rosa, HTIS

Sign language interpreting is one of the highest-risk professions for ergonomic injury, according to a new study conducted by the Rochester Institute of Technology (RIT). The research indicates that interpreting causes more physical stress to the extremities than high-risk tasks conducted in industrial settings, including assembly line work. It also found a direct link between an increase in the mental and cognitive stress of the interpreter and an increase in the risk of musculoskeletal injuries such as carpal tunnel syndrome and tendonitis. The research, conducted through RIT's Department of Industrial and Systems Engineering, is one of the first to catalog the effect of signing on interpreters and show a correlation between mental and cognitive stress and increased ergonomic risk. The results of the study are available in the March 2008 edition of the peer-reviewed journal of Ergonomics and were also presented at the 2007 biennial conference of the Registry of Interpreters for the Deaf.

"The impact of repetitive stress in industrial and office settings has been well documented, but there is less data on the risk of ergonomic injury to sign language interpreters," says Matthew Marshall, associate professor of industrial and systems engineering at RIT and a leader of the research group. "Our findings indicate that interpreters may actually be at a higher risk of injury than other professions."

Marshall notes that the impact of injury on interpreters and its effect on retention is a major issue in the deaf community because any reduction in the interpreter population would have an adverse effect on the full societal participation of deaf and hard-of-hearing individuals.

"Gaining a better understanding of the factors contributing to interpreter injury can show us ways to intervene and reduce the risks," adds Steve Nelson, director of access services for the National Technical Institute for the Deaf. "Informed intervention can help drastically reduce injuries and keep much-needed skilled interpreters at work."

In developing its findings, the RIT team studied a group of interpreters and measured the physical impact of signing over a fixed time period, utilizing metrics developed for industrial settings. The team found that wrist velocity and acceleration during interpreting, factors used to measure physical impact were more acute than the high risk limits for industrial workers. In addition, an increase in mental and cognitive stress led to a 15-19 percent increase in wrist velocity and acceleration during interpreting.

Marshall will next look to enhance this data through additional studies placing interpreters in a wide variety of settings. The information will assist in furthering understanding of the impact of sign

language interpreting on repetitive stress, while also assisting organizations in developing better training programs to reduce ergonomic risk.

Reference: Mr. William Dube, University News Services, Rochester Institute of Technology, (585) 475-2816 or wjduns@rit.edu

Hazardous Chemical Incidents in Schools from 2002—2007

By Ariel Rosa, Environmental Protection Specialist, HTIS

Every year unintentional and intentional releases of chemicals, or related fires or explosions occur in schools, causing injuries, costly cleanups, and lost school days. Chemicals that can cause adverse health effects are used in many elementary and secondary schools (e.g., in chemistry laboratories, art classrooms, automotive repair areas, printing and other vocational shops, and facility maintenance areas).

The federal Agency for Toxic Substances and Disease Registry (ATSDR) conducts national public health surveillance of chemical incidents through its Hazardous Substances Emergency Events Surveillance (HSEES) system. ATSDR conducted an analysis of HSEES data for 2002—2007 to identify school-related incidents and elucidate their causes and consequences to highlight the need for intervention.

During that period, 423 chemical incidents in elementary and secondary schools were reported by 15 participating states. Mercury was the most common chemical released. The analysis found that 62% of reported chemical incidents at elementary and secondary schools resulted from human error (i.e., mistakes in the use or handling of a substance), and 30% of incidents resulted in at least one acute injury.

Eleven state health departments (Colorado, Iowa, Minnesota, New Jersey, New York, North Carolina, Oregon, Texas, Utah, Washington, and Wisconsin) reported school-related events for all 6 years, and four additional state health departments reported events for some of those years (Mississippi: 2003, Missouri: 2002--2005, and Florida and Michigan: 2005--2007)

ATSDR established HSEES in 1990 to collect data about acute hazardous substances releases. HSEES funds state health departments through a competitive program announcement to collect information about eligible events and enter the data into a standardized, ATSDR-provided web-based system. Each of these states employs a state HSEES coordinator. Under HSEES, a substance is considered hazardous if it might reasonably be expected to cause adverse health effects to humans.

Per HSEES protocols, an eligible event is defined as an uncontrolled or illegal release, or threatened release, of one or more hazardous substances in a quantity sufficient to require removal, cleanup, or neutralization according to federal, state, or local law.

During the reported period a total of 895 persons were injured in the 423 school-related incidents. No injuries were fatal, but 11 persons were admitted to a hospital. Most injured persons received first aid on the scene, sought care from a private physician, or were treated at a hospital but not admitted. The health effects most commonly associated with the short-term release of carbon monoxide were

nausea, dizziness, and headache. The release of acids and mace or pepper spray resulted primarily in respiratory and eye irritation.

Proper chemical use and management (e.g., keeping an inventory and properly storing, labeling, and disposing of chemicals) is essential to protect school building occupants. Additional education directed at raising awareness of the problem and providing resources to reduce the risk is needed to ensure that schools are safe from unnecessary dangers posed by hazardous chemicals.

To reduce chemical misuse and improve chemical management in schools, the Environmental Protection Agency developed the Schools Chemical Cleanout Campaign and Prevention Program (SC3), a national strategy that incorporates models, tools, and guidance from pilot programs, along with building a national network of community partners to assist schools. Using this program, government agencies, private companies, and community leaders can work with schools to;

- Iincrease awareness about the risks associated with chemicals in schools;
- Facilitate the removal of outdated, unknown, unneeded, and potentially dangerous chemicals;
- Prepare teachers and schools to use less dangerous chemicals and in smaller quantities where appropriate; and
- Provide inventory tools and information to better manage chemicals that cause safety and health concerns in schools.

Reference: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5744a1.htm?s_cid=mm5744a1_e

The Navy's 2009 Green Procurement Program Implementation Guide

By Abdul H. Khalid, Chemical Engineer, HTIS

In a February 5, 2009, memorandum the Office of the Secretary of the Navy (DON) released the February 2009 version of "Green Procurement Program Implementation Guide" to assist the DON personnel with understanding and executing the Department of Defense (DOD) Green Procurement Program (GPP) policy.

According to this memorandum, the DON GPP requires use of "green" products services programs to the maximum extent practicable, consistent with the requirements of relevant Federal procurement preference programs.

This Guide revises in its entirety; Naval Supply Systems Command (NAVSUP) Publication 728 entitled "Affirmative Procurement Guide," National Stock Number COG 01 STOCK NO. 0530-LP-101-2482, dated September 2001.

In January 2007, Executive Order (EO) 13423 "Strengthening Federal Environmental, Energy, and Transportation Management" was signed, consolidating the existing preference purchasing programs, energy-efficient and water-conserving programs, and sustainable design requirements into one program. This Guide

covers the following GPP elements:

- Recovered Material (Affirmative Procurement)
- Energy Efficient
- Alternative fuels/alternative fueled vehicles
- Bio-based Products
- Non-ozone depleting substances
- Environmentally preferable products

Green Procurement applies to all DOD operations, except military tactical vehicles and equipment. Military tactical vehicles and equipment include weapon systems used on the battle ground, portable equipment that supports logistical and combat aircraft, vehicles to transport combat and support personnel during military operations, and other military equipment weapon systems.

Additionally, this Guide shows activities and installations how to meet Federal procurement and reporting goals and document GP practices in their respective Environmental Management Systems (EMS). EMS follows a "Plan, Do, Check, Act" cycle.

Reference: The Department of Navy (DON) Green Procurement Program Implementation Guide-Final, February 2009, DON Research, Development & Acquisition, at: http://acquisition.navy.mil/rda/content/view/full/6457

NTSB Recommends Modification to Mobile Acetylene Trailers Regulations

By Ariel Rosa, Environmental Protection Specialist, HTIS

The National Transportation Safety Board (NTSB) investigated various accidents that involved highway vehicles transporting bulk quantities of acetylene gas. The vehicles involved are called mobile acetylene trailers and they carried up to 225 cylinders that were connected by a manifold system and filled with acetylene.

Acetylene is a colorless flammable gas that has historically been handled relatively safe at pressures below atmospheric pressure (about 15 pounds per square inch, gauge [psig]). However, at elevated pressures acetylene becomes extremely unstable.

Two of the accidents investigated occurred as the vehicles overturned on public highways, in East New Orleans, Louisiana, on October 20, 2007, and in Lamar, Colorado, on June 9, 2008. Two others occurred while the vehicles were being prepared for unloading, in Dallas, Texas, on July 25, 2007, and in The Woodlands, Texas, on August 7, 2007.

In the two overturn accidents, cylinders were ejected from the trailers and damaged, releasing acetylene, which ignited. In one unloading accident, the fire on the initial trailer spread to cylinders on an adjacent trailer; in the other, the fire spread to cylinders on adjacent trailers and to nearby buildings and vehicles. The failures of the cylinders on these mobile acetylene trailers and the resultant damage raised concerns about the accident protection provided by these vehicles, the adequacy of the minimum safety standards and procedures applicable to unloading these

vehicles, and the adequacy of fire suppression systems at loading and unloading facilities. To address these concerns in its investigation, the Safety Board attempted to determine the hazards of the transportation and delivery of acetylene gas in bulk

As a result of its investigation the NTSB recommended that the DOT Pipeline and Hazardous Materials Safety Administration modify 49 CFR 173.301 to clearly address the adequacy of mobile acetylene trailer design for protecting cylinders during transport, and the effectiveness and safety of current unloading procedures. Additionally NTSB recommended that the Compressed Gas Association revise the recommended practices in Compressed Gas Association standard G-1.6, section 7, *General Provisions*, to require automated water deluge systems at all mobile acetylene trailer loading and unloading locations to control the spread of fire to other cylinders on a trailer and to nearby mobile acetylene trailers.

Reference: www.ntsb.gov/Publictn/Z_stu.htm. See NTSB Report SIR-09-01

The European Commission to Phase-out Incandescent Light Bulbs by 2012

By Abdul H. Khalid, Chemical Engineer, HTIS

On March 18, 2009, the European Commission (EC) adopted two regulations that would improve the energy efficiency of household lamps (domestic), office, street and industrial lighting products. The inefficient incandescent light bulbs (classic light bulbs) will be phase out by 2012. For more information on EU Energy online at: http://ec.europa.eu/energy/index_en.htm

The regulatory committee under a procedure initiated by the European Union's Eco-Design Directive (2005/32/EC), voted in September 2008 for tighter efficiency requirements for industrial and street lighting and then followed the same procedures in December 2008 making a similar decision on domestic lighting including incandescent light bulbs (237 DEN A-4, 12/10/08).

The purpose for these decisions was to improve the energy efficiency of household lamps and of offices, street, and industrial lighting products. According to the decisions laid down in the regulation requirements, it is anticipated that it would save 11 billion Euros every year and put income back into the European economy. The European Commission claims that the combined energy savings from the two regulations through 2020 would be roughly equivalent to the electricity consumption of Belgium.

Under the legislation, incandescent light bulbs may no longer be placed on the market after September 2012. Energy-use requirements are tightened for halogen lamps, fluorescent lamps, high-intensity discharge lamps, and lighting ballasts.

Reference: 1. http://ec.europa.eu/energy/efficiency/ecodesign/doc/committee/2008_09_26_tertiary_sector_lighting_products_regulation_post_vote.pdf. 2. http://ec.europa.eu/energy/efficiency/ecodesign/doc/committee/2008_12_08/draft_domestic_lighting_products_regulation_en.pdf.

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The HTIS Bulletin is produced bimonthly.
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