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In This Issue

DOD Issues Directive Manual on Wood Packaging Material

By Tom McCarley, Chemist, HTIS

Destructive Insects have a history of "hitching rides" via wood packaging material (WPM) into places where they are not native in and once introduced they can devastate forest resources and other fragile ecosystems. This is a global problem. Major pests include the pine wood nematode and the Asian longhorned beetle, but there are many others; some yet unknown.

To ensure that shipments of DOD materials are not frustrated when they reach overseas points of entry (airports, seaports etc.), DOD has issued manual DOD 4140.01-M-1 "COMPLIANCE FOR DEFENSE PACKAGING: Phytosanitary Requirements for Wood Packaging Material (WPM), to ensure that packaging materials used are in compliance with international phytosanitary standards. The directive is dated September 7, 2007 and is issued by the Office of the Deputy Under Secretary of Defense (Logistics and Materiel Readiness). The 28 pages Directive can be downloaded from http://www.dtic.mil/whs/directives/corres/pdf/414001m1p.pdf.

Two effective measures for treating wood packaging materials are:

- Heat Treatment
- Treatment with the fumigant Methyl Bromide

Because methyl bromide is a Class I ozone depleting substance, DOD only allows fumigation to treat WPM when use of heat treated WPM is precluded

because of repackaging cost or geographic constraints. Exemptions to use fumigation treatment must be approved by the Component WPM Program Manager.

Wood Packaging Material is defined in 4140-01-M-1 as Non-Coniferous (Hardwood) and Coniferous softwood) packaging material used in supporting, protecting, or carrying a commodity (includes dunnage). Examples of WPM include but are not limited to pallets, skids, pallet collars, containers, crates, boxes, cases, bins, reels, drums, load boards, and dunnage. Wood packaging made of exempt materials but combined with solid wood components must still be treated and marked.

The definition and Directive do not include processed wood materials and manufactured wood products such as plywood, particle board, oriented strand board (OSB) and veneers. The directive also does not apply to pieces of wood that are less than 6mm (0.24 inches) in any dimension.

Paragraph C2.1.1 contains a definition of what constitutes WPM and a summary of the Packaging Requirements used in solicitations when procuring goods for DOD customers.

"Packaging Requirements: DOD Components shall ensure all new purchases of WPM meet the requirements of Reference (f), and the commercial heat treatment process approved by the American Lumber Standard Committee (ALSC) required for all WPM. Packaging materials exempt from the requirements are materials that have undergone a manufacturing process such as corrugated fiberboard, plywood, particleboard, veneer, and oriented strand board. All WPM shall be constructed from heat treated (treated to 56 degrees Celsius -core temperature- for 30 minutes) lumber and certified by an accredited agency recognized by the ALSC in accordance with Wood Packaging Material Policy and Wood Packaging Material Enforcement Regulations (see http://www.alsc.org). All materials must include certification markings in accordance with Reference (f) certification and/or ALSC standards and be placed in an unobstructed area that will be readily visible to inspectors. Pallet markings shall be applied to the stringer or block on diagonally opposite sides and ends of the pallet and be contrasting and clearly visible. All dunnage used in configuring and/or securing the load shall also comply with ISPM 15 and be marked with an ALSC approved dunnage stamp."

Certification markings shall be in compliance with the International Standards for Phytosanitary Measures (ISPM 15). The interested reader should look at paragraph C2.5.1 of the manual for examples of the required markings.

When the DOD is certifying WPM using internal self-certification procedures, the decision tree in Appendix 1 (AP1) may be used. An audit inspection guide for compliance is required when an agency or service has established a self-certification program. Appendix 3 contains the "DOD "pest-Free" Compliance Procedures".

The manual is directed towards DOD component activities. Contractors should follow the applicable packaging requirements of their contracts and seek the advice of their applicable Agency/Service point of contact, such as the contracting officer or WPM Manager for resolution of any issue regarding their use of WPM in support of DOD.

Reference: DOD 4140.01-M-1 "COMPLIANCE FOR DEFENSE PACKAGING: Phytosanitary Requirements for Wood Packaging Material (WPM)", Office of the Deputy Under Secretary of Defense (Logistics and Materiel Readiness), September 7, 2007 - http://www.dtic.mil/whs/directives/corres/pdf/414001m1p.pdf

News from DOE

New Sensor System Improves Detection of Toxic Metals

By Ariel Rosa, Environmental Protection Specialist, HTIS

The Department of Energy's Pacific Northwest National Laboratory (PNNL), has developed a new rapid, portable and inexpensive detection system that identifies personal exposures to toxic lead and other dangerous heavy metals. The device can provide an accurate blood sample measurement from a simple finger prick, which is particularly important when sampling children.

PNNL's portable analyzer system accurately detects lead and other toxic metals in blood as well as in urine and saliva samples. Results are as reliable as those of current state-of-the-art mass spectrometry systems many times its size. This new system provides a quicker, simpler and easier method of monitoring toxic metal exposures in high-risk populations, such as industrial workers, children and people living in polluted areas.

A bit larger than a lunchbox, the new detection system is field-deployable with plug-and-play features that allow different sensors to be easily exchanged to detect a variety of heavy metal toxins. The entire system is battery-operated and requires about one and one-half times the power of a typical laptop computer. The system also routinely delivers reliable measurements within a rapid two-to-five minute analysis period.

Early production cost estimates indicate that the device may be as much as 10 times less expensive than existing plasma mass spectrometry systems, which lack field portability and require samples to be returned to the lab for time-consuming and more expensive analysis.

The device can use two classes of sensors for detecting lead and other heavy metals. The first is based on a flow injection system using a mercury-film electrode to analyze metals in blood, urine or saliva samples. The second class of the sensor uses a *mercury-free* approach of nanostructure materials developed at PNNL.

Reference: http://www.pnl.gov/topstory.asp?id=297

Efforts for Commercially Viable/Environmentally Friendly Renewable Fuels

By Moraima Lugo-Millán, Chemist, HTIS

Federal agencies along with private companies and universities are constantly promoting and expanding the use of environmentally friendly products, not only because it is the law, but the consciousness for saving the environment is growing among the entire population. Transportation is one of the areas to improve, and studies are mainly focused on fuels and vehicles. The Environmental Protection agency (EPA) coordinates with the Department of Transportation (DOT), and

the Department of Energy (DOE) to promote alternatives fuels and vehicles with the greatest environmental benefits. The private sectors and colleges are doing those studies as well.

The Department of Energy announced biofuels research and development projects to enhance the nation's energy, economic and national security by reducing the nation's reliance on foreign oil through increased energy efficiency and diversification of clean energy sources. Integral to these projects include ongoing examination of reducing greenhouse gases, and land, water, and fertilizer use. These projects will focus on the development of enzyme systems and the enhancement of enzyme's performance to convert cellulosic material into sugars suitable for production of biofuels through the fermentation process. They will address all technological aspects of making biofuels more commercially viable and the amount of fossil fuel used to produce the biofuels is significantly less than that associate with gasoline. Cellulosic ethanol is a renewable fuel produced from lignocellulose, a structural material that compromises much of the mass of plants. Corn stover, switchgrass, sugar cane bagasse, cereal straws, and woodchip are some of the more popular cellulosic materials for ethanol production. Also industrial plant waste, like sawdust and paper pulp, is used for fuel production. By relying on a variety of feed stocks, cellulosic ethanol can be produced in nearly every region of the country, using material grown locally. Though it requires a more complex refining process, cellulosic ethanol contains more net energy and results in lower greenhouse emissions than traditional corn-based ethanol and the lignocellulose raw material is highly abundant and diverse. On the other hand, the United Sates Department of Agriculture (USDA) is conducting an alternative fuels and fleet efficiency program that works to increase the use of alternative fuels, the purchase and lease of alternative fuel vehicles and fleet efficiency. This program is focused on the increased alternative fuel use and petroleum reduction requirements on all aspects of the agency extensive and varied missions, including law enforcement, food inspections, research, fire suppression, among others.

In private companies, most of the renewable fuels efforts have been directed in terms of nanotechnology and hydrogen economy. Some companies are taking advantage of the physical characteristics of nanoparticles to create coatings and catalysts that could make hydrogen easy to produce from distilled water and ultimately replace the fossil fuel based production methods. Some researchers ensure that nano scale nickel and iron particles improve the electrolysis process (the process by which electricity is use to generate hydrogen and oxygen from water) by increasing the surface area available for the catalytic reaction to generate hydrogen on commercial electrodes. While the primary purpose of hydrogen economy is to eliminate the use of carbon-based fossil fuels and thus reduce carbon dioxide emissions, a secondary goal is to provide an energy carrier to replace dwindling supplies of petroleum. Hydrogen is an environmentally cleaner source of energy to end-users, particularly in transportation applications, without the release of pollutants or greenhouse gases at the point of end use. Analyses have concluded that most of the hydrogen supply chain pathways would release

significantly less carbon dioxide into the atmosphere than would gasoline used in hybrid electric vehicles.

Recently, a biological company revealed the first ever algae-derived biodiesel fuel to have undergone road testing by successfully powering a factory standard automobile for long distances under typical driving conditions. This biodiesel ensures to be clean, renewable, environmentally sustainable, certified compatible with existing vehicles and infrastructure, and energy secure for the country. In terms of universities, students and researchers have been working with biological, bacteriological, and chemical mechanisms to obtain and maximize not only commercially viable fuels, but developing fuel cells that can replace batteries in electric cars. Scientists are concentrating their efforts on producing electrical energy from photovoltaic cells, wind power and burning biomass and producing fuel from hydrogen conversion. From an energy security point of view, nanotechnology developments are invariably positive since, at the very least, they can help save energy. They also assist, in varying degrees, with the development of alternatives to fossil fuels.

These are some examples of the efforts made by different organizations in order to obtain environmentally friendly/commercially viable renewable fuels, but certainly everybody is working to accomplish the requirements of petroleum conservation and alternative fuels. With the endless increasing of oil prices, the entire nation is taking a serious look at alternative fuel sources. The science of biofuels conversion still has a long way to go and there's no easy solution to meeting future energy needs. The combination of environmentally friendly/commercially viable renewable fuels is a formula that even though it is not impossible to reach, takes a lot of research, money, time and work. The efforts that companies, universities and government are taking now are gigantic steps to succeed and will benefit the environment and everyone in the future.

References:

1.http://www.epa.gov/oms/consumer/fuels/altfuels/altfuels.htm
2.http://www.doe.gov/news/6015.htm
3.http://www.usda.gov/energyandenvironment/altfuels/index.html
4.http://www.nanotechnology.com/press/?id=11833

DOE's Introduction to Hydrogen Safety for First Responders

By Ariel Rosa, Environmental Protection Specialist, HTIS

Hydrogen is the lightest and most common element in the universe. It has been safely used for decades in industrial applications. Currently, over 9 million tons of hydrogen is produced in the U.S. each year, and 3.2 trillion cubic feet are used to make many common products. Products and consumables include glass, margarine, soap, vitamins, peanut butter, toothpaste and almost all metal products. Hydrogen has been used as a fuel since the 1950s by the National Aeronautics Space Administration (NASA) in the U.S. space program.

Hydrogen has another use, one that can help our nation reduce its consumption of fossil fuels. Hydrogen can be used to power fuel cell vehicles. When combined with oxygen in a fuel cell, hydrogen generates

electricity used by the vehicle's electric motor to create a smooth, quiet ride and the only emission from the tailpipe is water vapor.

Hydrogen is an excellent vehicle fuel for many reasons. The U.S. Department of Energy compares hydrogen very favorably to other fuels. Hydrogen is not toxic, poisonous or corrosive. As a result of hydrogen's benign nature, it doesn't harm the environment or public health. If hydrogen were to leak it would disperse into the air almost immediately because it is so light compared with the effects of oil and gasoline spills.

Hydrogen cars are not only the future, they are here, now. When hydrogen cars become the status quo, the U. S. can lessen its dependence upon foreign oil, achieve lower prices at the fuel pumps and cut down on the greenhouse gases that produce global warming. The future of hydrogen cars is not a pipe dream, as there are already many hydrogen cars on the road. California and Japan have many hydrogen cars being used as fleet vehicles today.

What do you do when you're an ambulance medic and the accident you are responding to involves a hydrogen fueled vehicles? This is the scenario that the Department of Energy (DOE), would like to prepare first responders for with a new course, "*Introduction to Hydrogen Safety for First Responders"*. DOE's Introduction to Hydrogen Safety for First Responders is a Web-based course that provides an "awareness level" overview of hydrogen for fire, law enforcement, and emergency medical personnel. This multimedia tutorial introduces first responders to:

- Hydrogen and its basic properties,
- How hydrogen compares to other familiar fuels,
- Hydrogen use in fuel cells for transportation and stationary power;
- Potential hazards associated with hydrogen use; and
- Initial protective actions should a responder witness an incident.

Supplemental resources including videos, supporting documents, and links relevant to hydrogen safety are also provided.

Reference; The course at: http://www.hydrogen.energy.gov/firstresponders.html

News from DOT

DOT Publishes New Review of Regulations for Shipment of Radioactive Materials

By Ariel Rosa, Environmental Protection Specialist, HTIS

The Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) has published and posted on their publication review website http://hazmat.dot.gov/HMpubsreview/RAMreg.html a draft of its updated guidebook "***Radioactive Material Regulations Review***" ***(****formerly RAMREG-001-98).*

This review provides guidance on the DOT Hazardous Materials Regulations (HMR) contained in Title 49, Code of Federal Regulations (49 CFR) Parts 171-180, which govern the packaging and shipment of radioactive material.

The first version of this document was issued in 1972, with subsequent revisions issued in 1974, 1976, 1977, 1980, 1983, and 1998. This version updates the contents to be consistent with changes in the regulations since the last edition. These changes include those made in rulemaking RSPA-99-6283 (HM-230) to be compatible with changes contained in the International Atomic Energy Agency (IAEA) publication, ``IAEA Safety Standards Series: Regulations for the Safe Transport of Radioactive Material," 1996 Edition, No. TS-R-1.

This version is in draft form and is open for comments from 3-11-08 until 6-11-08.

This review, as a reference document, is not an official interpretation or restatement of the regulations. This review of the radioactive material regulations was designed as a guidance document and should not be used without simultaneous reference to all applicable and current regulations pertaining to the transportation of radioactive material.

Users of this review are strongly encouraged to obtain the latest copy of the HMR from the Government Printing Office (GPO) (http://bookstore.gpo.gov). Amendments to the HMR are published in the Federal Register (http://www.gpoaccess.gov/fr/index.html).

The current HMR may be found at: http://www.gpoaccess.gov/cfr/index.html. Additional information on DOT's hazardous materials transportation regulations and programs may be found at http://hazmat.dot.gov.

Reference: http://hazmat.dot.gov/HMpubsreview/docs/RAMreg.pdf

Air Bag Safety and Transportation Requirements

Reprint submitted by Eduardo Alvarado

Air bags, combined with lap/shoulder safety belts, offer the most effective safety protection available today for passenger vehicle occupants. The air bag supplements the protection the safety belts provide by distributing the impact load more evenly over the occupant's head and torso. Air bags are supplemental protection and are not designed to deploy in all crashes. Most are designed to inflate in a moderate-to-severe frontal crash.

Since September 1, 1989, all new cars sold in the United States are required to have an automatic restraint system as standard equipment. By law, all cars starting in model year 1998 and all trucks starting in model year 1999 are required to have air bag systems to provide automatic restraint. It is estimated that, as of 2005, more than 160 million air-bag-equipped passenger vehicles were on the road, including 146 million with dual air bags.

Air bags and safety belts used together reduce the risk of serious and fatal injuries by 40 to 55 percent. It is estimated that air bags have reduced head-on crash fatalities by up to 30 percent and moderate-to-severe injuries by 25 to 29 percent. The National Highway Traffic Safety Administration reported that in 2005, an estimated 2,741 lives were saved by air bags. From 1987 to 2005, a total of 19,659 lives were saved.

Like seat belts, the concept of the air bag, a soft pillow to land against in a crash, has been around for many

years. The first patent on an inflatable crash-landing device for airplanes was filed during World War II. In the 1980s, the first commercial air bags appeared in automobiles. John W. Hetrick of Newport, Pennsylvania, USA invented the air bag in 1951. Hetrick came up with the idea to help protect his own family using expertise from his naval engineering days.

Since model year 1998, all new cars sold in the United States have been required to have air bags on both driver and passenger sides. Light trucks came under the rule in 1999. To date, statistics show that air bags reduce the risk of dying in a direct frontal crash by about 30 percent. Then came seat-mounted and door-mounted side air bags. Today, some cars go far beyond having dual air bags to having six or even eight air bags.

The goal of an air bag is to slow the passenger's forward motion as evenly as possible in a fraction of a second. There are three parts to an air bag that help to accomplish this feat:

- The bag itself is made of a thin, nylon fabric, which is folded into the steering wheel or dashboard or, more recently, the seat or door.

- The sensor is the device that tells the bag to inflate. Inflation happens when there is a collision force equal to running into a brick wall at 10 to 15 miles per hour. A mechanical switch is flipped when there is a mass shift that closes an electrical contact, telling the sensors that a crash has occurred. The sensors receive information from an accelerometer built into a microchip.

- The airbag's inflation system reacts sodium azide (NaN3) with potassium nitrate (KNO3) to produce nitrogen gas. Hot blasts of the nitrogen inflate the airbag.

An air bag inflator consisting of a casing containing an igniter, a booster material, a gas generant and, in some cases, a pressure vessel (cylinder) is a gas generator used to inflate an air bag in a supplemental restraint system in a motor vehicle.

An air bag module is the air bag inflator plus an inflatable bag assembly. A seat-belt pretensioner contains similar hazardous materials and is used in the operation of a seat-belt restraining system in a motor vehicle.

Propellants containing sodium azide were very common in early inflator designs. The incomplete combustion of the charge due to rapid cooling leads to production of carbon monoxide and nitrogen oxide as reaction byproducts. However, propellants containing sodium azide were widely phased out during the 1990s in pursuit of more efficient, less expensive and less toxic alternatives. The alternative propellants may incorporate a combination of nitroguanidine, phase-stabilized ammonium nitrate or other nonmetallic oxidizer, and a nitrogen-rich fuel different than azide such as tetrazoles, triazoles, and their salts. Other alternatives are, for example, nitrocellulose based bipropellants, or high-oxygen nitrogen-free organic compounds with inorganic oxidizers.

Seatbelt pretensioners are a component of the seatbelt system which locks the seatbelt in place during a crash. There are three types of seatbelt pretensioner:

mechanical, electrical, and pyrotechnic. The pyrotechnic pretensioner is the most sophisticated type of pretensioning device. The electronically triggered pyrotechnic device not only locks the seatbelt in place but tightens the belt to take up any slack that may be present, by pulling back a buckle anchorage of the belt system or rapidly rewinding a seat belt retractor by means of the force generated by an explosive charge minimizing the movement of the occupant within the vehicle during a crash situation. Once a pyrotechnical pretensioner is activated it must be replaced.

Due to the explosive charge contained in these items, air bag inflators, air bag modules and seat-belt pretensioners are regulated for transportation. Air bag inflators and modules must be tested in accordance with Test series 6(c) of Part I of the UN Manual of Tests and Criteria, with no explosion of the device, no fragmentation of device casing or pressure vessel, and no projection hazard or thermal effect that would significantly hinder fire-fighting or other emergency response efforts in the immediate vicinity.

For domestic transport, air bag inflators, air bag modules or seat belt pretensioners that meet the criteria for a Division 1.4G explosive must be transported using the description, "Articles, pyrotechnic for technical purposes," UN0431. See 49CFR172.102 Special Provision 161. These items are forbidden for transportation in passenger carrying aircraft or passenger carrying rail cars.

An air bag inflator, air bag module, or seat-belt pretensioner may be classed as Class 9 (UN3268) PGIII if: (1) The manufacturer has submitted each design type air bag inflator, air bag module, or seat-belt pretensioner to a person approved by the Associate Administrator, and has received written notification from the Associate Administrator that the device has been approved for transportation and assigned an EX number; or, (2) The manufacturer has submitted an application, including a classification issued by the competent authority of a foreign government to the Associate Administrator, and received written notification from the Associate Administrator that the device has been approved for transportation and assigned an EX number. See 49CFR173.166(b).

When offered for domestic transportation by highway, rail freight, cargo vessel or cargo aircraft, *a serviceable air bag module or seat-belt pretensioner removed from a motor vehicle* that was manufactured as required for use in the United States may be offered for transportation and transported without compliance with the shipping paper requirement. However, the word *"Recycled"* must be entered on the shipping paper immediately *after the basic description prescribed in 49CFR172.202.* No more than one device is authorized in the packaging. The device must be cushioned and secured within the package to prevent movement during transportation. See 49CFR173.166(d)(4).

An air bag module or seat-belt pretensioner that has been approved by the Associate Administrator and is installed in a motor vehicle, aircraft, boat or other transport conveyance or its completed components, such as steering columns or door

panels, is not regulated for transportation. See 49CFR173.166(d)(1).

Convertible vehicles may have roll-over protection systems. These systems contain a small amount of explosive material used to release a spring-loaded roll bar that will protect the occupants. This explosive has been classed as a Division 1.4S and assigned the approval number EX-1998030106. The exception 49CFR173.166 does not apply for this type of device. See PHMSA Interpretation #05-0289.

The vast majority of air bags in cars, fortunately, are never deployed within the lifetime of the automobile. Typically, cars are flattened and recycled at the end of their lifetime, and the airbags are never removed from the cars. This can be hazardous during the automobile-recycling process and would endanger workers, and damage recycling equipment and the environment. Thus, the air bag canisters should be removed before the car is sent for flattening or recycling. Once the air bag module has been removed, it must be deployed before it can be safely discarded.

References: 1. DOT 49CFR. 2. PHMSA Interpretation #05-0289. http://www.phmsa.dot.gov/portal/site/PHMSA/menuitem.ebdc7a8a7e39f2e55cf2031050248a0c/?vgnextoid=dbc81c52b2f84110VgnVCM1000009ed07898RCRD&vgnextchannel=56acd3c1af814110VgnVCM1000009ed07898RCRD&vgnextfmt=print 3. Air Bags and Pretensioners in GM Vehicles. January 2001, http://www.carsp.ca/downloads/GM_airbags_pretensioners.pdf 4. How Airbags Work by Marshal Brain http://auto.howstuffworks.com/airbag.htm/ 5. Air Bag from Wikipedia, the free encyclopedia http://en.wikipedia.org/wiki/Airbag. 6. Automotive Occupant Restraint Council http://www.aorc.org/airbag.asp 7. Traffic Safety Facts 2005 Data National Highway Traffic Safety Administration National Center for Statistics and Analysis www.nhtsa.gov 8. Washington University in St Louis Chemistry http://cmi.chemistry.wustl.edu/~courses/genchem/Tutorials/Airbags/disposal.htm 9. Seatbelt Pretensioner http://www.autotropolis.com/wiki/index.php?title=Seatbelt_Pretensioner 9. Seat Belt Pretensioner http://www.freepatentsonline.com/5397075.html

EPA and NIH News

Revised National Ambient Air Quality Standards for Ozone

By Abdul H. Khalid, Chemical Engineer, HTIS

In a March 12, 2008, news release the U.S. Environmental Protection Agency (EPA) Administrator announced a final rule revising the primary and secondary National Ambient Air Quality Standards (NAAQS) for ozone (O_3). According to the EPA, the changes made in the primary and secondary NAAQS for ozone will improve both public health protection and the protection of sensitive trees and plants.

The new primary 8-hour standard is now 0.075 parts per million (ppm) expressed to three decimal places while the new secondary standard is set at the current 8-hour standard by making it identical to the revised primary standard. The previous primary and secondary standards were identical and were set at 0.08 ppm. This revised 8-hour standard for ozone is the most stringent and meets the requirements of

the Clean Air Act (CAA). The EPA has revised these standards for the first time in more than a decade and the revision of these standards are based on the most recent scientific evidence about the effects of ozone, being a primary component of smog.

The EPA is particularly concerned about individuals with asthma or other lung diseases, as well as those, such as children, who spend a lot of time outside. Ozone exposure can aggravate asthma, resulting in increased medication use and emergency room visits, and it can increase susceptibility to respiratory infections. Ground-level ozone is not emitted directly into the air, but forms when emissions of nitrogen oxides (NOx) and volatile organic compounds (VOCs) "cook" in the sun. Power plants, motor vehicle exhaust, industrial facilities, gasoline vapors and chemical solvents are the major human-made sources of these emissions.

As a part of this final rule and the action taken by the EPA, the agency made changes to the existing compliance requirements of the Air Quality Index (AQI) for ozone by setting an AQI value of 100 equal to 0.075 ppm per 8-hour average and making proportional changes to the AQI values of 50,150, and 200. The AQI is the EPA's color-coded tool for communicating daily air quality to the public. For more details on the revised standards and AQI on daily air quality forecasts, interested personnel should visit the following websites:

http://www.epa.gov/groundlevelozone/actions.html#mar07s
http://www.airnow.gov/

For more on this final rule and other related information, the point of contact (POC) is Dr. David J. KcKee, Health and Environmental Impact Division, Office of Air Quality Planning and Standards, U.S. EPA, mail code C504-06, Research Triangle Park, NC, 27711, phone: 919-54105288 or e-mail at: mckee.dave@epa.gov/.

Reference: Ground-level Ozone, Regulatory Action, U.S. EPA at: http://www.epa.gov/groundlevelozone/actions.html#mar07s

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Update on EPA's Electronic Manifest Project

By Tom McCarley, Chemist, HTIS

Over the last several years, the EPA has been working to update its regulations regarding the use of the uniform hazardous waste manifest; that document which does double duty as an authorized hazardous materials shipping paper and as a hazardous waste movement documentation – part of the so-called "Cradle to Grave" tracking system for such regulated wastes.

One aspect of the manifest updating project is already in effect; the use of a uniform document nationwide where printers produce the blank manifests to the EPA specifications and then generators and facilities must purchase the uniform forms from an authorized printer on the EPA's manifest registry for all hazardous waste shipments on or after September 5, 2006.

The other aspect of the manifest reform has taken longer; the creation of an electronic manifest system (e-manifest) where manifest data could be entered electronically and stored on the EPA or EPA

contractor servers. First proposed on April 18, 2006, the EPA indicates strong support in the creation of a national web-based system funded through user-fees which will be optional rather than a mandatory switch from the paper-based manifest. By Federal Register notice and request for comments on February 26, 2008, the EPA outlined several issues upon which they are seeking input:

- Handling of confidential business information and
- Potential confusion over having a dual manifest system

The EPA estimates that some five million uniform hazardous waste manifests are used annually.

Reference: Federal Register, Vol. 73, No. 38, pp 10204-10210, February 26, 2008.

NIH and EPA Joined Forces on New Chemical Testing Program

Moraima Lugo-Millán, Chemist, HTIS

The National Institute of Health (NIH) and the Environmental Protection Agency (EPA) joined forces to develop and improve the safety testing of chemicals. These two agencies unveiled a collaboration effort that will reduce reliance on animal use for chemical and toxicological testing and revolutionize the way that toxic chemicals are identified. This collaboration effort has launched an initiative to move from traditional studies on laboratory animals to rapid, automated testing using cultured human cells and isolated molecular targets.

Traditionally, toxicity has often been determined by injecting chemicals into laboratory animals, watching to see if the animals get picked and then looking at their tissues under the microscope. This technique has given the researchers valuable information, but it is expensive, time consuming, uses animals in large numbers and it doesn't always predict which chemicals would be harmful to humans; the correlation is not as precise as researchers would like. These are the reasons why scientists of NIH and EPA proposed and signed an agreement to bring together their skills and develop an innovative and effective process to test chemicals. This collaboration effort will result in a chemical testing program with a direct applicability to humans, more cost effective, and with fast results.

The agreement between the two federal agencies was signed in a five year memorandum of understanding (MOU) that brings together two NIH programs and an EPA research effort. The NIH initiatives rely in the experimental toxicology expertise of the National Toxicological Program (NTP), and the high-throughput technology of the NIH Chemical Genomics Center's (NCGC); while the EPA offers the computational toxicology capabilities of its recently formed National Center for Computational Toxicology (NCCT). This trans-agency collaboration will allow the quick exchange of information and effectively identify chemicals that might pose risks to human health, animals, and the environment.

The robotic devices at the NIH Chemical Genomics Center's (NCGC), are able to expose various types of cells to different concentrations of chemicals at the same time, successfully running

hundreds of thousands of toxicity tests per day. This will allow quick results to determine if the chemical is harmful and in what concentration. Scientists have been working testing these ideas and have analyzed around 2800 compounds including pesticides and industrial chemicals obtaining accurate and important information.

This new collaboration effort promises to generate data that are specifically applicable to humans, expand the amount of chemicals that are currently tested, and reduce the time, money, and number of animals involved in testing. It is in the experimental phase, but the process has been used to compare the answers and data collected via the traditional methods with favorable results. This effort will eventually replace the use of laboratory animals in toxicity tests, and it is expected to be more accurate in human diagnostics, involving human cells and cellular components in the testing process instead of laboratory animals.

References: 1. http://yosemite.epa.gov/opa/admpress.nsf/bd4379a92ceceeac8525735900400c27/35995a22ceb674678525 73f0006559de!OpenDocument
2. http://www.nih.gov/news/health/feb2008/nhgri-14.htm
3. http://www.niehs.nih.gov/news/releases/2008/tox-transcript.cfm

OSHA News

OSHA New Inspection Procedures for the Chromium (VI) Standards

By Ariel Rosa and Abdul Khalid, HTIS

The Occupational Safety and Health Administration (OSHA) recently issued a new compliance directive for occupational exposure to hexavalent chromium (Cr(VI). The directive, OSHA Instruction CPL 02-02-074, Inspection Procedures for the Chromium (VI) Standards, **became effective January 24, 2008**.

The new Directive provides guidelines and establishes uniform inspection and compliance procedures for the occupational exposure standards for hexavalent chromium found in Sections 29 CFR 1910.1026, 29 CFR 1926.1126, and 29 CFR 1915.1026, applicable to general industry, construction, and shipyards, respectively. The standards were originally published in the February 28, 2006, Federal Register and all three standards were effective May 30, 2006.

Employers with 20 or more employees were allowed six months, until a start-up date of November 27, 2006, to come into compliance with most of the provisions of the standards. Employers with 19 or fewer employees were allowed 12 months, until a start-up date of May 30, 2007, to come into compliance with most of the provisions. All employers were allowed four years from the effective date, a deadline of May 31, 2010, to install feasible engineering controls. The new Cr(VI) standards have lowered the permissible exposure limit (PEL) to 5 µg/m3 and established an action level of 2.5 µg/m3.

Guidelines and procedures for CSHOs to review employer's air monitoring records or other data used by the employer to characterize exposures, and the assessment of protective work clothing and equipment where a hazard is present or is likely to be present from skin or eye contact with

Cr(VI) are highlighted in the new CPL 02-02-074 Directive. Also highlighted are guidelines to evaluate hygiene areas provided, housekeeping, work practices, and medical surveillance.

In addition to lung cancer, Cr(VI) is also capable of causing airway sensitization or asthma, nasal ulcerations and septum perforations, skin sensitization or allergic and irritant contact dermatitis, skin ulcerations, and eye irritation.

Reference: http://www.osha.gov/OshDoc/Directive_pdf/CPL_02-02-074.pdf

Other News

"PCB", a Potential Source of Exposure in Some Old Wood Floor Finishes

By Ariel Rosa, Environmental Protection Specialist and Beverly Howell, Industrial Hygienist, HTIS

Hardwood floors have become a popular design element in both new and pre-owned homes. Older homes with hardwood floors are seen as having a timeless character, whereas quality and value is added to newer homes. It is very fashionable today to purchase older homes and recondition and renovate them back to their original beauty. Many of these old homes have beautiful hardwood flooring that may have been covered by a carpet or vinyl tiles for some time. When new owners discover this fact they just can't wait to bring the hard floor back to its original luster.

Although it is reasonable to assume that contractors and professional in the floor installing and refinishing business are aware of the many health hazards associated with hardwood floor refinishing, we can not assume the same for the self-help or do-it-yourselfer individuals.

Generally refinishing hardwood floors usually involves the following steps:

- Sanding;
- Buffing
- Stain finishing application (waxes, lacquer sealers, oil modified or water based polyurethane)

The processes of sanding and buffing hardwood floors create an enormous amount of airborne wood dust. Wood dust is a potential health hazard when wood particles from these processes become airborne. Wood dust may be inhaled and deposited in the nose and throat region, the upper bronchial region, or the lung, depending on the particle aerodynamic size. Workers exposed to wood dust have experienced a variety of adverse health effects including eye and skin irritation, allergy, reduced lung function, asthma, and nasal cancer. As a general rule, hard woods are more hazardous to human health than soft woods therefore it is highly recommended that every precautionary measure be taken to avoid breathing such dust.

What many contractors or self helper don't realize is that other intangible dangers may lie beneath the surface. Lead and asbestos can lie harmlessly on floors, but pose serious health risks when disturbed through sanding. With the increasing popularity of renovating older homes or office spaces, ripping up old tiles, to expose original wood flooring, and removing the old floor adhesive can lead to exposure to these harmful toxins.

Dust becomes a problem because the infiltration and

permeation of dust into vents and air conditioning units also creates the potential for poor air quality as it is circulated throughout a house or business, escalating the dangers of the occupant breathing it in and the nightmare of cleaning it up.

The products used in the staining and finishing process contain organic solvents and other substances: epoxies, urea-formaldehyde, polyurethane, and nitrocellulose resins and additives. Among other dangers to health and safety, fire is a constant threat in a work setting that combines highly flammable solvents, large quantities of airborne wood dust, electrical equipment, heat, and friction inside old homes. The use of these products in enclosed and poorly ventilated areas may cause a significant build-up of vapors, to a level where sparks or open flames can ignite the vapors, causing a fire or explosion.

High vapor concentrations are not only a fire or explosion risk. In addition to a fire hazard the use of lacquer sealers and other flammable products may result in health problems from exposures to vapors from the solvents in certain floor finishes. The prolonged and repeated exposure to high levels of these vapors may produce both acute and chronic adverse health effects.

Direct contact with these solvents can cause skin dermatitis and/or sensitization. Sufficient absorption through the skin could lead to adverse systemic health effects.

A recent case study conducted by researchers Ruthann Rudel and Julia Brody of the Silent Spring Institute and Liesel Seryak, of the Ohio State University suggests that old wood floor finishes in some homes may be an overlooked source of exposure to the now banned polychlorinated biphenyls (PCBs).

The researchers initially measured PCBs in indoor air and dust in homes in Cape Cod during 1999-2001. Serum concentrations in residents and air and dust concentrations were especially high in a home where a resident reported use of PCB-containing floor finish in the past, and where the floor of one room was sanded and refinished just prior to sample collection.

This case-study concluded that PCB residues in homes may be more significant contributors to overall exposure than diet for some people, and that use of a commercially-available PCB-containing wood floor finish in residences during the 1950s and 1960s is an overlooked but potentially important source of current PCB exposure in the general population. The study also reports that potential exposure to floor sanders may be significant and studies to evaluate blood PCB concentrations among this group are needed.

To determine the potential source, during participant interviews and household surveys, one resident recalled having used a floor finish called Fabulon on hardwood floors throughout the 1950s and 1960s.

The researchers consulted an out-of-print set of reference books designed for poison control centers and medical professionals, Clinical Toxicology of Commercial Products, which reported that in 1957 Fabulon's formula contained chlorinated biphenyl, hexachlor bi-phenyl, and quadraclor bi-phenyl. By 1969, PCBs were no longer listed as part of the Fabulon formula, according to a later edition of the same resource book.
Since the Hazard Communication Standard

(HCS) was adopted 24 years ago, the availability of chemical information in workplaces has increased dramatically, and the provision of labels and Material Safety Data Sheets (MSDSs) with products has become a standard business practice. Unfortunately, information on chemicals pre-dating OSHA and the HCS requirements are not easy to obtain, especially when manufacturers have closed their plants and gone out of business for so many years.

Concerned with the PCB case study findings, the Hazardous Technical Information Service (HTIS) consulted the Hazardous Materials Information Resource System (HMIRS), a federal repository of MSDSs and value added information which dates back to April 1975. The research resulted in five records. The records showed that "Fabulon" was procured by the Department of the Navy and the Air Force through local vendor contracts with no National Stock Numbers (NSN's) during the years, 1987, 1989 and 1990. All five "Fabulon" MSDS found were PCB's free. No record was found dated prior 1987.

Before starting floor finishing jobs, employers should get information on manufacturer's safety recommendations for all products being used, ignition sources in the house and how to keep the work area ventilated.

Obtaining some historical and background information on the property or area to be work can only add to the safety of all involved.

There are sanding systems available specifically designed to virtually eliminate the amount of airborne dust and actual exposure time from frequent and lengthy sanding. These dust containment systems use portable vacuums to capture and remove the dust before the sander operator is exposed.

It is recommended whenever possible to choose water-borne (water-based) adhesive and sealers instead of "solvent-based" or "oil-based" finishes. There are many environmentally friendly products with lower levels of toxicity available to choose from. Always, procure the corresponding MSDS for the product to be used.

Even though the installation or refinishing of a hardwood floor may be considered a do-it-yourself project, for all the above reasons, it would be wise to consider leaving the job to the experts.

The complete case study report on PCB-containing wood floor finish can be found in the following link: http://www.ehjournal.net/content/pdf/1476-069x-7-2.pdf

Other sources of information on hard wood dust hazards: http://www.osha.gov/SLTC/wooddust/recognition.html and http://www.osha.gov/SLTC/healthguidelines/wooddustallsoftandhardwoodsexceptwesternredcedar/recognition.html

Reference: Rudel R, Seryak L, Brody J "PCB-containing wood floor finish is a likely source of elevated PCBs in residents' blood, household air and dust: a case study of exposure", Environmental Health 2008, 7:2, 17 January 2008

IUCLID 5 Software for Chemical Information

By Abdul H. Khalid, Chemical Engineer, HTIS

The European Chemicals Agency (ECHA) located at

Helsinki, Finland is responsible for managing the registration, evaluation, authorization, and restriction processes for chemical substances to ensure consistency across the European Union (EU).

Recently, the European Commission's Joint Research Center (JRC) announced the availability of IUCLID 5 (International Uniform Chemical Information Database 5) software. This software stores chemical information and prepares and submits reports. European government agencies and member companies are to use this software to implement the European Union's Registration, Evaluation, and Authorization of Chemicals (REACH) regulations.

IUCLID 5 lets you use this system to enter, manage, store and exchange information on intrinsic and hazard properties of chemical substances. It implements the Harmonized Templates develops by the Organization for Economic and Cooperation and Development (OECD). This software is compatible with chemical legislation and program requirements in different part of the world such as REACH, the EU Biocides Directive and OECD High Production Volume (HPV) program. Data stored in this software can be easily reused for any of these purposes and to support other regulatory requirements. Members companies can use or download this software free of charge.

Global chemical regulatory compliance has become somewhat complicated as product sourcing and formulations grow more complex and the organizations expand into new markets on a global scale. New initiatives such as REACH and GHS add to the challenge of keeping on top of compliance issues.

Global Harmonized System for Classification and Labeling (GHS) is the UN system for harmonization of classification and labeling of chemicals. Japan and New Zealand have already implemented GHS while Korea would implement GHS on June 30, 2008. The EU and Australia have drafted a GHS regulation. The implementation and requirement timelines for GHS and REACH are closely tied together in Europe.

The new EU regulatory framework REACH for managing chemical substances in Europe became effective on June 1, 2007. Companies with European production or distribution of chemical substances and companies that import into Europe are affected by REACH and should go through several steps in preparation, for example establishing an inventory of substances with Chemical Abstract Service (CAS) number, amount, and classification, authorization requirements, and updating the Material Safety Data Sheets (MSDSs). More information on IUCLID 5 is available online at: http://ec.europa.eu/echa/reach/software/iuclid_en.html.

Reference: European Chemical Agency at: **http://ec.europa.eu/echa/home_en.html**

Nonsmokers can Absorb Carcinogen from Second-Hand Smoke Exposure

By Abdul H. Khalid, Chemical Engineer, HTIS

Secondhand smoking is also known as environmental tobacco smoking (ETS) or passive or involuntary smoking. A second hand smoker can inhale a mixture of two

forms of smoke from burning tobacco products, side stream smoke (smoke that comes from the end of a lighted cigarette, pipe, or cigar) and main stream smoke (the smoke that is exhaled by a smoker). Nonsmokers exposed to secondhand smoke can also absorb nicotine and other toxic chemicals just as smokers do.

A recent study conducted on nonsmoking employees of bars and restaurants in the state of Oregon shows that non smokers can absorb a major chemical abbreviated as **NNK (4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone**; a nitrosamine present in tobacco. Places such as bars and restaurants are places where nonsmoking employees can breathe tobacco smoke from customers and co-workers and may get tobacco related illnesses due to that exposure.

This study was funded by the Robert Wood Johnson Foundation and conducted by Oregon public health researchers. NNK were found in the urine of nonsmoking employees shortly after exposure to secondhand smoke during their shifts. The levels of this carcinogenic chemical continue to increase the longer the person works in a place where smoking is permitted. According to the study, NNK is a major cancer causing agent from tobacco products and workers should not have to be exposed to any dose of this major cancer causing chemical.

Secondhand smoke is dangerous in any amount because it may cause lung cancer in nonsmoking adults. The health effects of secondhand smoke exposure are more pervasive than we previously thought. Secondhand smoke is not only an annoyance but it is a serious health hazard that can lead to disease and premature death in children and nonsmoking adults. This study emphasizes and confirms that the only way to protect people from secondhand smoke is to eliminate their exposure. Secondhand smoke exposure is preventable. Smoke-free indoor environments are the best to prevent exposure and protect workers.

Secondhand smoke meets the criteria to be classified as a potential cancer-causing agent by the Occupational Safety and Health Administration (OSHA). OSHA is responsible for health and safety regulations in the workplace. The National Institute for Occupational Safety and Health (NIOSH) is another federal agency that also recommends that secondhand smoke be considered a potential occupational carcinogen. Because there are no known safe levels, these agencies recommend that exposures to secondhand smoke be reduced to the lowest possible levels.

The recent Surgeon General report also concludes that smoke-free workplace policies are the only effective way to eliminate secondhand smoke exposure in the workplace. Separating smokers from nonsmokers, cleaning the air, and ventilating buildings cannot eliminate exposure. It is very important to protect the health of employees and others in work and public places. Information on smoking restrictions in each state is available from the American Lung Association at: http://slati.lungusa.org or contact American Cancer Society at 1-800-ACS-2345 (1-800-227-2345). More information on how to quit smoking, visit CDC web site at: http://www.cdc.gov/tobacco/

Reference: Oregon DHS news release, June 28, 2007; "Study shows nonsmokers immediately absorb potent carcinogen found in secondhand smoke" web site at:

http://www.oregon.gov/DHS/news/2007news/2007-0628.shtml

BioPreferred Web Site Aims to Help Federal Agencies and Vendors Alike

By Tom McCarley, Chemist, HTIS

As time goes on, more and more of the products we use both at home and in the Federal office place, will be "biobased"; based on agricultural content. Federal agencies are mandated to increase their use of biobased products per the Farm Security and Rural Investment Act (FSRIA) of 2002.

FSRIA also called for the US Department of Agriculture (USDA) to develop a "comprehensive program for designating biobased products". USDA's BioPreffered Web site at http://www.biopreferred.gov/ is a part of the biobased program implementation.

Information on the BioPreffered website further defines "biobased products" as "products determined by the U.S. Secretary of Agriculture to be commercial or industrial goods (other than food or feed) composed in whole or in significant part of biological products, forestry materials, or renewable domestic agricultural materials, including plant, animal, or marine materials. Made from renewable plant and animal sources, biobased products are generally safer for the environment than their petroleum-based counterparts. They are usually biodegradable or recyclable."

FSRIA further mandates Federal agencies "to purchase biobased products over their petroleum-based counterparts, as long as the biobased materials are reasonably available, reasonably priced, and comparable in performance. As the single largest consumer in the United States, purchasing roughly $400 billion annually in goods and service, the federal government's preferred use of biobased resources will help achieve four significant goals:

- create new jobs for rural communities
- provide new markets for farm commodities
- increase national security by lessening our dependence on foreign oil
- improve the environment through the use of non-toxic, renewable resources"

The website contains the following helpful areas:

- Search features
- Policies and Laws
- Proposed and Final Regulations
- Designation Items
- Product Submission
- Selling to the Federal Government
- Purchasing Biobased
- Success Stories

As you can see, some aspects of the BioPreffered web site are geared towards product vendors while other sections are geared towards Federal agencies, especially those major procurement agencies like the Defense Logistics Agency (DLA) and the General Services Administration (GSA). Interested readers may want to click on the link for Designation Items and view the extensive list of products which are potentially biobased.

Reference: USDA's BioPreffered Web Site at http://www.biopreferred.gov

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