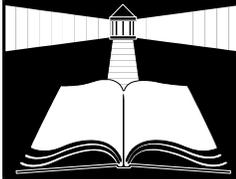


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In This Issue

OSHA Safety and Health Information on Mold

RCRA Hotline Clarifies Hazardous Waste Status of Reuse/Resold Electronics

Justice Department Report Examines Chemical Facility Assessment Method

California's E-waste Recycling Act

What are the Marking Requirements for Universal Waste Containers

HazMat Transportation Security Requirements

RSPA Enhances Transportation Security Under HMR

HazMat Regs Updated for Harmonization with IAE Rules

Pre-Transportation Functions for HazMat Shipping

Aircrafts Hauling HazMat Requires Emergency Contact Number in the Cockpit

Used Oil Regulations Amended

OSHA Updates Form 300 for 2004

EPA SNAP Ruling Does Not Allow Use of the CFC-12 Substitute HC-12a

EPA Promotes Partnership with the Freight Industry

And More

The Many Faces of Mold in Human History

Reprint submitted by Beverly Howell, Industrial Hygienist

Over the course of time, scientists have found that mold may have been the driving force behind a number of interesting phenomena including stories of leprosy in the Bible, the Salem Witch Trials, the Irish Potato Famine and the curse of the mummy's tombs. The written history of contaminated housing and its health effects can be traced back thousands of years. Leviticus Chapter 13:1-47 and 14:33-47 is one of the oldest known references to ill health effects and contaminated housing. Some recent archaeologists believe that individuals referred to as "Lepers" were actually people with fungal infections. The bible speaks of isolation and purification of people with

skin diseases, and mold clean up. In biblical times, the priest acted in a similar fashion to today's home inspector. If mildew was found in the homes, the priest would order the contaminated stones to be torn out, the inside walls to be scraped clean, old stones to be replaced with new ones, and the walls to be replastered. The home was then to be monitored for re-growth. Mold remediation back then was not much different from what is done today.

Mold-induced food poisoning called ergotism may have been responsible for the Salem Witch Trials of 1692. The fungus *Claviceps purpurea*, which was believed to have infected the rye crops of Salem, Massachusetts, produces ergot, a chemical with effects similar to LSD. It may also have been responsible for the development of the hallucinations, seizures, mental disturbances, miscarriages, and even

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**

death in small children all of whom could have been mistaken for witchcraft or satanic influences. Mold infected crops causing epidemics and mass hysteria can be dated as far back as the 14th century.

In 1845, Ireland's population totaled 8 million people, 4 million of which were enormously dependant on potatoes as a food source for humans and animals alike. A period of rain, which lasted from May 1845 until March 1846 provided textbook conditions for the rapid reproduction of the fungus *Phyophthora infestans*. This fungus grew on the leaves of potato plants causing entire fields to rot within weeks. Farmers were forced to use their uninfected seed potatoes for food and were therefore unable to plant a new crop the next year. Starvation quickly spread throughout Ireland; three and a half million people died from starvation and disease or were forced to leave the country.

The tombs of ancient Egypt are famous for their "curses" that call for death and destruction to those who enter. Many of the explorers who suffered from the supposed "curse" experienced symptoms similar to those caused by exposure to *Aspergillus*, a

mold that has been found throughout the Egyptian tombs. Egyptians often buried food, jewels, and other treasures along with their loved ones for use in the afterlife. This food may have provided the perfect nutrient source for the mold *Aspergillus* and other such molds.

The most notorious case of the mummy's curse occurred with the opening of King Casimir's tomb in Poland on April 13, 1973. Within a few days after opening the tomb, four of the 12 researchers present had died. Shortly thereafter, six more died. One of the two remaining survivors was a research microbiologist; he suffered equilibrium problems for five years but was able to perform some detailed microbiological examinations of the tomb to determine if there were correlation between his illness and anything found in the tomb. He found traces of three different species of fungi on artifacts that had been removed from the tomb: *Aspergillus flavus*, *Penicillium rubrum*, and *Penicillium rugulosum*. These fungi produce aflatoxins B1 and B2 and are believed to have caused the deaths of the 10 researchers.

It has also been speculated that these fungi may have

been responsible for the death of Lord Carnarvon, who died a few months after exploring King Tut's tomb in 1922. When the mummy of King Tut was examined in 1976, over 370 separate fungal colonies containing 89 different fungal species (including *Aspergillus*) were discovered growing on the mummy. During an analysis of 40 mummies in 1999, a German microbiologist discovered that each of the mummies contained several potentially dangerous fungal spores. Due to this evidence, scientists now take extra precautions such as wearing personal protective equipment when handling mummies and exploring new tombs.

Recent media coverage leads us to believe that molds are a new problem, but these examples show that molds have played an important part in the course of human history.

Reference: 1. Aero IAQ Tech Tip #97 - The Many Faces of Mold in Human History. 2. Aerotech Monitor, Vol 6. Issue 2, Spring 2003, page 9
website:
<http://www.aerotechlabs.com/downloads/pdf/spring03AERO.pdf>

OSHA's Safety and Health Information Bulletin on Mold

Abdul H. Khalid,
Chemical Engineer, HTIS

The U.S. Occupational Safety and Health Administration (OSHA) issued a "Safety and Health Information Bulletin" which provides information and recommendations on preventing mold growth and protecting the workers who work in the prevention and cleanup of mold.

According to the OSHA's "Trade News Release" indoor exposure to mold can cause **allergic reactions and asthmatic attacks in some individuals**. Exposure to mold can also cause other types of allergic reactions, including hay fever type symptoms, skin rashes, and irritation to the eyes, noses, throat, and lungs in both mold-allergic and non-allergic people.

In the bulletin, OSHA provides some basic information on how to prevent, control and remove mold in buildings, thus, reducing the health risks to those who work in those building as well as those who are doing the mold remediation. The OSHA Administrator, John Henshaw, believes

that workers who have little or no experience with mold remediation may use this information to determine if a mold problem exists and whether the contamination can be managed in-house or if outside assistance is required. It is a good source of information on mold.

The DOD safety and health personnel, building managers, custodians, and others responsible for building maintenance are encouraged to reference this bulletin on mold whenever the subject arises. The Bulletin includes the following:

- Molds are found almost everywhere and can grow on virtually any substance as long as moisture and oxygen are present.
- Recommendations on how to prevent mold growth.
- Proper use of personal protective equipment (PPE).
- Ways to assess mold or moisture problems.
- Methods to cleanup damage caused by moisture and mold growth.
- Checklists on mold prevention tips, how to determine if a mold problem exists

- Sampling methods and remediation equipment.

In addition to allergic reactions in people, molds can damage building materials and if left unchecked, can eventually cause structural damage to wood-framed buildings by weakening floors and walls.

For more information, DOD personnel can visit the OSHA website at: http://www.osha.gov/pls/shaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=10489 and at: <http://www.osha.gov/dts/s hib/shib101003.html>

Reference: A Trade Release October 14, 2003, POC is Frank Meilinger, phone: 202- 693-1999

RCRA Hotline Question Clarifies Hazardous Waste Status of Reused/Resold Electronics

Submitted by Tom McCarley, Chemist, HTIS

EPA's contractor operated hotline has over the years, answered many thousands of questions concerning the applicability of hazardous waste regulations under the Resource Conservation

and Recovery Act (RCRA). With the advent of a subset of hazardous waste being designated "universal waste" and with increased attention to heavy metals like lead and mercury that are persistent, bioaccumulative and toxic (PBT), it is natural that proper waste classification of heavy metal-containing electronics has become an important issue.

EPA's Hotline publishes a monthly report (<http://www.epa.gov/epaoswer/hotline/mrqs.htm>) that highlights some of the more interesting and pertinent questions for that month. During April 2003, the issue of the status of electronics that are sent offsite for potential reuse or resale was raised. Is such an activity considered reclamation under RCRA? Are you considered a hazardous waste generator in such a case? What hazardous waste regulations apply? With the volume of electronic equipment that the Department of Defense has, we felt it useful to reprint the hotline question and answer here in their entirety for your reference. The embedded 'FR' references refer to the respective Federal Register citation.

"Computer equipment, including monitors and

processing units, along with other electronics are often resold or donated to be reused. Typically, repairs such as rewiring or replacing defective parts are necessary before electronics can be reused. A business sends used electronics, which have the potential to be RCRA hazardous wastes, to a reseller who tests and identifies whether the equipment can be resold, repaired, or recycled. Is a business sending used electronics to a reseller considered a RCRA generator that must comply with RCRA Subtitle C requirements?

Pursuant to EPA regulations, a business that sends electronics to a reseller for potential reuse is not a RCRA generator. Under these circumstances, the electronic equipment is still considered a commercial product because materials used and taken out of service by one person are not considered wastes if a second person reuses them in the same manner without first reclaiming them (40 CFR Section 261.2(e)). Repairing electronics before resale is not considered reclamation, and such repair and replacement activities do not constitute waste management. Therefore, electronics from a business

are not considered solid wastes when sent to resellers and would not be subject to RCRA requirements. To minimize the amount of electronics sent for disposal, the EPA encourages reuse to extend the life and delay the waste generation of these items (67 FR 40508, 40511; June 12, 2002).

While used electronics sent to a reseller are not solid wastes, used electronics sent to a recycler could, under certain circumstances, be considered spent materials undergoing reclamation and could therefore be solid wastes. However, the EPA believes that in some instances, electronics sent for recycling do not resemble spent materials. To determine how electronics must be managed in particular situations, users and recyclers of electronics should check with their implementing agencies to see which, if any, RCRA Subtitle C requirements apply when used electronics are sent toward specific recycling pathways (67 FR 40508, 40511; June 12, 2002).

In the case of cathode ray tubes (CRTs), the EPA has encouraged states to take approaches consistent with its recent proposal, which, if finalized, would exclude

CRTs being recycled from the definition of solid waste when they are managed under certain streamlined conditions (67 FR 40508; June 12, 2002).”

Reference: EPA’s RCRA Hotline Report for April 2003

<http://www.epa.gov/epaoswer/hotline/mrqs.htm>

Justice Department Report Examines Chemical Facility Vulnerability Assessment Method

By Tom McCarley,
Chemist, HTIS

The Environmental Protection Agency (EPA) plays a major role in our homeland defense even though it is not formally a part of the new cabinet level department. Two of the EPA’s highest priorities are: 1. The state of security for America’s water supply, and 2. The state of security for America’s chemical plants. Millions of dollars are being spent on both endeavors. Of the half-million facilities within the US with hazardous chemicals, some 15000 have large quantities near population centers and many of those chemical plants with hazardous chemicals on hand had to recently develop Risk Management Plans

(RMPs) pursuant to Section 112r of the Clean Air Act Amendments. One section of the RMP was for the facility to examine the off-site consequences of a catastrophic release of a hazardous chemical. Fearing that widespread dissemination of the off-site consequences could be a map for potential terrorists, such information is now only available in a limited way to the public.

The Office of Justice Programs issued a final report in November 2002 that provides a handy approach to looking at chemical facilities from a vulnerability and security point of view. Entitled “A Method to Assess the Vulnerability of U.S. Chemical Facilities”, the 33 page report is available online at

<http://www.ncjrs.org/pdffiles1/nij/195171.pdf> and is based on a study performed at the Sandia National Laboratory.

Some of the concepts and common sense approaches to security are applicable to these facilities, as well as, to our military installations that *store* or *use* large quantities of hazardous chemicals as opposed to their production.

The Vulnerability Assessment Model uses 12 steps to systematically

examine an installation. More detailed flow charts for each of the following 12 steps used in the model are provided in the document itself:

1. Screening for the need for a vulnerability assessment,
2. Defining the project,
3. Characterizing the facility,
4. Deriving severity levels,
5. Assessing threats,
6. Prioritizing threats,
7. Preparing for the site analysis,
8. Surveying the site,
9. Analyzing the system’s effectiveness,
10. Analyzing risks,
11. Making recommendations for risk reduction, and
12. Preparing the final report.

Based on the already-in-place security of your hazardous materiel assets, some recommendations that the report provides include:

Physical protection improvements (detection, delay, and response improvements), for example:

- Sensors on gates and doors,
- An assessment system (cameras),
- A security alarm control center,
- Hardened doors and locks,

- Access control (cards + PIN) on doors and gates, and
- A compartmented facility.

Consequence reduction improvements (detection, mitigation improvements), for example:

- Reduction of quantity of controlled chemicals (to less than TQ),
- Dispersion of chemicals (in storage), and
- Addition of mitigation measures conceived or known by facility personnel.

Process control protection improvements, for example:

- Chemical/process sensors routed to alarm control center,
- Protected and strong passwords that are changed regularly,
- Firewalls,
- Configuration control (of security patches/routing table/control parameters),
- Virus protection,
- Computer audits of activity on network,
- Encryption and authentication,
- Emergency backups/backup power,
- Redundant communication, and

- Process control isolated from external information systems.

References: 1. U.S. Department of Justice, National Institute of Justice, Office of Justice Programs, "A Method to Assess the Vulnerability of U.S. Chemical Facilities", November 2002; - available online at <http://www.ncjrs.org/pdffiles1/nij/195171.pdf>. 2. Presentations at the EPA Region III Chemical Emergency and Preparedness Conference, Baltimore, MD, December 11, 2002

California "E-Waste" Recycling Act of 2003

By Abdul H. Khalid,
Chemical Engineer, HTIS

On September 25, 2003, California Governor Gary Davis, signed the first electronics waste (E-Waste) recycling act. It is the nation's first comprehensive electronics recycling program.

Under this recycling program, the retailers are required to collect recycling fees on new computer monitors, televisions, flat panel screens, and other products that contain hazardous components. Consumers will pay extra money when

buying electronic products containing hazardous components. The California retailers will start collecting fee for an electronic waste recycling covered products effective **July 1, 2004**. According to the press release, the revenue collected will be used to pay electronic waste collectors and recyclers to operate collection programs for public safety and environment in the state of California. The fee rates according to the size of screens are listed below:

- \$6 on products with video display screens of at least four inches but less than 15 inches;
- \$8 for screens 15 inches to smaller than 35 inches; and
- \$10 for those with screens 35 inches or larger.

The fees also apply to mail order and Internet purchases. The California Integrated Waste Management Board (IWMB) has the authority to impose administrative civil penalties of up to \$2,500 per violation and seek penalties of up to \$5,000 per violation when fees are not paid. This legislation (S.B. 20) was a result of a three-year effort to provide consumers a safe method for the

collection and recycling of hazardous electronic products and to finally dispose of out-dated computer monitors and televisions and other products that contain hazardous components, particularly the cathode ray tubes (CRTs). CRTs may contain five to seven pounds of lead as well as mercury, cadmium, and other hazardous substances. Presently, California bans the disposal of CRTs in landfills effective March 2001, thus, preventing lead and other substances from contaminating soil and groundwater. **This electronic waste-recycling program is expected to eliminate the existing stockpiles by the end of 2007.**

Effective July 1, 2005, the manufacturers are required to report annually to the Board their approximate sales of covered products for the preceding year, the amount of hazardous materials used in manufacturing their products, what they have done to reduce this and efforts undertaken to design more recyclable electronic products, the level of hazardous materials in the products; and a summary of what steps they have taken to reduce the use of hazardous substances.

Currently, there are no drop-off sites for this electronic waste but the California Integrated Waste Management Board (CIWMB) is addressing that issue and will provide guidance to California once the procedure is established.

For further information on this rule and the export or import of electronic product and wastes to or from California, consult Mr Jeff Hunts of the California Integrated Waste Management Board (CIWMB) at 916-341-6603 or view SB 20 at web site, <http://www.ciwmb.ca.gov/Electronics/Act2003/>.

Reference: Press Release, September 25, 2003, Office of the Governor of California.

What are the Marking Requirements for Universal Waste Containers?

By Muhammad Hanif, Chemist, HTIS

The universal waste rule (UWR) promulgated in 1995 streamlined hazardous waste management requirements for collecting and managing certain widely generated hazardous wastes. The universal

waste regulations eased regulatory burdens on businesses. It also assures that wastes subject to this system go to appropriate treatment or recycling facilities pursuant to the full hazardous waste regulatory controls. The UWR covers hazardous waste batteries, thermostats, lamps, and certain pesticides. Universal waste handlers who generate or manage items designated as universal waste are exempt from certain requirements routinely applied to hazardous waste management and instead are subject to the management standards under part 273 of 40 Code of Federal Regulation (CFR). These include streamlined standards for storing universal waste, labeling and marking universal waste or containers, preparing and sending shipments of universal waste off-site, employee training and response to releases. This article accentuates labeling and marking requirements of universal waste items or containers that are described in 40CFR273.

The labeling and marking requirements for universal waste are included in the UWR to identify the types of universal waste being managed by universal waste handler. The labeling requirements vary

depending on the type of waste. According to 273.14 and 273.34, small quantity and large quantity handlers of universal waste must label or mark the universal waste to identify the type of universal waste as specified below:

Batteries: Universal waste batteries (i.e., each battery), or a container or tank in which the batteries are contained, must be labeled or marked clearly with any one of the following phrases: "Universal Waste-Battery(ies)," or "Waste Battery(ies)," or "Used Battery(ies)." Battery means a device consisting of one or more electrically connected electrochemical cells designed to receive, store, and deliver electric energy. An electrochemical cell is a system consisting of an anode, cathode, and an electrolyte, plus such connections (electrical and mechanical) as may be needed to allow the cell to deliver or receive electrical energy. *The term battery also includes an intact, unbroken battery from which the electrolyte has been removed.*

Pesticides: Agricultural pesticides that are recalled under certain conditions and unused pesticides that are collected and managed as part of a waste pesticide

collection program. Pesticides may be unwanted for a number of reasons, such as being banned, obsolete, damaged or no longer needed due to changes in cropping patterns or other factors. The following marking and labeling must identify a universal waste pesticide:

(a) A container (or multiple container package unit), tank, transport vehicle or vessel holding the recalled universal waste pesticides as described in 40 CFR 273.3(a)(1) must be labeled or marked clearly with:

(i) The label that was on or accompanied the product as sold or distributed, and

(ii) The words "Universal Waste-Pesticide(s)" or "Waste-Pesticide(s);"

(b) A container, tank, or transport vehicle or vessel holding the unused pesticide products as described in 40 CFR 273.3(a)(2) that are universal wastes must be labeled or marked clearly with:

(i) The label that was on the product when purchased, if still legible

(ii) If using the labels described in paragraph (c)(1)(i) of 40CFR273.14 or 40CFR273.34 is not feasible, the appropriate label as required under the

Department of Transportation (DOT) regulation 49 CFR part 172

(iii) If using the labels described in paragraphs (c)(1)(i) and (c)(1)(ii) of section 40CFR273.14 or 40CFR273.34 is not feasible, another label prescribed or designated by the waste pesticide collection program, and

(iv) The words "Universal Waste-Pesticide(s)" or "Waste-Pesticide(s)."

Thermostats: Universal waste thermostats (i.e., each thermostat), or a container or tank in which the mercury-containing thermostats are contained, must be labeled or marked clearly with any one of the following phrases: "Universal Waste-Mercury Thermostat(s)," or "Waste Mercury Thermostat(s)," or "Used Mercury Thermostat(s)."

Thermostat means a temperature control device that contains metallic mercury in an ampule attached to a bimetal sensing element, and mercury-containing ampules that have been removed from these temperature control devices in compliance with the requirements of 40 CFR 273.13(c)(2) or 273.33(c)(2).

Lamps: Each lamp or a container or package in which such lamps are contained must be labeled or marked clearly with any one of the following phrases: "Universal Waste-Lamp(s)," or "Waste Lamp(s)," or "Used Lamp(s)." Lamp, also referred to as "universal waste lamp," is defined as the bulb or tube portion of an electric lighting device. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infrared regions of the electromagnetic spectrum.

References: Universal Waste Rule, 60FR25491, May 11, 1995, and Hazardous Waste Lamps, 64FR36465, July 6, 1999.

HazMat Transportation Security Requirement

By Tom McCarley,
Chemist, HTIS

By final rule that became effective March 25, 2003, the Department of Transportation (DOT) mandates that shippers and carriers of certain highly hazardous materials must develop and implement security plans and train their hazmat employees in aspects of security.

The following changes were made to the hazardous materials regulations:

(1) "Shippers and carriers subject to the registration requirements in 49 CFR part 107 or who offer or transport select agents and toxins regulated by the Centers for Disease Control and Prevention (CDC) must develop and implement security plans.

(2) Hazmat employers must provide security training to their hazmat employees. Hazmat employees of companies required to use a security plan must be trained in the plan's specifics. All hazmat employees must receive training that provides an awareness of the security issues associated with hazardous materials transportation and possible methods to enhance transportation security. This training must also include a component covering how to recognize and respond to possible security threats".

The final rule indicates that DOT inspectors will be specifically looking for security plans and training records with a security component when they inspect shipper and other facilities required to have security plans.

In addition to the new security training requirement to be part of 49 CFR 172.704, the following, entirely new, 172 Subpart I (172.800 et. Seq.) will be added to the regulations:

"Subpart I--Security Plans

Section

172.800 Purpose and applicability.

172.802 Components of a security plan.

172.804 Relationship to other Federal requirements.

172.800 Purpose and applicability.

(a) Purpose. This subpart prescribes requirements for development and implementation of plans to address security risks related to the transportation of hazardous materials in commerce.

(b) Applicability. By September 25, 2003, each person who offers for transportation in commerce or transports in commerce one or more of the following hazardous materials must develop and adhere to a security plan for hazardous materials that conforms to the requirements of this subpart:

(1) A highway route-controlled quantity of a Class 7 (radioactive)

material, as defined in Sec. 173.403 of this subchapter, in a motor vehicle, rail car, or freight container;

(2) More than 25 kg (55 pounds) of a Division 1.1, 1.2, or 1.3

(explosive) material in a motor vehicle, rail car, or freight container;

(3) More than one L (1.06 qt) per package of a material poisonous by inhalation, as defined in Sec. 171.8 of this subchapter, that meets the criteria for Hazard Zone A, as specified in Sec. Sec. 173.116(a) or 173.133(a) of this subchapter;

(4) A shipment of a quantity of hazardous materials in a bulk packaging having a capacity equal to or greater than 13,248 L (3,500 gallons) for liquids or gases or more than 13.24 cubic meters (468 cubic feet) for solids;

(5) A shipment in other than a bulk packaging of 2,268 kg (5,000 pounds) gross weight or more of one class of hazardous materials for which placarding of a vehicle, rail car, or freight container is required for that class under the provisions of subpart F of this part;

(6) A select agent or toxin regulated by the Centers for Disease Control and Prevention under 42 CFR part 73; or

(7) A quantity of hazardous material that requires placarding under the provisions of subpart F of this part.

Sec. 172.802
Components of a security plan.

(a) The security plan must include an assessment of possible transportation security risks for shipments of the hazardous materials listed in Sec. 172.800 and appropriate measures to address the assessed risks. Specific measures put into place by the plan may vary commensurate with the level of threat at a particular time. At a minimum, a security plan must include the following elements:

(1) Personnel security. Measures to confirm information provided by job applicants hired for positions that involve access to and handling of the hazardous materials covered by the security plan. Such confirmation system must be consistent with applicable Federal and State laws and requirements concerning employment practices and individual privacy.

(2) Unauthorized access. Measures to address the assessed risk that unauthorized persons may gain access to the hazardous materials covered by the security

plan or transport conveyances being prepared for transportation of the hazardous materials covered by the security plan.

(3) En route security. Measures to address the assessed security risks of shipments of hazardous materials covered by the security plan en route from origin to destination, including shipments stored incidental to movement.

(b) The security plan must be in writing and must be retained for as long as it remains in effect. Copies of the security plan, or portions thereof, must be available to the employees who are responsible for implementing it, consistent with personnel security clearance or background investigation restrictions and a demonstrated need to know. The security plan must be revised and updated as necessary to reflect changing circumstances. When the security plan is updated or revised, all copies of the plan must be maintained as of the date of the most recent revision.

Sec. 172.804
Relationship to other Federal requirements.

To avoid unnecessary duplication of security requirements, security

plans that conform to regulations, standards, protocols, or guidelines issued by other Federal agencies, international organizations, or industrial organizations may be used to satisfy the requirements in this subpart, provided such security plans address the requirements specified in this subpart.”

DOT estimates that the new security plan requirements will impact some 42,000 facilities and have a first year cost of some \$ 54 million.

Reference: Federal Register, Vol. 68, No. 57, pp14509-14521, March 25, 2003.

RSPA Enhances Transportation Security Under HMR

By Abdul H. Khalid,
Chemical Engineer, HTIS

On February 10, 2004, the U.S. Department of Transportation (DOT)'s Research and Special Programs Administration (RSPA), issued a final rule and amended its hazardous materials regulations (HMR) under 49 CFR 107, 171, 176, and 177 to revise the procedures for applying for an exemption from the HMR adopted on May 5, 2003, interim final rule (68 FR 23832). Under this revision, certain

applicants are required to certify compliance with provisions of the Safe Explosives Act. The rule also incorporates without change provisions in the interim final rule that require motor carriers and vessel operators to comply with applicable licensing requirements for drivers and crewmen, respectively.

This final rule became effective on March 11, 2004. For further information on this rule, DOD personnel can contact Susan Gorsky, RSPA, Office of Hazardous Materials Standards, phone: 202-366-8553. Complete details of this rule are available on the GPO web page at:
<http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov/2004/pdf/04-2751.pdf>

Reference: Federal Register, February 10, 2004, Vol. 69, No. 27, pages 6195-6198.

HazMat Regs Updated for Harmonization with International Atomic Energy Rules

By Tom McCarley,
Chemist and Abdul Khalid, Chemical Engineer, HTIS

The Department of Transportation (DOT) updated its hazardous materials transportation regulations (HMR) so that they are reflective of international rules. In the January 26, 2004 Federal Register, DOT published an update to the 49 CFR which brings domestic regulations for certain radioactive materials in concert with those of the International Atomic Energy Agency (IAEC).

In the 66 page final rule, the following changes were adopted:

“Adopt the nuclide-specific exemption activity concentrations and the nuclide-specific exemption consignment activities listed in TS-R-1 (TS-R-1 is the 1996 IAEA Regulations for the Safe Transport of Radioactive Material) to assure continued consistency between domestic and international regulations for the basic definition of radioactive material;

Provide an exception in the HMR that certain naturally occurring radioactive materials would not be subject to the requirements of the HMR so long as their specific activities do not exceed 10 times the activity concentration exemption values;

Incorporate the TS-R-1 changes in the A₁ and A₂ values into the HMR;

Adopt the new proper shipping names and UN identification numbers, except for those referring to Type C packages, to fissile LSA material and to fissile Surface Contaminated Objects (SCOs);

Require, if customary units are used, that the appropriate quantity and customary units be placed within parentheses positioned after the original quantity expressed in the International System of Units (SI units);

Adopt the use of the Criticality Safety Index (CSI) to refer to what was formerly the criticality control transport index, and to restrict the use of the concept of transport index (TI) to a number derived purely from the maximum radiation level at one meter from the package;

Require the new fissile label be placed on each fissile material package, and that the CSI for that package be noted on the fissile label;

Adopt the requirement that excepted packages are marked with the UN identification number, that industrial packaging be

marked with the package type, and that Type IP-2 and IP-3 industrial packages and Type A packages are marked with the international vehicle registration code of the country of origin of packaging design;

Remove some former requirements, which would become redundant upon adoption of the new proper shipping names, such as the requirement that the shipping description contain the words "Radioactive Material" unless those words are included in the proper shipping name;

Remove plutonium-238 from the definition of fissile material. Remove the reference to Pu-238 in the list of fissile radionuclides for which the weight in grams or kilograms may be listed instead of or in addition to the activity, in the shipping paper or radioactive label description of the radioactive contents of a package;

Adopt a definition of contamination, and include an authority to transport unpackaged LSA material and SCO, and an authority to use qualified tank containers, freight containers and metal intermediate bulk containers as industrial

packagings, types 2 and 3 (IP-2 and IP-3);

Adopt the new class of LSA-I material, consisting of radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the activity concentration exemption level, and to remove the present category referring to mill tailings, contaminated earth, concrete, rubble, other debris, and activated material that is essentially uniformly distributed, with specific activity not exceeding 10⁻⁶ A₂/g.

Incorporate the TS-R-1 changes for packagings containing more than 0.1 kg of uranium hexafluoride (UF₆);

Require UF₆ packagings to meet the pressure, drop and thermal test requirements, to prohibit the use of pressure relief devices, and to certify the packagings in accordance with TS-R-1 requirements;

Revise Sec. 173.453 to reflect the NRC "fissile material exemption provisions," to remove the definition of "fissile material, controlled shipment," and to revise Sec. 173.457 and 173.459 to remove the references to "fissile material, controlled shipment" and

to base requirements for non-exclusive use and exclusive use shipments of fissile material packages on TS-R-1 package and conveyance CSI limits;

Accept the IAEA transitional requirements and begin the phase out of packages satisfying the 1967 IAEA requirements, including DOT specification packages;

Prohibit the manufacture of all Type B specification packages conforming to Safety Series No. 6 (1967) as of the effective date of this rule. The use of these packages would be allowed for three years after the effective date of this rule; and

Add a requirement that the active material in an instrument or article intended to be transported in an excepted package be completely enclosed by the non-active components.”

These changes to the 49 CFR hazardous materials regulations become effective October 1, 2004. Those responsible for packaging and shipping radioactives will want to study the final rule in some detail.

Reference: Federal Register, Vol. 69, No. 16, pp 3631-3696, January 26, 2004.

Pre-Transportation Functions For HazMat Shipping

By Muhammad Hanif,
Chemist, HTIS

To ensure that hazardous materials (including hazardous waste) will reach their destination safely, Department of Transportation (DOT) has established requirements in subchapter C – Hazardous Material Regulations (HMR), parts 171 through 180, under Chapter I – Research and Special Programs Administration, Department of Transportation, of Title 49 Code of Federal Regulations (49CFR). Requirements in the HMR apply to each person who offers a hazardous material for transportation in commerce, causes a hazardous material to be transported in commerce, or transports a hazardous material in commerce. According to [49 CFR 171.8](#), “hazardous material” means substances or materials that the Secretary of Transportation has determined are capable of posing an unreasonable risk to health, safety, or property while in transport in commerce. The term hazardous material (HM) includes:

- Materials listed on the hazardous materials table [49CFR172.101](#),
- Hazardous substances (shipped at or above their reportable quantity) (171.8),
- Hazardous wastes (as defined by the Environmental Protection Agency in 40CFR 261.3),
- Marine pollutants that are listed in appendix B to 172.101. (171.8),
- Elevated temperature materials (intentionally heated to >100°C for shipment) (171.8), and
- Materials that meet the defining criteria for hazard classes and divisions in part 173. (171.8).

In order to comply, it is critical that shippers, carriers, container manufacturers and others affecting transportation safety stay up-to-date with the HMR (49 CFR Parts 171 through 180), including changes that are issued by the DOT. On October 30, 2003, RSPA published amendments to 49 CFR 171.1 (Applicability of Hazardous Materials Regulations to persons and functions) in Federal Register, 68FR61905. These requirements extend

to persons who either perform a pre-transportation function described in 49CFR171.1 or are responsible for performing a pre-transportation function. These functions are *in addition* to transportation functions that are performed when the hazardous material is actually on the highway. Pre-transportation functions include but are not limited to the following:

- (1) Determining the hazard class of a hazardous material.
- (2) Selecting a hazardous material packaging.
- (3) Filling a hazardous material packaging, including a bulk packaging.
- (4) Transloading a hazardous material at an intermodal transfer facility from one bulk packaging to another bulk packaging for purposes of continuing the movement of the hazardous material in commerce.
- (5) Securing a closure on a filled or partially filled hazardous material package or container or on a package or container containing a residue of a hazardous material.
- (6) Marking a package to indicate that it contains a hazardous material.
- (7) Labeling a package to indicate that it contains a hazardous material.

- (8) Preparing a shipping paper.
- (9) Providing and maintaining emergency response information.
- (10) Reviewing a shipping paper to verify compliance with the HMR or international equivalents.
- (11) For each person importing a hazardous material into the United States, providing the shipper with timely and complete information as to the HMR requirements that will apply to the transportation of the material within the United States.
- (12) Certifying that a hazardous material is in proper condition for transportation in conformance with the requirements of the HMR.
- (13) Loading, blocking, and bracing a hazardous material package in a freight container or transport vehicle.
- (14) Segregating a hazardous material package in a freight container or transport vehicle from incompatible cargo.
- (15) Selecting, providing, or affixing placards for a freight container or transport vehicle to indicate that it contains a hazardous material.

Personnel that perform any of the pre-transportation functions described above are subject to all applicable hazardous

material regulations, including the training requirements at [49CFR172.700](#).

It is important to note that facilities at which pre-transportation functions are performed may also be subject to EPA and OSHA regulations, and may also have to comply with applicable state and local regulations for hazardous material handling and storage operations. Similarly, facilities at which pre-transportation functions are performed may also be subject to regulations of the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) concerning the handling of explosives.

The amendments to 49CFR171.1 are explained in more detail in the [68FR61905](#) preamble discussion. Questions as to the applicability of EPA, OSHA, or ATF regulations to particular facilities or operations should be directed to the appropriate EPA, OSHA, or ATF office.

References: Federal Register, Vol. 68, No. 210, October 30, 2003 (68FR61937).



Aircraft Hauling Hazmat Requires Emergency Contact Number in Cockpit

By Tom McCarley,
Chemist, HTIS

By final rule of March 25, 2003, airlines hauling regulated hazardous materials will need to have an emergency response number with the pilot-in-command in the cockpit in order to have a contact in case of an emergency involving the hazardous material. The rule became effective October 1, 2003 and includes specific regulations on retention of the emergency response information. That information must include:

- (1) Proper shipping name, hazard class, and identification number;
- (2) technical and chemical group name, if applicable;
- (3) any additional shipping description requirements applicable to specific types or shipments of hazardous materials or to materials shipped under International Civil Aviation Organization (ICAO) regulations;
- (4) total number of packages;

(5) net quantity or gross weight, as appropriate, for each package;

(6) the location of each package on the aircraft;

(7) for Class 7 (radioactive) materials, the number of packages, overpacks or freight containers, their transport index, their location on the aircraft; and

(8) an indication, if applicable, that a hazardous material is being transported under terms of an exemption.

49 CFR 175.33 will require that the aircraft operator ensure that the telephone number be monitored by someone not aboard the flight anytime the aircraft is in flight.

Reference: Federal Register, Vol. 68, No. 57, pp 14341-7, March 25, 2003.

Used Oil Regulations Amended

By Tom McCarley,
Chemist, HTIS

The regulations governing the classification and management of used oil (40 CFR 279) have been part of the overall hazardous waste management regulations under the Resource

Conservation and Recovery Act (RCRA) for over a decade now. On July 30, 2003, the Environmental Protection Agency (EPA) updated the used oil rules to reflect several technical changes and clarifications that became effective on September 29, 2003.

The final rule:

Clarifies when used oil contaminated with polychlorinated biphenyls (PCBs) is regulated under the RCRA used oil management standards and when it is not (see below for discussion).

Clarifies that mixtures of conditionally exempt small quantity generator (CESQG) hazardous waste and used oil are subject to the RCRA used oil management standards irrespective of how that mixture is to be recycled;

Clarifies that the initial marketer of used oil that meets the used oil fuel specification need only keep a record of a shipment of used oil to the facility to which the initial marketer delivers the used oil.

A full discussion of the clarification of the status of used oil containing PCBs would increase the size of this brief article to nearly the size of the seven

page final rule itself. Suffices to say if your responsibilities include PCB and oil management, you need to obtain a copy of the entire rule for your reference.

The Toxic Substances Control Act (TSCA) through the EPA enforced regulations at 40 CFR 761 generally manages PCB oil. Generally oil containing less than 50 parts per million (ppm) PCB content would be regulated under the RCRA used oil standards and not under TSCA. Dilution of oil above 50ppm to get below 50ppm is expressly prohibited under TSCA. The major exception to the 50ppm threshold management amount is for used oil that is to be burned for energy recovery. Because burning chlorinated aromatic hydrocarbons like PCBs can produce toxic dioxins and furans, the regulations are more stringent. Used oil between 2 ppm and 50 ppm will be regulated by both the used oil standards of 40 CFR 279 as well as the PCB regulations of 40 CFR 761.20(e) if the intent is to burn the oil for energy recovery. Used oil below 2 ppm can be burned for energy recovery but the PCB concentration must be verified by testing or other verifiable information and

records must be kept (see 40 CFR 761.20(e)(2),(4). If you are burning used oil at your facility, you will need to understand your compliance status per the July 30 rule.

TSCA regulations also prohibit the use of used oil with *any detectable concentration of PCB* as a sealant, coating, or as a dust suppressant (including road oiling). Road oiling is also prohibited under RCRA unless your State specifically received authorization (to date none have) to allow for road oiling with non-PCB oil.

Reference: Federal Register, Vol. 68, No. 146, pp 44659-44665, July 30, 2003.

OSHA Updates Form 300 for 2004

By Tom McCarley,
Chemist, HTIS

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has released its new OSHA Form 300 – “Log of Work-Related Injuries and Illnesses” which employers subject to OSHA reporting must start using and displaying January 1, 2004. The new form is marked “(Rev. 01/2004).

The 12 page OSHA Form 300 for 2004 and instructions are downloadable from <http://www.osha.gov/recordingkeeping/new-osha300form1-1-04.pdf> . The OSHA forms 300, 300A, and 301 by themselves are available as an Excel spreadsheet download (150KB) from <http://www.osha.gov/recordingkeeping/new-osha300form1-1-04.xls>

Changes from the previous years include:

- A position switch for the positions of the day count columns. The days “away from work” column now comes before the days “on job transfer or restriction.”
- Clarification of the formulas for calculating incidence rates.
- Addition of new recording criteria for occupational hearing loss to the “Overview” section.
- The column heading “Classify the Case” is now more prominent on Form 300 to make it clear that employers should mark only one selection among

the four columns offered.

References: 1. OSHA Form 300 (Rev. 1/2004) and instructions at <http://www.osha.gov/recordingkeeping/new-osha300form1-1-04.pdf> .
2. Federal Register, Vol. 67, No. 242, pp 77165-77170, December 17, 2003.

EPA SNAP Ruling Does Not Allow the Use of CFC-12 Substitute HC-12a

By Tom McCarley,
Chemist, HTIS

The Environmental Protection Agency (EPA) is not permitting a hydrocarbon blend known as HC-12a to be used as a substitute for the common refrigerant CFC-12. The EPA cites a lack of data concerning safety issues on HC-12a, also known as Hydrocarbon Blend B, as a major factor in the denial. The EPA notes that there are a number of other substitutes that exist as replacements for CFC-12. The manufacturer of HC-12a has petitioned the EPA four times for approval.

Alternatives to Ozone-Depleting Substances (ODS) are regulated by the EPA under Section 612 of the Clean Air Act under a program known as the

Significant New Alternatives Policy (SNAP). Substitute chemicals are regulated for all of the major ODS applications (refrigeration, solvent use, aerosol use, foam-blowing etc.) and are regulated under the SNAP program whether or not the substitute materials have any ozone depleting potential. The EPA wants to ensure the substitutes are acceptable for use based on their safety, health, and environmental attributes.

Reference: Federal Register, Vol. 69, No. 41, pp 9754-5, March 2, 2004

The EPA Promotes Smart Way Transport Partnership with Freight Industry

By Abdul H. Khalid,
Chemical Engineer, HTIS

On February 9, 2004, the U.S. Environmental Protection Agency (EPA) announced the Smart Way Transport Partnership. The Smart Way Transport Partnership is a collaborative voluntary program between the EPA and freight industry to save energy, money, and energy security of the country while reducing air pollution and greenhouse gases significantly.

The EPA Administrator Mr. Leavitt joined 52 freight shippers and carriers from around the nation to promote the Smart Way Transport Partnership during an annual leadership conference at the Capital Hilton Hotel in Washington, D.C. The partnership creates strong market-based incentives that challenge companies shipping products, and the truck and rail companies delivering these products, to improve the environmental performance of their freight operations. The Smart Way Transport partners will improve their delivery in a new smart way and meet the performance goals established by their leadership.

The freight industry plays an important roll to deliver the goods. The performance goals are established to raise the Nation's economic levels at all stages during the transportation of goods and making air quality better which ultimately keep the public in good health. The Depart of Defense (DOD), particularly the Defense Logistics Agency (DLA), and Military Traffic Management Command (MTMC) are in this business. In January 2004 MTMC became Surface

Deployment and Distribution Command (SDDC) and is responsible for the worldwide movement of combat units, sustainment cargo, service member household goods, and privately owned vehicles through freight shippers and carriers. DOD is committed to environmental stewardship and welcomes the meeting with freight shippers and carriers to promote the Smart Way Transport Partnership.

President Bush challenged every sector of the American economy to contribute to reduce the greenhouse gases and raise the country economy up to his goal of 18 percent by 2012. According to EPA, the agency will be able to achieve nearly ten percent of the President's goal. Also, the adoption of Smart Way Transport's best practices in combination with the new regulations under the Clean Air Act (CAA) will reduce sulfur in diesel fuel resulting in meeting the nation's air quality standards.

The EPA estimates that the Smart Way Transport Partnership will achieve fuel efficiency in a number of ways through:

- The automatic tire-inflation systems,

- The use of low-viscosity lubricants,
- Reducing truck idling time and,
- Improving routing and scheduling.

By adopting the Smart Way Transport Partnership, the fuel savings will result in reductions of at least 33 million metric tons of carbon dioxide, a greenhouse gas, and 200,000 tons of nitrogen oxides, an air pollutant that causes smog and respiratory problems.

For further information and questions on the Smart Way Transport Partnership, DOD personnel can seek information online at: <http://www.epa.gov/smartway> and on **Climate VISION** available at: <http://www.climatevision.gov>

EPA's Headquarters Press Release, February 9, 2004; National News Web page at: <http://www.epa.gov/newsroom/>



DOT Interprets Hazmat in your Luggage

By Tom McCarley,
Chemist, HTIS

Most, if not all of you have experienced the increased delays and frustrations caused by heightened airport security screening in the aftermath of 9-11. While the initial focus was on sharp objects, increasingly airport screeners have noticed the amount and variety of hazardous materials being carried on board an aircraft or in checked passenger luggage. Small amounts of hazardous materials carried by passengers are generally for personal use and not for introduction into commerce are exempt from the hazardous materials regulations of the Department of Transportation (49 CFR 175.10).

One of the regulatory "fine points" that has arisen concerns when such hazmat from passengers is "offered" or "presented" to the airlines and would fall under the conditions as being "in commerce". The Research and Special Programs Administration (RSPA) of the U.S. Department of Transportation (DOT) has clarified this hazmat issue. RSPA's interpretation

does not apply to cargo shipments.

For purposes of the hazardous materials regulations, a passenger with hazmat in commerce must be in compliance with the regulations when:

- Placing the baggage on the X-ray machine conveyor belt,
- Handing the baggage to screening personnel,
- Placing the baggage in a bin or tray for examination by screening personnel, or
- When the passenger physically passes through the security checkpoint with the baggage.

Carry-on baggage is accepted by an air carrier when the airline accepts the boarding pass of the passenger boarding the flight. However, the passenger remains responsible for ensuring compliance. Checked baggage containing a hazardous material is offered to the carrier at the point the passenger presents the baggage for acceptance by the carrier.

Acceptance by a carrier may occur at curbside check-in, at the ticket counter in the airport, or when the passenger presents the bag to screening personnel for explosive detection screening as a prerequisite to presentation to the carrier. When the baggage is tendered at curbside check-in or the ticket counter to the air carrier it is considered to have been accepted when the air carrier issues a baggage claim ticket for the checked baggage.”

Reference: Federal Register, Vol. 68, No. 40, pp9735-7, February 28, 2003.

Ethylene Oxide and Risk of Breast Cancer in Women

By Abdul H. Khalid,
Chemical Engineer, HTIS

The National Institute for Occupational Safety and Health (NIOSH)'s Division of Surveillance Health Evaluations and Field Studies (DSHEFS) has published a study that suggests a link between occupational exposure to ethylene oxide and increased risk for breast cancer in women. Ethylene oxide (EtO) is used as a disinfectant, sterilant, and also as a starting material in the

production of other chemicals.

EtO is known to be a human carcinogen based on sufficient evidence of carcinogenicity from study in humans (10th Report 2002 on Carcinogen). EtO, a potential occupational carcinogen, has been associated in past studies with mammary tumors in animal but human evidence was limited. NIOSH studied breast cancer incidence in 7,578 women. It was found that there was a two-fold increase over the expected incidence of breast cancer. This study will help scientists design further studies and find definite breast cancer links in EtO exposure study. The study was reported in the August 2003 issue of the Cancer, Causes, and Control Journal.

For further information on this project, DOD personnel can contact Elizabeth Whelan at eaw0@cdc.gov.

Reference: NIOSH News, Vol. 1, No. 5, September 2003.



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