Fall 2007

Environmental Health and Safety Buzz

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From the AVP

It has been six months since I came to Georgia Tech after spending the past twelve years at the Board of Regents, most recently as Assistant Vice Chancellor for Compliance and Operations. I am very excited and energized by the many great things happening on campus and within our EHS Office. What I have found here in the EHS Office are good, hard-working individuals who know their subject matter, and who share a commitment to well-being and betterment of Georgia Tech. It is my goal to build on this strong foundation, and guide the EHS Office to become a national model in higher education.

We are working hard to improve our processes and procedures in our major program areas - which include Biosafety, Chemical & Laboratory Safety, Fire & Life Safety, Occupational Safety, and Hazardous Materials Management - to provide value-added service to assist the Georgia Tech community in meeting its public health, safety, and environmental protection responsibilities. All in the campus community are our customers – faculty, researchers, staff and students.

The approach EHS uses in our customer interactions is based on the assumption that everyone in the Georgia Tech community takes pride in their work, that they want to work in a safe environment, that they do not want to create adverse environmental impacts, and that they want to comply with applicable laws and regulations. Our job is to communicate with our customers to let them know what is expected of them and provide the information, services and support to allow them to successfully carry out their responsibilities. It is as simple as that.

As we move toward the end of the fall 2007 semester, I want to thank you for your support. I also wish you a healthy and happy holiday season.
See you around campus.

Mark L. Demyanek, CIH, CSP
Assistant Vice President, Environmental Health & Safety

Georgia Tech to Undergo US EPA Self-Audit

In November of 2006, the US Environmental Protection Agency (EPA) sent a letter to the Board of Regents offering the institutions of the University System of Georgia (USG) the opportunity to participate in a self-audit / self disclosure program. The letter also indicated that if USG institutions chose not to conduct the self-audits, that they would be specifically targeted for compliance inspections and enforcement. As a result, the Board of Regents made the decision to enter into an agreement with the US EPA to conduct self-audits / self-disclosures at all USG institutions. Colleges and universities in other regions of the country, particularly in the northeast, have already participated in similar programs.

At this time, it is anticipated that Georgia Tech's self-audit will take place during the Spring 2008 semester. The audit will be "multi-media", which means that Georgia Tech will be evaluated for compliance with a number of different environmental federal regulatory programs including:

- Clean Air Act (CAA)
- Clean Water Act (CWA)
- Safe Drinking Water Act (SDWA)

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NEW EHS COMMITTEE

There is a new Environmental Health and Safety (EHS) oversight committee structure in place at Georgia Tech. Four new committees have been established to increase oversight of policies and practices related to safety, occupational health, and environmental compliance.

The Institute Council on Environmental health and Safety (IC-EHS) serves as a forum for development and implementation of policies and procedures on EHS matters, and for the integration of policies developed by other EHS-related committees at Georgia Tech. The IC-EHS is comprised of the Chairs of the other EHS-related committees, as well as representatives of EHS, GTRC, Human Resources, Health Services, and Legal affairs. The IC-EHS is chaired by Dr. Ronald Rousseau, Chair of the School of Chemical and Biomolecular Engineering.

The Occupational Health and Safety Committee (OHS) focuses on all aspects of employee safety. The committee chaired by Dr. Dennis Folds, Principal Research Scientist and Chief of the Human System Integration Division in the Electronic systems Laboratory of GRTI, is also charged with creating an Occupational Health Program for researchers working with animals and other biological materials. This program is in the development stage and an agreement with a health care service provider is being finalized.

The Chemical and Environmental Safety Committee (CESC), chaired by Dr. Bill Baron, Professor of Chemistry and Biochemistry. recommends policies and procedures that ensure the proper use, storage, and disposal of chemicals at Georgia Tech. It is also focused on best management practices for laboratory safety.

The Biological Materials Safeguards Committee (BMSC), chaired by Dr. Alfred Merrill, Professor and Smithgall Chair in Molecular Cell Biology, is charged with reviewing applications for any research involving non-recombinant DNA biological materials. These materials include pathenogenic organisms, select agents, etiological agents, infectious and non-infectious materials. The committee has developed a new form for working with such materials. If you have any questions concerning your research or if you need a form to complete, please call or email Lee Zacarias, Biosafety Officer at 404-894-6119 or lee.zacarias@ehs.gatech.edu or Lisa Brindel, Assistant Biosafety Officer at 404-894-6120 or lisa.brindel@ehs.gatech.edu.

The Institute Biosafety Committee (IBC) deals only with research protocols that involve recombinant DNA. The IBC has a new Chairman, Dr. Andreas Garcia. Dr. Garcia is a Woodruff Faculty Fellow and an Associate Professor in Mechanical Engineering department.

The two compliance oversight committees that have seen no change in structure or scope are the Radiation Safety Committee (RSC) and the Institute Animal Care and Use Committee (IACUC).

Georgia EPD Visits Campus

On Monday, September 17th, the Georgia Environmental Protection Division (EPD) conducted an unannounced compliance inspection at Georgia Tech.

The inspectors were on campus to inspect hazardous waste management procedures and hazardous materials storage areas. The final EPD report has not been released, but the EHS staff who accompanied the inspectors made note of issues identified during the inspection. In the first laboratory visited, graduate students were observed pouring hazardous waste from one leaking container to another and spilling the mixture onto the floor. Other issues cited were the presence of unlabeled chemical containers in a number of laboratories and overstocking of chemicals-some of which had apparently not been used for a very long time. The inspectors noted that many of these materials could be considered “hazardous waste stored in lieu of disposal”. Another issue noted was that the current hazardous waste facility does not have enough space to effectively handle the amount of waste material being produced at Georgia Tech.

Other areas visited by the inspectors were Maintenance Areas I & II and the Athletic Association Grounds Department. The maintenance areas were commended by the inspectors as being in good order and the Athletic Association received kudos for storing its pesticides and chemicals properly.

Though the inspection showed mixed results, it serves as a reminder to all of the importance of proper chemical and hazardous waste management in Georgia Tech operations.

EPA Self Audit Continued

- Resource Conservation and Recovery Act (RCRA)
- Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, otherwise known as "Superfund")
- Emergency Planning and Community Right-to-Know Act (EPCRA)
- Toxic Substances Control Act (TSCA)

The audit will be performed by a team of trained professionals from other USG research institutions, and is likely to take up to a week on-site to complete. The auditors will use audit protocols prepared by the firm Woodard & Curran, which has substantial experience with similar EPA self-audit programs completed at other colleges and universities. While a specific list and schedule have not yet been developed, Georgia Tech departments and operations likely to be evaluated include Chemistry labs, Biology labs, Facilities, Grounds, Athletic Association, and Housing among others. Any violations found during the audit are required to be disclosed to the EPA as part of the agreement. In exchange, the EPA has agreed not to assess penalties or fines to Georgia Tech for the noted violations. However, we will be required to develop and implement corrective action plans, as appropriate.

EHS plans to provide additional information to all departments on the self-audit program, including training on specific elements of the audit protocols and guidance on how best to prepare for the review. In the meantime, our best advice to departments is to make sure all environmental compliance records are in order, verify that chemicals and wastes are stored properly, and check all environmental control equipment for proper operation.

Christmas Tree Safety

Christmas tree contribute to nearly 200 fires annually. The National Institute of Standards and Technology fire safety engineers selected a green Scotch pine, had it cut in their presence, had an additional two inches cut from the trunk's bottom, and placed the tree in a stand with at least a 7.6 liter water capacity. The researchers maintained the Scotch pine's water on a daily basis. A single match could not ignite the tree. A second attempt in which an electric current ignited an entire matchbook failed to fire the tree. Finally they applied an open flame to the tree using a propane torch. The branches ignited briefly, but self-extinguished when the researchers removed the torch from the branches. REMEMBER, A WET TREE IS A SAFE TREE!

Did you know that by taking the defensive driving class, you could save money on your car insurance.?

Upcoming EHS Training Programs

Class	December	January	February	March
Fire Safety	12/6/2007			
Using Chematix		1/29/2008	2/27/2008	
Defensive Driving	12/11/2007	1/15/2008	2/21/2008	3/18/2008
Right to Know		1/29/2008	2/27/2008	
Basic Lab Safety		1/29/2008	2/27/2008	
Lab Safety for PI's and Lab Managers		1/29/2008	2/27/2008	
Understanding MSDS'		1/29/2008	2/27/2008	
CPR	12/13/2007	1/17/2008	2/12/2008	
First Aid	12/13/2007	1/17/2008	2/12/2008	
Bloodborne Pathogens Contact Lee Zacharias				

Getting to Know Your Chemicals—Debbie Wolfe-Lopez

Physical Hazards:Ethylene Oxide (EtO) is an extremely flammable and reactive material which is a gas at room temperature. It has a flash point of -0.4°F and an extremely large flammable range of 3 to 100%. It is very water soluble and solutions of as little as 4% in water are flammable. In closed systems, such as sewers, dilutions of 1:100 are required to produce a mixture that will not support combustion. Violent self polymerization of the material can occur with exposure to heat, acids, or bases. It also reacts violently with exposure to copper, copper alloys, and rust. Liquids can accumulate a static charge by splashing or agitation. The gas can be ignited by a static charge. The gas is heavier than air and can travel long distances to a source of ignition and flash back to a leaking or open container. The heat of a fire may cause spontaneous polymerization, causing containers to rupture violently. EtO can also ignite and decompose explosively at pressures less than one atmosphere. Once the decomposition reaction has been initiated, it can be propagated from the ignition source through the gas phase as a flame and, under certain conditions, may be explosive. This reaction can occur in the absence of air or oxygen.

Warning Properties and Exposure Limits: EtO has a sweet odor with an odor threshold of 200 ppm (perception) but is not distinguishable from other organics until 500-700 ppm. Odor cannot be relied on to determine safe conditions, however: The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) and the Occupational Health and Safety Administration (OSHA) Permissible Exposure Limit for EtO is 1 ppm. This is the level of EtO to which a worker can be exposed for up to eight hours a day, forty hours per week, for a working lifetime without adverse health effects.) OSHA also has set a 15 minute excursion level for EtO at 5 ppm and an action level of 0.5 ppm. The National Institutes of Occupational Safety and Health (NIOSH) Immediately Dangerous to Life and Health Level (IDLH) for EtO is 800 ppm. This is the level to which a worker can be exposed for up to 30 minutes while escaping from a hazardous atmosphere without serious permanent injury.

Toxicity Data:Ethylene oxide is generally classified as genotoxic, mutagenic and carcinogenic. EtO toxicity is based on its ability to bind to nucleophilic biopolymers such as RNA, DNA, and proteins. The primary enzyme for EtO detoxification is microsomal epoxide hydrolase (EH). To a lesser degree, the cytoplasmic enzyme glutathione-S-transferase (GST) is also involved. Levels of these enzymes vary widely between species, for example, mice have a much lower level of EH than do humans. This is reflected in the differences seen in the literature in $LD_{50's}$ and $LC_{50's,}$ not just between studies, but also between species. Given orally in water or corn oil, EtO is only slightly toxic with an LD_{50} of 250-350 mg/kg, (rats and mice). By inhalation, EtO is moderately toxic with an LC_{50} (1 hr) of 1460 ppm in rats and 835 ppm in mice. The species differences in detoxification pathways makes assessing risk to humans based on animal testing somewhat more complicated for EtO than with other chemicals. Evaluating human studies is also difficult because the human data is confounded by the fact that EtO is found in cigarette smoke. In one study, EtO associated genetic markers were more prevalent in smokers than in occupationally exposed non-smokers. In the case of EtO, however, we have the advantage of a large body of data, much of it from hospital workers and other people who had little or no exposures to other chemicals that might confound test results.

Health Effects/ Signs and Symptoms of Exposure:

Acute Exposures

- Eyes- irritation including corneal injury
- Skin- effects go from irritation to blistering with the possibility of frostbite from exposure to the rapidly evaporating liquid
- Inhalation
- Central Nervous System (CNS) effects have been reported from human exposures including headache, nausea and coma.

Lung damage/pulmonary edema

Chronic Exposures

- Eyes- cataracts have been reported in people working at the 1 ppm (TLV) level with no protection.
- Skin- contact dermatitis has been reported. Sensitization has been reported as well but the data is equivocal and may be species related

Inhalation-chronic exposures to several hundred ppm in humans have resulted in CNS effects: ataxia (muscle incoordination) and slurred speech.

- Reproductive-

Increased frequency of spontaneous abortions have been reported in women who worked in hospitals or dental clinics around EtO sterilizers.

- Damage to the testes and ovaries have been reported from animal studies but may be species related and not directly applicable to human exposures
- Carcinogenicity
- IARC: classified as carcinogenic to humans (Group 1), based to a great degree, on studies done on hospital workers who have very few other chemical exposures.

ACGIH: classified a possible human carcinogen (A2).

Emergency Procedures: Areas around ethylene oxide sterilizers are required to be equipped with monitors set to alarm at 0.5 ppm. In the event of an alarm, exit the building immediately, pulling the fire alarm on your way out. Be sure to stay in the area to inform emergency responders of the nature of the emergency. In the event of an inhalation exposure to EtO, move victim outdoor to fresh air. Exposure victims should rest in half upright position and seek medical attention. In the event of a skin exposure-

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Getting to Know your Chemicals

Remove contaminated clothes. Rinse with tepid water for 15 minutes. For frostbite: rinse with plenty of water, do NOT remove clothes. Rinse skin with plenty of water or shower. Seek medical attention.

Methods of Determining EtO Exposures: Biological monitoring to determine whether a person has been over-exposed to EtO by testing their blood or urine is possible, but not standard practice unless workplace exposures exceed ½ the TLV (0.5 ppm). A much more direct method to assess exposure is to take air samples in the worker's breathing zone. This can be done by a number of methods, some involve monitoring badges (passive sampling) while others involve using a small air pump worn by the worker to pull air through a tube of chemically treated sampling media, specific for EtO (active sampling). Area monitoring for EtO is also possible by direct reading devices. Many such devices are available and can be set to alarm if levels exceed a preset level.

Protecting Against Ethylene Oxide Exposure: The best protection against inhalation of EtO is making sure that all personnel using EtO follow a Standard Operating Procedure (SOP) which has been checked by personal sampling and has been proven to keep worker exposures below the action level of 0.5 PPM. In addition, areas with ethylene oxide sterilizers are required to be equipped with monitors set to alarm at 0.5 ppm. Personal protective equipment for working with EtO includes appropriate lab attire, safety glasses, lab coat and butyl, viton, or heavy nitrile gloves (check with the glove manufacturer for chemical resistance testing data before purchasing, or call GT EH&S for help). Respirators will not be issued at Georgia Tech for people working with EtO; the only acceptable methods of respiratory protection against EtO are a military style gas mask (not available at GT) or a Self Contained Breathing Apparatus (SCBA). An air purifying respirator with an organic vapor cartridge is not sufficient to protect against EtO.

The Ethylene Oxide Training Competency Evaluation is attached. See also the GT Program for the Safe Use of Ethylene Oxide Sterilizers.

LD_{50} = Lethal Dose, 50%, or the dose that killed 50% of the test animals, usually within 1-2 hours;
LC_{50} = Lethal Concentration, 50%, or the concentration of airborne contaminant that killed 50% of the test animals, within a specified time.

Space Heater Safety-Michael Hodgson

TO: Georgia Tech Building Manager and Occupants
FROM: Michael L. Hodgson, GT Fire Safety Coordinator
RE: Space Heater Requirements
DATE: 10-16-07

The following are mandatory requirements for space heaters within any Georgia Tech managed facilities.

All space heaters MUST be ceramic type devices.
All space heaters MUST have individual thermostats.
All space heaters MUST automatically shut the fan off if the airflow becomes blocked.
All space heaters MUST have safety shut off devices if the heater is tipped over.
All space heaters MUST be UL (Underwriters Laboratories) listed.

Any space heater in a Georgia Tech facility not meeting the standards outlined above is prohibited and will be removed.

STAY SAFE REMINDERS:

1. The use of extension cords to provide electricity to space heaters is STRICTLY PROHIBITED.
2. Keep all space heaters a minimum of 3 feet (on all sides) away from combustible materials like furniture, paper, boxes, and trash cans, clothes and any fabric-covered items.
3. Keep all space heaters a minimum of 3 feet (on all sides) away from combustible materials like furniture, paper, boxes, and trash cans, clothes and any fabric-covered items.
4. Place space heaters in areas that do not hamper air flow from the back or front of the unit.
5. All space heaters MUST be turned off prior to leav ing for breaks, lunch and home at the end of each work day.

As always, please feel free to address any questions, comments or concerns to the Georgia Tech Fire Safety Office at 404.894.2990 or 404.894.5045

Michael L. Hodgson
Fire Safety Coordinator
Email:
michael.hodgson@ehs.gatech.edu