Florida State University
Environmental Health and Safety
**LAB GUARDIAN**

**The Florida State University Lab Guardian**

Fall, 2003

# Research Proposal Transmittal Form

Researchers who are planning to conduct research that involves the use of **any** chemicals, radioactive materials, biohazardous materials or Select Agents must check box 22 on the Proposal Transmittal Form (OCG Form 1) that is submitted to Sponsored Research. Researchers who are planning to conduct research involving recombinant DNA must check box 19. EH&S will be notified and will collect information that is required by various regulating agencies.

The EH&S collection of information is completed AFTER the grant is submitted to the appropriate funding agency. However, if your funding agency requires any information, approval, or certifications with the submittal, EH&S will work with you to ensure that the necessary paperwork is completed in an efficient and timely manner for agency notification.

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# Hydrofluoric Acid

Hydrofluoric acid (HF) is an extremely corrosive acid used for many purposes including mineral digestion, surface cleaning, etching, and biological staining. HF's unique properties make it significantly more hazardous than many of the other acids used on campus. This article briefly discusses how to protect your self against the dangers of HF.

**HEALTH HAZARDS:** The health hazards of HF are dependent upon the type of exposure and the concentration.

**Eye and Skin Exposure** -- HF is corrosive and readily destroys tissue. Exposure of the eyes to HF may result in blindness or permanent eye damage. HF readily penetrates human skin, allowing it to destroy soft tissues and decalcify bone. Chemical burns from HF are typically very painful and slow to heal. Skin exposure to high concentrated HF (approximately 50% or greater) immediately results in serious and painful destruction of tissue. Not only can skin contact cause burns, but systemic fluoride poisoning may also result.

> *One of HF's most insidious properties is that skin contact at lower concentrations may not produce pain or burning sensations until hours after the exposure. Because of the ability of HF to produce delayed serious tissue damage without necessarily producing pain,* ***all skin, eye, or tissue contact with HF should receive immediate first aid and medical evaluation even if the injury appears minor or no pain is felt****.*

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**Contents:**



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## Hydrofluoric Acid *(continued from page 1)*

**Inhalation of HF Vapor** -- Inhaling HF vapors can seriously damage the lungs. Delayed reactions up to and including fatal pulmonary edema (flooding of the lungs with body fluids) may not be apparent for hours after the initial exposure. Airborne concentrations of 10-15 ppm will irritate the eyes, skin, and respiratory tract. 30 ppm is considered "Immediately Dangerous to Life and Health" (IDLH) and may have irreversible health effects.

**Chronic HF Exposure --**Long-term or chronic exposure to HF may result in fluorosis, a syndrome characterized by weight loss, bone embrittlement, anemia, and general ill health.

## SAFETY PRECAUTIONS FOR HF USE

**Ventilation --** *HF should be used with adequate ventilation* to minimize inhalation of vapor. Concentrations greater than 5% should always be handled inside a properly functioning chemical fume hood. (Call EH&S if you use hydrofluoric acid outside of a chemical fume hood.)

**Eye Protection** -- Always use chemical goggles together with a face shield when handling concentrated HF. Due to HF's highly corrosive nature, safety glasses with side shields do not provide adequate eye protection.

**Body Protection --** Wear a laboratory coat with a chemical splash apron made out of natural rubber, neoprene, or viton. Never wear shorts or open-toed shoes when handling HF or other corrosive chemicals.

**Gloves** -- Typically, medium or heavyweight viton, nitrile, or natural rubber gloves are worn when working with HF. A second pair of nitrile exam gloves should be worn under the gloves for protection against leaks. Always consult the manufacturer's glove selection guide when selecting a glove for HF. If you have any questions about selecting a glove to use for handling HF, contact the EH&S Chemical Safety staff (644-0971, 644-7682).

**Eyewash/Shower Combination** -- Since HF is corrosive and rapidly damages tissue. EH&S recommends a combination eyewash/shower to be nearby and accessible. The combination eyewash/shower should be used to rinse the exposed area for 5 minutes, and then treatment of skin with calcium gluconate gel should be initiated.

**Calcium Gluconate Gel** -- Calcium gluconate gel is a topical antidote for HF skin exposure. Calcium gluconate works by combining with HF to form insoluble calcium fluoride, thus preventing the extraction of calcium from tissues and bones and the resulting burns. EH&S recommends that lab workers research the limitations of calcium gluconate before purchasing. EH&S further recommends that immediate medical evaluation be sought after an HF exposure, even when calcium gluconate is used to ameliorate injury. Calcium Gluconate is commercially available. Call Chemical Safety for information.

**Safe Work Practices** -- Avoid working alone when you're using HF. Do not eat, smoke, or drink where HF is handled, since the chemical can be swallowed. Wash hands thoroughly after handling HF.

## EH&S CAN HELP

EH&S is available to help train staff members on the hazards of HF, its proper storage, handling, and cleanup procedures. EH&S can also evaluate HF use in your workspace for safety. If assistance is needed, or if you have any questions about HF, please call EH&S at 644-0971 or 644-7682.

## Research Proposal Transmittal Form *(continued from page 1)*

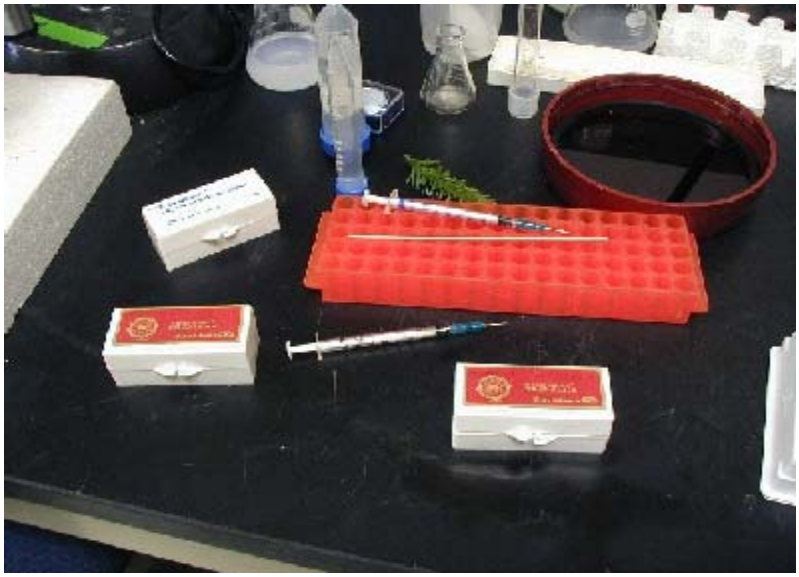
After EH&S is notified that box 22 or box 19 was checked on a Transmittal form, we will review our records to determine if any additional information is needed to ensure compliance. Typically, a records review will include a determination that staff and students have been properly trained; a check for current chemical inventories; and a review of any outstanding safety issues.

As always, if you have any questions please feel free to contact us at 644-8800.

## Cuts and Needlestick Injuries

It's has been a long day, and you are finishing up your last experiment for the day and looking forward to a quiet evening. As you are concluding for the day, you accidentally drop a test tube containing a blood sample, and cut yourself. What do you do?

Working in a research environment can expose one to risks associated with wide variety of potential hazards: chemicals, radioactive materials, human blood, potentially infectious blood and biological agents. However, one of the most common laboratory injuries results from cuts and needle sticks. That is why it is important for every one to review the departmental "Exposure Control Plan" in dealing with cuts and needle stick injuries. The Environmental Health & Safety Department (EH&S) has developed a generic "Exposure Control Plan" that each department can use and modify according to need. The "Exposure Control Plan" is available on line at http://www.safety.fsu.edu/expctrlplan.html



In general, the following procedure should be implemented when a cut or needle stick has occurred:

- Alert co-workers.
- If contamination of intact skin with blood or body fluid occurs, wash with plenty of soap and water. This would not be considered a significant exposure.
- For needle sticks, mucous membrane or wound exposures that have punctured the skin:
  - Wash the area with plenty of soap and water.
  - For mouth exposure, use saline solution or rinse with plenty of water .
  - If you strongly feel that untested human blood, potentially infectious blood or biological agents have infected you, OBTAIN MEDICAL ATTENTION IMMEDIATELY.
  - Contact your supervisor, the University's Worker Compensation Office at 644-7684, and the Biological Safety Office at 644-5374 as soon as possible to file injury report.

# What to do in case of a spill…

Researchers who have been through the various safety training classes given by Environmental Health & Safety (EH&S) know what to do in an emergency situation, right? When was the last time you reviewed your laboratory emergency procedures? If you haven't done so, now would be a good time to think about and discuss with your co-workers what type of spill could occur in your laboratory, what the appropriate actions are, and assemble the appropriate items for a spill response. The following are general steps that can be used in a spill situation.

1. **Inform others of the spill.** Adjust your response to the seriousness of the spill. Instruct personnel present in the room at the time of the spill to remain in a restricted (evacuation) area to prevent spreading the contamination.

2. **Contain the spill.** Give attention first to personnel health and safety. If the spill is serious, close off and vacate the premises, and call 911 and EH&S at 644-6895. If appropriate, close doors and windows and turn off the room ventilation fans.

   For minor spills, proceed with clean up operations. Be sure to put on the proper personal protective equipment for the clean up.

   If the material is a liquid, place an absorbent material such as paper towels, tissues, cloth or similar materials over the spill to prevent its spread. If the material is a powdered solid, attempt to contain its spread by covering the area with a protective barrier such as a drip tray, empty beaker, or section of absorbent paper. Remember that any materials used to soak up or pick up the spill should be handled accordingly and disposed of properly.


*Apparent spill of ethidium bromide onto lab bench and balance*

3. **Decontaminate the area.** Give careful attention to the type of spill. For chemical spill be sure to use the appropriate neutralizing chemical or agent. For blood spill use a 10% bleach solution or EPA registered tuberculocidal solution.

4. **Follow up**. Report the spill to the principal investigator or supervisors to determine if EH&S should be notified. Keep in mind that if you're not sure whether your clean up and decontamination procedure is complete, contact EH&S for assistance.

In short, **if you spill it, make sure that you clean it or that the spill will get clean up.** Keep in mind that this sequence of steps is appropriate for many emergency situations, however, if you're not sure whether your laboratory could handle the spill, contact EH&S or call 911.

## Working in a Biosafety Cabinet or Tissue Culture Hood

Good microbiological techniques should always be used when working in a biological safety cabinet (BSC) or clean bench. Techniques that are used to reduce splatter and aerosol generation should always be put in practice to reduce the potential for personnel exposure to infectious materials being manipulated within the cabinet or clean bench.

In addition to applying techniques to reduce potential exposure, one should not use open flames when working in a biological safety cabinet or clean bench, in particular the use of Bunsen burners, especially when using or storing alcohol.

There have been reports from various research institutions that laboratory fires have resulted from the use of Bunsen burners. In one case, gas leaked from a loose tubing connection and was ignited by the burner's flame, causing a small explosion. In another incident, a researcher inadvertently turned on the gas thinking that it was the vacuum line. Realizing the mistake, the researcher turned off the gas. When the researcher subsequently attempted to light the burner, the residual gas in the cabinet ignited, burning his arms and singeing the researcher's hair.

The sterilization of inoculating loops, tubes, flasks or pipettes can be accomplished by using a small electric "furnace", a device expressly designed to eliminate the need open flames in a safety cabinet.

The result of a fire in a BSC isn't pretty.

## Are you still using that old, pitted centrifuge rotor?

Some researchers are using old Sorvall or Beckman centrifuges. Why not? They still work!

Unfortunately, many of the old centrifuge rotors have not been replaced or inspected. With use and chemical exposure, rotor material degrades and weakens. Each rotor should be inspected by a manufacturer's representative, who will certify it for continued use, sometimes with restrictions on maximum g-force permitted, or condemn it if it is no longer safe for use. It is essential that laboratory workers use only rotors that have passed these inspections.

In addition to laboratory accidents resulting from disintigrating rotors, accidents may also occur from improper centrifuge maintenance or improper use. While more recently purchased centrifuges are equipped with braking mechanisms and locking lids, many of the older models are not. Users should be made aware of the hazards associated with opening the centrifuge top while the rotor is still spinning or the dangers of unbalanced loading. Users should also restrict use of centrifuge models that do not have safety features to low speed spins and prohibit use of these centrifuges when centrifuging toxic, radioactive or infectious materials.

It is essential that laboratory workers know the limits of the centrifuge tubes and bottles they are using. Centrifuge tubes and bottles must not be used at a higher g-force than is rated by the manufacturer. Most vendors list the permitted g-force in their catalogs as part of the product description. Reusable centrifuge

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## Centrifuge Safety

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tubes and bottles should be checked for stress cracks before use, and must be made from materials compatible with the chemicals they will contain.

Lastly, laboratory accidents may result from machine failure. Researchers should be aware of a Safety Warning for a discontinued line of Savant centrifuges, the HSC10 series, produced from 1983-1993. Contact Savant at 1-800-327-2643 for information.

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Lab Safety Support

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## Lab Safety Reminders

- **MSDS—**Each researcher should know where the Material Safety Data Sheets (MSDS) are located in the laboratory or department. Researchers should review the MSDS before using a chemical to assess chemical properties, toxicity, protective equipment, emergency response and spill clean up methods.
- **Waste containers—**EH&S provides free waste containers for liquid and solid hazardous waste, including chemical, radioactive or potentially infectious waste. EH&S also provide sharps boxes for disposal of needles, syringes, and razor blades. For information, for waste pick-up, or for replacement containers, please contact EH&S using the contact information above.
- **Waste sorting and storage**—Call EH&S with questions about segregation and storage of chemical, radiological, biological or sharps waste.
- **Disposable Glove selection**—One of the most important safety choices that researchers make every day is glove selection. Many researchers use disposable latex, nitrile or vinyl gloves in laboratory work. Researchers should be aware that disposable gloves provide barrier protection against organisms and large molecules and particles, but provide limited chemical protection. To ascertain which glove material is most suitable for a particular chemical exposure, EH&S recommends that researchers check with the manufacturer or call the EH&S Chemical section for guidance, or visit the Laboratory Safety website at www.safety.fsu.edu/lab.html for links to several glove selection charts.
- **Training**—Researchers should be aware that Florida Statute mandates chemical safety training for newly employed individuals to be given within 30 days of employment. EH&S provides general training for students and staff on chemical awareness and Right-to-Know, as well as on special safety topics. **Additionally, PI's are responsible for training related to specific laboratory hazards and potential exposures.** EH&S can provide guidance on training in special topics. Contact the EH&S to schedule safety training in chemical use, radioactive materials use, biohazards, Right-to-Know, laboratory safety, or special topics.
- **Eating and Drinking in the laboratory**—All researchers should be aware that, beginning on January 1, 2004, a policy of NO eating or drinking in laboratory areas where chemical, radiological or biological hazards are present will be implemented. Please contact the Laboratory Safety Office to disucss concerns or issues related to this policy.
- **Laboratory Security—**PI's are responsible for maintaining laboratory security consistent with regulatory demands for storage of radiological, chemical, biological or controlled substances.