

# BenchSmart



A NEWSLETTER FOR THE UMDNJ LABORATORY COMMUNITY

## IN THE NEWS

# Foot-and-Mouth Disease Outbreak in the UK Inadequate Sterilization and Leaky Effluent Pipe Are to Blame

A report by the British agency Health and Safety Executive (HSE) concluded that the August 2007 foot-and-mouth disease virus (FMDV) outbreak in Surrey, England, was caused by an accidental release of live virus from effluent in a leaky drainage pipe.<sup>1</sup> The effluent is believed to have originated from the Merial Animal Health facility, a private large-scale vaccine production plant located in the Pirbright government research complex, approximately 3 miles from the first farm outbreak.

Because of the outbreak, a nationwide ban on animal movements and trade was imposed for several weeks. Costs to the farming industry may reach £80 million, according to a National Farmers' Union estimate.<sup>2</sup> Ironically, Merial was authorized to start up vaccine production in an attempt to prevent a repeat of the disastrous 2001 outbreak, in which 10 million animals were culled and which cost the British economy £8 billion.

FMDV is a highly communicable and sometimes fatal viral disease of cattle, swine, sheep, goats, deer, and other cloven-hoofed ruminants. The virus can spread easily through animal-to-animal contact; through contaminated products like milk; through the open movement of animals, people, and vehicles from farm to farm; and even through the air.

HSE and independent investigators scrutinized containment measures that were designed to prevent the release of pathogens from the complex, including solid waste disposal, airborne routes through buildings or via faults in HEPA filtration systems,



liquid waste disposal, and human movements. The investigators concluded that the most likely explanation for the outbreak was that FMDV leaked out from a damaged liquid waste pipe that connected the preliminary chemical treatment sump at Merial to a secondary sodium hydroxide treatment tank located 100 meters away. Localized flooding from heavy rains caused leakage from the pipe onto the surrounding

soil. Then, construction and other vehicles drove over the contaminated soil, transporting the virus on their tires past the first farm that became infected with the foot-and-mouth disease virus.

An inspection of the piping between the primary and secondary sterilization systems revealed displaced joints, cracks, debris buildup, and tree root ingress. It was also confirmed that officials knew about the poorly maintained system for years but did nothing to resolve it. The HSE determined that there were no written standard operating procedures in place for maintenance of the pipe or clearing blockages. Specified Animal Pathogens Order (SAPO) Containment Level 4, the highest containment level in Britain, is required for facilities working with FMDV. The HSE deemed the record keeping, maintenance,

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## CLOSER TO HOME

### UMDNJ Emergency Preparedness Initiative

Hurricanes, bomb threats, hostage crises, hazmat incidents, floods, power and water outages ... The University is meeting its responsibility for preparedness through a number of initiatives led by Brendan McCluskey, Executive Director of Emergency Management and Occupational Health and Safety (EMOHS), including revising the University policy for emergency management, developing a Continuity

of Operations Plan (COOP), updating UMDNJ's Emergency Operations Plan, organizing campus-based emergency planning teams, and helping individual departments through a department-specific Disaster Plan. Take a look at the new EMOHS website at <http://ready.umdnj.edu> and check out the nation's preparedness site at <http://www.ready.gov/america/npm07/index.html>, which is sponsored by the Department of Homeland Security.

## Don't Get Stuck: Use Safer Sharps!

Safer sharps are an important tool for working in the research environment. These redesigned needles and scalpels reduce the risk of needlestick injuries for laboratory workers.

Since laboratory workers account for up to 21% of needlesticks,<sup>1</sup> individuals should consider safer sharps alternatives whenever possible. Replacing glassware with plasticware is an easy alternative that many labs have already adopted. Avoiding the use of needles is another solution. If the use of sharps is required, select a specially designed safety device.

Many new safety devices are currently on the market:

- ◆ Needleless systems
- ◆ Needles that retract into the syringe barrel
- ◆ Hinged or sliding shields that cover a needle or blade
- ◆ Self-blunting needles<sup>2</sup>

These safety sharps provide protection to workers by eliminating the need for a needle or blade, permanently isolating the sharp so it never poses a hazard, or providing a method to encase the needle or blade after use.<sup>1</sup>

Safety sharps are especially important for researchers using animals in their experiments. Live animals bring an added safety risk to research. Using safety devices can reduce this risk and protect workers

from exposure to hazardous biological and chemical reagents.

The NJMS Institutional Biosafety Committee has recently focused on the use of safety sharps for research involving pathogens, recombinant DNA, human cell lines, and human body fluids. Experiments involving animal studies must evaluate potential safety devices and provide justification if they are not used. Safety sharps should also be considered when injecting hazardous chemicals or drugs.

If you are using conventional sharps in your research, consider the use of safer alternatives. Most major suppliers like VWR, Fisher Scientific, and Lab Safety Supply sell a variety of safety sharps. For a few examples of commercially available safety sharps, visit [http://www2.umdnj.edu/eohssweb/publications/safety\\_sharps\\_examples.doc](http://www2.umdnj.edu/eohssweb/publications/safety_sharps_examples.doc).

If you have questions about the use of safety sharps in the laboratory, contact your campus EOHSS office. In Newark or Scotch Plains, call 2-4812. In Piscataway or New Brunswick, call 5-4058. In Camden or Stratford, call 6-2871. ◆



### References:

1. CDC publication. Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program. <http://www.cdc.gov/sharpsafety/index.html> (accessed Sept. 4, 2007).
2. National Institute for Occupational Safety and Health. NIOSH Alert: Preventing Needlestick Injuries in Health Care Settings. <http://www.cdc.gov/niosh/2000-108.html> (accessed Sept. 4, 2007).

## Foot-and-Mouth Disease

Continued from page 1

and inspection regimens at Merial to be inadequate and not meeting the highly stringent standards for SAPO Level 4.

The sterilization procedure involved an initial on-site treatment with 0.4% citric acid followed by treatment with sodium hydroxide at the secondary treatment facility. The HSE report indicates that heat sterilization of liquid waste is more effective than liquid sterilization, especially in situations like the Merial effluent, where organic material is present in the waste. The report states: "We have concerns as to whether a system of chemical treatments

could ever be considered to sterilize liquid waste as required for SAPO Category 4 pathogens."

The British Department for Environment, Food, and Rural Affairs (Defra) has published a government statement in response to investigations into the probable release of FMDV from Pirbright.<sup>3</sup> The document outlines the steps that will be taken to prevent a similar release in the future.

In the U.S., the House Committee on Energy and Commerce held a hearing on the risks of high-level biosafety labs on October 4, 2007. The hearing was coordinated in response to information published by the Sunshine Project, a biosafety watchdog group, which sparked concerns that far more accidents are occurring in U.S. high-containment labs than federal

government records indicate. See the AP article "Lab Incidents with Deadly Germs" for more information.<sup>4</sup>

For further information on this topic, visit the EOHSS website at <http://www2.umdnj.edu/eohssweb/publications/fm.pdf>. ◆

### Sources:

1. HSE report. Final report on potential breaches of biosecurity at the Pirbright site 2007. <http://www.hse.gov.uk/news/archive/07aug/finalreport.pdf>.
2. BBC News. Foot-and-mouth 'to cost millions.' Oct. 13, 2007. <http://news.bbc.co.uk/1/hi/business/6992873.stm>.
3. Defra. Foot and Mouth Disease: Government Statement in response to investigations into the probable release of FMD virus from Pirbright. [http://www.defra.gov.uk/animalh/diseases/fmd/investigations/pdf/govstatement\\_fmd2007.pdf](http://www.defra.gov.uk/animalh/diseases/fmd/investigations/pdf/govstatement_fmd2007.pdf).
4. Margasak L. Lab Incidents With Deadly Germs. *Forbes.com*. Oct. 2, 2007. <http://www.forbes.com/feeds/ap/2007/10/02/ap4176170.html>.

# INCIDENTS

## Researcher Injured in Incompatible Waste Explosion Eyesight Saved Thanks to Eye Protection

An explosion occurred in a non-UMDNJ laboratory in a chemical hood a few seconds after several milliliters of ethanol were added to a waste container of nitric acid.

Approximately 20 milliliters of ethanol were inadvertently added to a 4-liter container half full of nitric acid waste. The chemical hood sash was in the fully opened position, thus there was no barrier between the researcher and the explosion. Glass shards and nitric acid sprayed onto the researcher's face, neck, and forearms, as well as into the lab.

The injured researcher was helped out of the laboratory and waited for about 5 minutes for the principal investigator (PI) to reach the scene. Upon arriving, the PI immediately assisted the injured researcher into the laboratory's safety shower.

Luckily, the researcher had been wearing a lab coat, safety glasses, and nitrile gloves. However, she still sustained chemical burns to exposed areas of her face, arms, and neck that were not protected by the personal protective equipment. In addition, the researcher stayed in the safety shower for only 30 seconds because the water was icy cold and she became chilled. For fear that she was going into shock, the injured researcher left the shower, and lab personnel applied sodium bicarbonate to the burned areas until Emergency Medical Services arrived at the scene and provided medical attention.

### Lessons Learned

1. Incompatible waste chemicals must never be mixed in the same waste container. Nitric acid is responsible for many lab fires since it is a very powerful oxidizing agent and reacts with many organic compounds and explodes or causes a fire when it comes in contact with combustible, organic, or readily



oxidizable materials such as alcohols, turpentine, charcoal, organic refuse, metal powder, and hydrogen sulfide. If you have any questions pertaining to disposal, please consult your local EOHSS office.

2. Only chemicals, containers, and equipment needed for the work currently being performed should be in the chemical fume hood. This reduces the likelihood that the wrong waste container will be used and also keeps additional materials from becoming involved if a fire or explosion occurs.

3. Keep the sash of the hood lowered as far as possible. Besides improving the ability of the hood to contain air contaminants, this allows the hood to function as a shield protecting the operator from splashes and explosions.

4. Know the location of the safety shower and eyewash station before working with any chemicals. Use the eyewash and/or shower for 15 minutes immediately following an exposure. (Showers and eyewashes in newer facilities have tempered water to make it

more bearable to stay in for the required time.)

5. The Public Safety emergency number must be called for all emergencies to summon emergency medical help. The numbers below are listed on the Emergency Response Guide, which is posted in each laboratory:

**Newark: 2-4490**

**Piscataway/New Brunswick: 5-4000**

**Scotch Plains: 2-4490**

**Camden/Stratford: 7-7777**

6. Do not put sodium bicarbonate or any other laboratory chemical on a burn. Only the emergency responders should decide how to treat an injury. Infection is a major risk after a burn, and a container that has been sitting around the lab is not sterile. The most important measure to be taken is to rinse off the exposed area and summon emergency help. ♦

*Source:* American Industrial Hygiene Association (AIHA) Laboratory Health & Safety Committee. Incompatible Chemicals. <http://www2umdnj.edu/ehssweb/aiha/accidents/explosion.htm#Being>.

## REGULATORY SPOTLIGHT

### Part 2

# Hazardous Waste (RCRA) Compliance Audit

EOHSS recently completed a baseline Resource Conservation and Recovery Act (RCRA), or hazardous waste, audit of all central and southern campus research labs. EOHSS did this to mirror the Newark campus audit program, which came about in response to an initial inspection by the Environmental Protection Agency in 2002. As with the Newark campus audits, EOHSS hired a third-party vendor, the Clean Harbors Environmental Services (CHES) training and consulting group, to conduct physical inspections where hazardous materials were used and/or stored and to identify all areas where hazardous waste may be generated (i.e., Satellite Accumulation Areas [SAAs]).

CHES conducted a RCRA baseline audit in Piscataway and New Brunswick on April 17–19, 2007. The group audited the Stratford and Camden campuses on May 3, 2007. CHES inspected over 161 SAAs to determine the types and quantities of hazardous waste they were generating. It designated these 161 SAAs with signage, while EOHSS provided pertinent

information about the University's Hazardous Waste Management Program. This data forms the basis of UMDNJ's RCRA Compliance Audit Program university-wide.

The results of the baseline RCRA audit showed that less than 1% of lab areas would exhibit potential inspection issues if a state or federal agency were to conduct a surprise inspection. This is a positively astounding result! EOHSS extends kudos to all research labs on the central and southern campuses for a job well done.

To summarize the process, whenever EOHSS discovers a violation, it works with the PI or supervisor to correct the item "on the spot" and issue an electronic Notice to Comply (NTC). The PI or supervisor must acknowledge the NTC within the appropriate time frame and take corrective actions to ensure that the item does not persist.

Following development of the baseline audit by CHES, EOHSS shall commence a semiannual audit program at the Piscataway campus and an annual audit at the New Brunswick, Stratford, and Camden campuses. As such, EOHSS will audit Piscataway labs in the spring and fall of each subsequent year, while the other three campuses will be audited by June 30 each year hence. In 2008, EOHSS shall evaluate the RCRA Compliance Audit Program and adjust the list of SAAs to account for new SAAs and SAAs whose locations have moved, closed, or changed. ♦



**THE DEPARTMENT OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY SERVICES (EOHSS)** provides support to the University community through the development and implementation of health and safety programs. Some of the key areas in which EOHSS provides assistance are: hazard evaluation and control; consultation and technical assistance; safety education and training; hospital safety; fire/life safety; emergency chemical spill response; chemical waste management; and laboratory safety.

#### Contact EOHSS at:

##### NEWARK

65 Bergen Street, Room 443  
Newark, NJ 07107  
973-972-4812 / Fax: 973-972-3694

##### SCOTCH PLAINS

1776 Raritan Road, Room 323  
Scotch Plains, NJ 07076  
908-889-2486 / Fax: 908-889-2496

##### PISCATAWAY/NEW BRUNSWICK

335 George Street, Suite 2250  
New Brunswick, NJ 08901  
732-235-4058 / Fax: 732-235-5270

##### CAMDEN/STRATFORD

40 E. Laurel Road, Suite 1031  
Stratford, NJ 08084  
856-566-6189 / Fax: 856-566-6352

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*BenchSmart* is published quarterly by the Department of EOHSS for UMDNJ laboratory personnel. This newsletter will address current and relevant laboratory health and safety information for the research community. If you have any comments, would like to submit an article, or would like us to address a particular topic, please contact Lindsey Kayman at 732-235-4058 or at [kayman@umdnj.edu](mailto:kayman@umdnj.edu) or contact Jennifer Ayres at 732-235-4128 or at [ayresje@umdnj.edu](mailto:ayresje@umdnj.edu).



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## EOHSS BELIEVE IT OR NOT!

Your eyes are not deceiving you!

EOHSS staff found a mercury thermometer in this incubator in a lab in New Brunswick. The incubator was turned on and was hot! Keep in mind that the inhalation route of exposure to mercury causes particularly devastating health effects compared to ingestion or skin absorption.

