



Enforcement Alert

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Mismanagement of Laboratory Waste Creates Risk of Serious Injury

Routine inspections at laboratories have found a pattern of hazardous waste management problems in recent years. EPA has discovered chemicals forgotten in university stockrooms for decades,

a research lab with wastes in damaged containers, some labeled “unknown,” and a hospital storing a chemical at almost twice the temperature at which it could explode. Improper disposal of waste is also common.



Air and water reactive chemicals stored in refrigerator – even small containers can be big problems.

About Enforcement Alert

Enforcement Alert is published periodically by EPA’s Office of Regulatory Enforcement, Office of Enforcement and Compliance Assurance to inform and educate the public and regulated community of important environmental enforcement issues, recent trends and significant enforcement actions.

This information should help the regulated community anticipate and prevent violations of federal environmental law. Please reproduce and share this publication. To receive this newsletter electronically, see <http://www.epa.gov/compliance/resources/newsletters/civil/enfalert/index.html>.

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Laboratories in colleges and universities, industrial facilities, and medical research centers use a wide variety of chemicals to do a wide range of work. If the chemicals and resulting wastes are not managed properly, they can endanger both laboratory workers and the surrounding community. The most serious of these problems can lead to serious injury or death.

Environmental regulations under the Resource Conservation and Recovery Act (RCRA) outline how to manage hazardous waste at laboratories. To improve chemical management, EPA has offered workshops, compliance assistance, and encouraged self-auditing, and, in some instances, has taken enforcement actions.

In September 2004, EPA and the University of California (UC) settled a case resolving 98 viola-

tions of RCRA. The university voluntarily disclosed the violations of hazardous waste requirements at 34 of its facilities. The violations involved 4,000 containers of hazardous waste, including ignitable paint, corrosive acid, reactive cyanide, photochemical waste and toxic contaminated waste. UC estimated that it spent \$1.78 million and 23,645 staff hours since 2001 completing an environmental audit of 47 university facilities—its campuses, agricultural research stations, medical and veterinary schools and other miscellaneous facilities. EPA reduced the penalties for most of the violations based on the Incentives for Self-Policing:





Discovery, Disclosure, Correction and Prevention of Violations Policy (Audit Policy). UC agreed to pay a \$9,570 penalty to resolve these violations.

The Agency has made a special effort to reach out to colleges to encourage them to use the Audit Policy. The Audit Policy establishes a framework for the voluntary disclosure and correction of violations in return for greatly reduced penalties.

This Enforcement Alert presents the findings from EPA laboratory inspections and highlights both the dangers and potential enforcement consequences of the mismanagement of hazardous waste. This Alert also highlights recent EPA enforcement actions taken as a result of inspections at universities that chose not to voluntarily disclose RCRA violations.

In September 2004, EPA initiated an enforcement action seeking \$238,225 against the Maine Community College system for RCRA violations found at the Southern Maine Community and Eastern Maine Community College campuses by EPA inspectors. Inspectors discovered, among other violations, five containers of waste picric acid stored in a classroom immediately accessible to faculty and students. The waste picric acid had crystallized in one of the containers. The containers were stored on open shelves. EPA inspectors secured the area by



Flammable storage locker contains bottles labeled unknown chemicals.

restricting access. Within days, Eastern Maine Community College arranged for a contractor to detonate the containers of picric acid on site.

Problematic Practices

During recent inspections, EPA observed many storage and disposal practices that could cause problems at labs. Chemicals stored for an inappropriately long time may become unstable and explode. Picric acid, a chemical found in many laboratories, dries and forms crystals that may explode when the container is handled. Reactive waste chemicals have been placed close together. If they were to mix, these chemicals could cause explosions and start fires. EPA has observed the laboratory practice of disposing of used chemicals by pouring them into sinks and drains connected to public sewage systems. This could pose serious contamination problems for water treatment plants. These problems need to be addressed in order to meet the environmental obligations for safe

management of chemicals and chemical waste.

No Expiration Date

During an EPA inspection at a laboratory in Ponce, Puerto Rico, inspectors found one-pound jars of crystallized picric acid and other waste chemicals stored in a cardboard box under shelves holding flammable solvents. The acid containers were very dry and of indeterminate age. EPA's Emergency Response Team directed the removal and on-site detonation of the jars.

At Columbia University, heavy odors led EPA inspectors to containers that had deteriorated to a point where their contents were unidentifiable and they were releasing fumes. The results of this EPA inspection led to an enforcement action requiring Columbia University to come into compliance with environmental regulations and pay a penalty of \$100,000. Columbia University also agreed to conduct three supplemental environmental projects, including the implementation of an environmental management system to improve environmental performance.

An EPA inspection of a lab in Missouri found waste from student activities stored in stockrooms for 30 to 40 years. A hazardous waste contractor had declined to remove them because the condition and contents were unknown.





Improper Storage

EPA discovered crystalized picric acid during an inspection at the Vermont Veterans Administration Medical Hospital laboratory. A lab worker handed the crystalized picric acid to an EPA inspector unaware of the potentially explosive nature of the material. In a separate incident at the facility, the inspector observed the storage of ethyl ether in a room without air conditioning and a room temperature of 80 degrees. Ethyl ether has a flashpoint of negative 49 degrees. The inspector also observed storage of ethyl ether in an outdoor metal shed with an inside temperature approaching 100 degrees. The ethyl ether containers, which were several years old, were unopened but the material had evaporated through the spacing located between the containers and the lids. Crystallization often occurs inside the container threads when evaporative losses are found. Ethyl ether is extremely unstable in crystalline form leading to concerns that the material had become shock sensitive. Within two days of the inspection, the materials were detonated at the request of EPA in close coordination with the local police and fire departments and state emergency response personnel.

At another inspection, EPA personnel discovered corrosives and halogenated wastes stored together. If these incompatible wastes had come into contact, a

violent chemical reaction could have resulted in an explosion or fire. At the same inspection, nine containers of various sizes of corrosive wastes were stored in the same area as a 55 gallon container of halogenated solvent. These containers of incompatible wastes were not separated to prevent mixing in the event of a release.

Improper Container Labeling

An EPA inspection at a research laboratory in Brooklyn, N.Y., revealed approximately 150 containers of waste chemicals, including solvents, reactive chemicals and picric acid that were not labeled or labeled "unknown." Some containers were damaged.

Improper Disposal of Waste

EPA inspections in Colorado found waste from laboratory floors and sinks entering a drainage system where it mixed with raw sewage and flowed into a pond that overflowed into a ditch.

Legal Responsibilities

Several federal requirements of RCRA regulate waste chemicals at labs. One of the most significant responsibilities is to control waste accumulation. The regulations regarding satellite accumulation (40 CFR 262.34(c)(1)) allow labs to accumulate up to 55 gallons of hazardous waste or one-quart of acutely hazardous waste with no time limit on storage as long as the container remains in good condi-

tion, is closed and labeled correctly with its contents or the words "hazardous waste" and is located at or near the point where it was generated.

Once lab waste accumulates above the allowable volume, lab operators must place the date on the container within three days and may store it in a hazardous waste storage area for the time specified by the regulations (90, 180, or 270 days), and then dispose of it in accordance with RCRA regulations.

In addition to storage of chemical waste, RCRA regulations, codified in 40 CFR Part 262, govern hazardous waste activities at labs. If a lab generates more than 100 kilograms of hazardous waste in a calendar month or one kilogram of acutely hazardous waste, these regulations apply. Labs should pay particular attention to regulations concerning hazardous waste determination (40 CFR 262.11), generator accumulation time (40 CFR 262.34), manifesting shipments transported offsite (40 CFR 262.20, and generator training (40 CFR 262.34(a)(4) and 265.16).

The Clean Air Act also addresses risks posed by chemicals and their safe management. Section 112(r)(1) of the Clean Air Act, known as the General Duty Clause, requires owners or operators of facilities that have extremely hazardous substances to ensure that their chemicals are safely managed. Extremely hazardous substances are





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listed in the regulations at 40 CFR Part 68, and include any other chemical that may, as a result of short-term releases to the air, cause death, injury or property damage because of their toxicity, reactivity, flammability, volatility or corrosivity. The General Duty Clause applies to laboratories, as well as other facilities and managers should be aware of its requirements.

The Bottom Line

First and foremost, laboratories have a duty to operate safe facilities and manage risks posed by waste chemicals. Managers of laboratories can make facilities safer by:

- knowing which chemicals are in their possession and how to properly store, use and dispose of them;
- periodically inspecting storage areas;

- training staff; and
- communicating regularly with local emergency response teams.

Laboratories must comply with all applicable environmental laws and regulations in order to ensure the safety of students, laboratory employees, and the community, and to avoid costly penalties.

Compliance Assistance

Environmental Management Guide for Small Laboratories
<http://www.epa.gov/sbo/labguide.htm>
http://www.epa.gov/sbo/smalllabguide_500.pdf

Compliance Assistance Centers
<http://www.epa.gov/compliance/assistance/centers/index.html>

National Environmental Compliance Assistance Clearinghouse
<http://cfpub.epa.gov/clearinghouse/>

Lab Waste Guidance

Two EPA documents offer guidance for laboratories that generate small quantities of hazardous waste. These documents include “Frequently Asked Questions,” dated March 17, 2004, detailing federal requirements on the storage and disposal of hazardous wastes and an Aug. 16, 2002, memo that laboratory personnel can use to determine what is a hazardous waste and operate satellite accumulation areas. Both are available on EPA’s website at www.epa.gov/rcraonline. See the July 2000 Enforcement Alert on universities and colleges for more information on the Audit Policy: <http://www.epa.gov/compliance/resources/newsletters/civil/enfalert/universities.pdf>.