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Region 6 LEPC Update

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In this issue we partner with ATSDR to bring you information on mercury, suggestions for preventing elemental mercury spills and exposure in our communities, and guidance on spill cleanup and disposal.

- Steve and Hilary

Elemental Mercury Preventing Spills and Exposure at Home and in the Community

Spilled elemental mercury, also known as metallic mercury or quicksilver, continues to threaten public health. Children are particularly sensitive to the harmful effects of poisoning by mercury vapors.

Although the number of accidental elemental mercury spills in Region 6 has decreased since 2001, data collected by Poison Control Centers shows that mercury spills still average at about

1-2 occurrences per month in our Region. The past few years have seen several instances where children were hospitalized or schools contaminated because of elemental mercury spills.



Some Headlines from the Past 2 Years:

Three Urban Park Elementary Children Hospitalized for Mercury Poisoning Dallas Morning News, 2012

Mercury Cleanup at Odessa School Costs Nearly \$900K Star Telegram, 2014

Mercury Spill Sends Kids to Hospital and Leaves Family Homeless for Christmas KXAN, Austin, 2014

Mercury Spills in School Office The Advocate, Baton Rouge, 2012



What is elemental mercury, and what are the most common ways that people come into contact with it?

How can we minimize public exposure to this harmful chemical?

What should you do if you find or spill elemental mercury?

In the articles below we will focus on elemental mercury, and provide resources and information for the general public, and the emergency management, health, and response communities.

Mercury FAQs for the General Public



What is Mercury?

Mercury is a naturally-occurring element that is found in air, water, and soil. It exists in several forms: elemental mercury (also known as metallic mercury), inorganic mercury compounds, and organic mercury compounds.

We will focus on elemental mercury in this newsletter, in an effort to foster chemical exposure prevention in our communities in Region 6.

Elemental mercury is a shiny, silver-white liquid - the only metal which is liquid at room temperature. When dropped, elemental mercury breaks into smaller "droplets" or "beads", which may be large or too small to see with the naked eye.



What Are Sources of Elemental Mercury?

Elemental mercury is found in many products, due to its useful properties. It conducts electricity, expands in response to temperature and pressure, and can form alloys with other metals. Some everyday items which contain mercury include:

- Thermostats
- Thermometers
- Switches and relays in mechanical items
- Fluorescent light bulbs (including "green tip")
- Antiques barometers, clocks, organs, mirrors, and glass
- Batteries especially button cell batteries for watches, cameras, hearing aids, toys, and other small items

Due to its unique appearance and properties, people sometimes collect and store mercury in jars, bottles, or other containers. This provides an opportunity for a dangerous spill, or for children to be tempted to play with the mercury.











How do People Become Exposed to Elemental Mercury?

When a container or device containing elemental mercury spills, it is difficult to know the extent of the spill, and impossible to detect the presence of toxic vapors without specialized monitoring equipment. Mercury beads can roll into cracks I floors, travel under tiles and foundations, and spread to many places where it cannot be seen. **The toxic vapors produced by the hidden mercury are colorless and odorless.**



Because mercury runs easily and binds to certain materials, it can be tracked around from place to place by shoes, mops, vacuum cleaners, or anything that travels from one place to another. Mercury spilled within a home is often tracked to other places such as schools by unsuspecting residents when the mercury clings to shoes, clothing, and belongings.



Mercury FAQs for the General Public

Why is Spilled Elemental Mercury Dangerous?

The primary hazard of elemental mercury is inhalation of the mercury vapors it readily produces.

Elemental mercury volatizes readily, producing highly toxic fumes. Elemental mercury is not readily adsorbed by the digestive tract when ingested, and causes rashes when absorbed by the skin.

When spilled, mercury breaks into smaller droplets which can easily roll through small cracks or become strongly attached to certain materials. Although some drops may be large enough to see, mercury can potentially break into millions of tiny beads, too small to be seen by the naked eye.

At room temperature, spilled elemental mercury can evaporate into an invisible, odorless toxic vapor. Mercury spilled inside a home, garage, school, or any other building can potentially continue to fill the structure with odorless toxic vapor, continually poisoning regular inhabitants.



Data collected by Poison Control Centers shows that in Region 6, the most common exposure site to elemental mercury is the affected person's own residence, followed by school, the workplace, and the residence of another person.

What are the Signs of Poisoning by Mercury Vapors?

Medical professionals and victims themselves often to not recognize the signs of mercury vapor poisoning, because the symptoms are often varied and difficult for the affected person to describe. Exposure to lower levels of airborne mercury for prolonged periods of time produce subtle effects. Because children (0-18) are more sensitive to mercury vapors, they exhibit signs of mercury poisoning sooner and more severely than adults. Symptoms may include:

- Sleep disturbances or insomnia
- Irritability, mood swings, nervousness, excessive shyness, or other emotional changes
- Memory problems
- Decreased cognitive function
- Coordination problems
- Headache

- Tremors (sometimes described as "seizures" or "muscle twitching")
- Abnormal sensations in mouth or extremities (tingling, numbness)
- Weakness
- Changes in vision or hearing

Most of the effects of mercury resulting from prolonged lower level exposure are reversible, once exposure is terminated and the mercury has left the body.

Exposure to very high levels of metallic mercury vapor can cause brain, kidney, and lung damage and may seriously harm a developing fetus. Symptoms of exposure to mercury vapor concentrations high enough to produce such serious effects include:

- Coughing
- Chest pains
- Nausea
- Vomiting

- Diarrhea
- Increases in blood pressure or heart rate
- Skin rashes
- Eye irritation

Mercury FAQs for the General Public

How Can Mercury Vapors Affect Children Differently than Adults?

Children are especially sensitive to mercury vapors, due to their smaller size and developing bodies. The younger a person, the stronger the more harmful mercury vapors are to them. When pregnant women inhale mercury vapors, their developing fetus in the womb is dangerously affected. Very young children are more sensitive than adults to the effects of mercury. Children 5 years of age and younger are considered to be particularly sensitive to the effects of mercury on the nervous system, since their central nervous system is still developing.





Some children exposed to high mercury vapor levels develop a reversible condition called acrodynia, in which the palms of the hands and soles of the feet often become reddened and tender, before beginning to peel. Children with acrodynia may also have mood swings, increased irritability, difficulty sleeping, and muscle or joint pains. Exposure levels high enough to cause acrodynia might also cause coughing or pain in the chest area. Acrodynia is usually, but not always, associated with urine mercury concentrations of 100 micrograms (or more) of mercury per liter of urine. Tests are available to measure mercury levels in the body, and urine samples provide the best indicator of exposure to this form of mercury. Urine mercury concentrations over 10 micrograms per liter would indicate that a person has been exposed to higher mercury levels than the average population.

Mercury Resources for First Responders



The *Mercury Response Guidebook*, by EPA's Emergency Response Team and EPA's Region 5 office in Chicago, is designed to assist emergency and remedial professionals coordinate and clean up indoor mercury spills. The principles in this guidebook can also be used at other mercury-contaminated sites. The guide book provides advice for local responding agencies, including:

- Guidance on selection of appropriate monitoring equipment
- Mercury vapor action levels
- Monitoring and sampling procedures
- Safety best practices
- Removal measures
- Restoration/re-occupation guidance



The guidebook is available for online viewing and download at:

http://www.epa.gov/mercury/spills/index.htm#guidebook

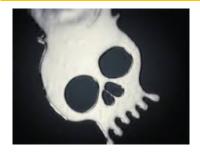
Mercury Information for Schools

Elemental mercury spills and contamination in schools is both dangerous and costly. ATSDR estimates that school mercury cleanup costs have run as high as \$750,000. Cleanup efforts require the closure of school facilities, costing students valuable classroom time.



The Agency for Toxic Substances and Disease Registry (ATSDR) recently added new content to the "<u>Don't Mess with Mercury</u>" website. The website offers resources to help teachers and school professionals learn about mercury safety, how to clean up after a spill, and how to develop a mercury policy for their school.

For Students





The Don't Mess with Mercury web site includes interactive lesson plans teachers can use to teach students about elemental mercury and the hazards associated with exposure. Students can test their "mercury IQ" by:

- Playing a video game that quizzes them on mercury facts and safety
- Exploring an interactive human body showing the health effects of mercury
- Using the timeline to see how mercury has been used throughout the centuries.

For Educators

Educational professionals can access useful guidance on how to both keep mercury out of schools, and actions to take in the event of a mercury spill within the school system, including:

- A sample mercury school policy
- Mercury in Schools Case studies from EPA
- Elements of an effective mercury policy

Some items for educators to consider include:

- Is your staff educated about the dangers of mercury?
- Do you understand how to store mercury safely before disposal?
- Does school policy identify how to dispose of mercury, or the right professionals to contact?
- Are there local resources (like a hazmat team or environmental consultants) available to help with cleanup?
- What disciplinary action will be taken if a person brings mercury to school?

Visit the website today at: www.atsdr.cdc.gov/dontmesswithmercury/



Mercury Guidance for Community Leaders

Leadership from all walks of the community can help to reduce the threat that spilled elemental mercury poses to the public. County and municipal representatives, emergency managers and responders, business owners and managers, healthcare providers, educators, and citizens can all work together in creative ways to reduce the threat of elemental mercury in the community.

Community Mercury Collection

Organizing a collection event is a great way to reduce mercury in the community. Collection events can be as short as a weekend, or as long as a year.

Many communities already have established E-waste or Household Hazardous Waste programs, or hold publicized recycling events. Consider organizing a mercury collection campaign, educating the community on mercury, and encouraging citizens to bring in elemental mercury or mercury-containing devices for proper disposal.

Consider including local businesses and organizations as volunteers to help run a mercury collection events.



Students are often eager to volunteer for community events, both to fulfill community service requisites (Boy Scouts, NHS) and to learn more about career interests (waste management and emergency management students). Businesses often enjoy contributing to local community events, because it boosts employee morale, contributes to the community in which many of the employees live, allows the company to network, and is a great positive marketing tool for the company image. Some communities have found businesses to sponsor and market their collection events by offering incentives for people to bring in mercury containing items.

Success story: The City of Huntsville, Alabama Operation Green Team partnered with Covanta Energy to reduce mercury in the community at a community recycling event in 2013. Covanta Energy offered \$10 gift cards to the first fifty people who brought in mercury-containing thermostats, \$5 gift cards to anyone bringing in a mercury thermometer, and gave a \$50 gift card to the first person to bring in both a thermostat and a thermometer.

Offer incentives to local businesses to sponsor or help with mercury collection events, or participate in voluntary mercury removal collection programs.

A community might encourage HVAC wholesaler/distribution companies to become a mercury thermostat collection point under the Thermostat Recycling Corporation collection program http://www.thermostat-recycle.org/. Automotive scrap dealers or other business that deal in dismantling vehicles might participate in the End of Life Vehicle Solutions mercury switch reclamation program http://elvsolutions.org/.

Recognize local businesses who participate by presenting them with certificates of thank or accomplishment. Reward them with congratulatory write-ups in local print or on local websites. Publicize them as community partners of environmental stewardship at county fair booths, chamber of commerce events, or local festivals or sporting events.



Mercury Guidance for Community Leaders

Although many communities are experienced in dealing with elemental mercury though their solid waste or HHW programs, some communities may be new to the idea of collecting mercury to improve citizen health and safety.

Community Mercury Collection Guidance

- The <u>State of Ohio Environmental Protection Agency</u> has developed a guide on Developing a Community Mercury Reduction Program. The guide is available online, and offers step by step guidance on how a community can instill a mercury reduction program from start to finish. The guide is available for viewing and download at:
 - http://www.epa.state.oh.us/Portals/41/p2/mercury pbt/Mercury%20Community%20Guide web.pdf
- The Boston Public Health Commission's Environmental Health Office also implemented a mercury thermometer exchange program in 2002, and published an article describing the program in the American Journal for Public Health (2003 December; 93(12): 1997-1999.

 The article is also available for viewing at the National Conter for Piotochnology Information website at:
 - The article is also available for viewing at the National Center for Biotechnology Information website at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1448138/

Cleaning Up Small Elemental Mercury Spills

Help! We've spilled elemental mercury! Now what!?

EPA offers guidance and steps to take in the event of mercury spills and releases at of what to do in the event of a mercury spill. http://www.epa.gov/mercury/spills/

Mercury Spills of Two Tablespoons or More

Any time one pound or more of mercury is released to the environment, it is mandatory to call the <u>National Response</u> Center (NRC). The NRC hotline operates 24 hours a day, 7 days a week. Call (800) 424-8802.

Note that because mercury is heavy, only two tablespoons of mercury weigh about one pound.

2 tablespoons = 1 lb. = 1.3 liquid oz.

Spills Less Than 2 Tablespoons, and More Than Contents of a Thermometer

Cleanup Instructions

- 1. Have everyone else leave the area; don't let anyone walk through the mercury on their way out.
- 2. Open all windows and doors to the outside.
- 3. Turn down the temperature.
- 4. Shut all doors to other parts of the house, and leave the area.

Do not vacuum or sweep. Call your local health department as soon as possible. If it is after-hours, please call your local fire department.

Cleaning Up Small Elemental Mercury Spills

Help! We've spilled elemental mercury! Now what!? (cont.)

What Never to Do After a Mercury Spill

- **Never** use a vacuum cleaner to clean up mercury. The vacuum will put mercury into the air and increase exposure.
- Never use a broom to clean up mercury. It will break the mercury into smaller droplets and spread them.
- **Never** pour mercury down a drain. It may lodge in the plumbing and cause future problems during plumbing repairs. If discharged, it can cause pollution of the septic tank or sewage treatment plant.
- Never wash clothing or other items that have come in direct contact with mercury in a washing machine,
 because mercury may contaminate the machine and/or pollute sewage. Clothing that has come into direct
 contact with mercury should be discarded. By "direct contact," we mean that mercury was (or has been) spilled
 directly on the clothing, for example, if you break a mercury thermometer and some of elemental mercury
 beads came in contact with your clothing.
- **Never** walk around if your shoes might be contaminated with mercury. Contaminated clothing can also spread mercury around.











Cleaning Up Spills Less Than 2 Tablespoons, Broken Thermometers

For spill less than 2 tablespoons and broken mercury thermometers, EPA advises that individuals can clean up the spill, provided that they take careful steps and follow cleanup instructions provided to the public by EPA. The cleanup instructions described below are also available at EPA's website at http://www.epa.gov/mercury/spills/

If you have further questions, or if there are young children or pregnant women in the house at the time of the thermometer breakage, please call your local poison control center at 1-800-222-1222

Broken Thermometer: Did It Contain Mercury?

- Newer non-digital fever thermometers often use alcohol or a non-toxic compound that looks similar to mercury.
- Ask: Is the liquid in the thermometer red? If so, it is most likely alcohol. Is the liquid in the thermometer silver? If so, it may be either mercury or a non-mercury substance.
- If there is a paper calibration strip inside of the thermometer that includes the words "mercury free", then the liquid in the thermometer is not mercury. If you do NOT see the words "mercury free," assume that the liquid is mercury.



Cleaning Up Small Elemental Mercury Spills

Cleaning Up Spills Less Than 2 Tablespoons, Broken Thermometers (cont.)

Prepping for Cleanup

- Have everyone else leave the area; don't let anyone walk through the mercury on their way out. Make sure all
 pets are removed from the area. Open all windows and doors to the outside; shut all doors to other parts of the
 house.
- DO NOT allow children to help you clean up the spill.
- Mercury can be cleaned up easily from the following surfaces: wood, linoleum, tile and any similarly smooth surfaces
- If a spill occurs on carpet, curtains, upholstery or other absorbent surfaces, these contaminated items should be thrown away in accordance with the disposal means outlined below. Only cut and remove the affected portion of the contaminated carpet for disposal.

Items Needed to Clean Up a Small Spill

- 4-5 self-sealing plastic (ziploc-type) bags
- Trash bags (2 to 6 mils thick)
- Rubber, nitrile or latex gloves
- Paper towels
- Cardboard or squeegee

- Eyedropper
- Duct tape, or shaving cream and small paint brush
- Flashlight
- Powdered sulfur (optional)

















Cleanup Instructions

- 1. Put on rubber, nitrile or latex gloves.
- 2. If there are any broken pieces of glass or sharp objects, pick them up with care. Place all broken objects on a paper towel. Fold the paper towel and place in a zip lock bag. Secure the bag and label it as directed by your local health or fire department.
- 3. Locate visible mercury beads. Use a squeegee or cardboard to gather mercury beads. Use slow sweeping motions to keep mercury from becoming uncontrollable. Take a flashlight, hold it at a low angle close to the floor in a darkened room and look for additional glistening beads of mercury that may be sticking to the surface or in small cracked areas of the surface. Note: Mercury can move surprising distances on hard-flat surfaces, so be sure to inspect the entire room when "searching."
- 4. Use the eyedropper to collect or draw up the mercury beads. Slowly and carefully squeeze mercury onto a damp paper towel. Place the paper towel in a zip lock bag and secure. Make sure to label the bag as directed by your local health or fire department.
- 5. After you remove larger beads, put shaving cream on top of small paint brush and gently "dot" the affected area to pick up smaller hard-to-see beads. Alternatively, use sticky tape, such as duct tape, to pick up any remaining small glass fragments. Place the paint brush or duct tape in a zip lock bag and secure. Make sure to label the bag as directed by your local health or fire department.

Cleaning Up Small Elemental Mercury Spills

Cleaning Up Spills Less Than 2 Tablespoons, Broken Thermometers (cont.)

- 6. OPTIONAL STEP: It is OPTIONAL to use commercially available powdered sulfur to absorb the beads that are too small to see. The sulfur does two things: (1) it makes the mercury easier to see since there may be a color change from yellow to brown and (2) it binds the mercury so that it can be easily removed and suppresses the vapor of any missing mercury. Where to get commercialized sulfur? It may be supplied as mercury vapor absorbent in mercury spill kits, which can be purchased from laboratory, chemical supply and hazardous materials response supply manufacturers.
 - **Note:** Powdered sulfur may stain fabrics a dark color. When using powdered sulfur, do not breathe in the powder as it can be moderately toxic. Additionally, users should read and understand product information before use.
 - 7. If you choose not to use this option, you may want to request the services of a contractor who has monitoring equipment to screen for mercury vapors. Consult your local environmental or health agency to inquire about contractors in your area. Place all materials used with the cleanup, including gloves, in a trash bag. Place all mercury beads and objects into the trash bag. Secure trash bag and label it as directed by your local health or fire department.
 - 8. Contact your local health department, municipal waste authority or your local fire department for proper disposal in accordance with local, state and federal laws.
 - 9. Remember to keep the area well ventilated to the outside (i.e., windows open and fans in exterior windows running) for at least 24 hours after your successful cleanup. Continue to keep pets and children out of cleanup area. If sickness occurs, seek medical attention immediately. <u>View information on health effects related to exposures to vapors from metallic mercury</u>. For additional information on health effects, the Agency for Toxic Substances and Disease Registry (ATSDR) provides a Mercury Fact Sheet that also presents information on health effects related to exposures to vapors from metallic mercury.

Cleaning Up Broken Compact Fluorescent Light Bulbs (CFLs)

Small amounts of mercury can be released into the environment when CFLs break, or if they are improperly disposed of at the end of their useful lives. No mercury is released when the bulbs are intact (i.e., not broken) or in use, but CFLs can release mercury vapor when broken. CFLs contain a very small amount of mercury -- less than 1/100th of the amount in a mercury thermometer.

Note: Despite these emissions, the use of CFLs actually helps reduce total mercury emissions in the U.S. because of their significant energy savings. Using energy-saving CFLs reduces demand for electricity, which in turn reduces the amount of coal burned by power plants, which reduces emissions of mercury when the coal is burned.





For steps to take in cleaning up broken CFLs on both hard and carpeted surfaces, disposal of broken CFLs, and other information on mercury and CFLs, visit EPA's CFL website at http://www2.epa.gov/cfl.

The steps described on the EPA's website are only precautions that reflect best practices for cleaning up a broken CFL. However, if you are concerned about the risk to your health from a potential exposure to mercury, consult your physician, or your local poison control center at **1-800-222-1222**.

Disposal of Elemental Mercury

How Do I Get Rid of This Mercury?!

Disposal for Residences

Some counties and cities have established Household Hazardous Waste (HHW) collection programs or Electronic Waste (E-Waste) programs which will accept elemental mercury or mercury containing items.

Many communities have also developed special collection programs/events for elemental mercury and mercury containing items.

Individuals can contact their local city or county representatives, or check municipal and county websites, to determine if their community has an HHW or E-waste program which accepts elemental mercury or mercury-containing devices.





The <u>Thermostat Recycling Corporation</u> is an industry-funded non-profit which facilitates and manages the collection and proper disposal of mercury-containing thermostats. Visitors to the website can find collection centers which accept mercury containing thermostats, or participate in the program by becoming a collection site. Visit Thermostat Recycling Corporation at http://www.thermostat-recycle.org/

Earth 911 is a website which provides a useful search tool, where users can search for collection centers for various materials, including mercury, by location. Visit Earth911 at http://search.earth911.com/



Packaging Mercury for Storage and Transportation

Many people have containers of elemental mercury in their homes left over from science projects or other sources. If you have elemental mercury in your home, you need to exercise extreme caution with it and package it to prevent any leaks or spills.

- All mercury-containing products or containers of mercury should be placed inside a larger container with a tight fitting lid.
- Kitty litter or oil-absorbent matter should be placed around the product to protect it from breaking or sudden shocks
- Clearly label storage container as "Mercury DO NOT OPEN."
- If you must wait for a hazardous waste collection day, store products safely in their original containers with the labels intact, and keep them out of reach of children and pets.
- Transport container to a household hazardous collection center in a cardboard box. Secure them so that they do not tip over. This will minimize shifting or sliding during sudden stops or turns.
- Transport containers in the back of a pick-up truck or in a car trunk. If you must transport in the passenger compartment, make sure there is adequate ventilation.







Disposal of Elemental Mercury

Disposal for Businesses

Unlike households, small and large businesses and industries are regulated under the Resource Conservation and Recovery Act (RCRA) which governs the transportation, storage and disposal of hazardous wastes that contain mercury. Their mercury wastes are governed under EPA's Land Disposal Restrictions (LDR) Program.

EPA has designated some widely generated hazardous wastes, including certain spent batteries, pesticides, mercury-containing equipment and light bulbs, as "Universal Wastes". The regulations that govern universal wastes include special management provisions intended to facilitate the recycling of such materials. More information on mercury-containing equipment and universal wastes can be found at:

http://www.epa.gov/waste/hazard/wastetypes/universal/mce.htm





Note that some states and local jurisdictions have elected to pass regulations that are more stringent than the federal hazardous waste regulations. Several states and municipalities do not recognize the exemption for households; others regulate all fluorescent bulbs as hazardous, regardless of their mercury content.

For example, Vermont bans all mercury-containing waste from landfills, including mercury-containing waste generated by households. For more information specific to your state, contact your state or local environmental regulatory agency.

Mercury Guidance Online

EPA Mercury Information – http://www.epa.gov/mercury/

EPA Compact Fluorescent Light Bulb (CFL) Information – http://www2.epa.gov/cfl

ATSDR Mercury and Your Health –

http://www.atsdr.cdc.gov/mercury/

ATSDR Don't Mess With Mercury Campaign -

http://www.atsdr.cdc.gov/dontmesswithmercury/index.html

LDEQ Mercury Initiative -

http://www.deq.louisiana.gov/portal/PROGRAMS/MercuryInitiative.aspx

ODEQ Mercury Fact Sheet - http://www.deq.state.ok.us/factsheets/land/whatismercury.pdf

State EPCRA / LEPC Coordinators and SERC Contacts

Arkansas	Kenny Harmon	501-683-6700	kenny.harmon@adem.arkansas.gov
Louisiana	Gene Dunegan	225-925-6113	gene.dunegan@dps.la.gov
New Mexico	Henry Jolly	505-476-6240	henry.jolly@state.nm.us
Oklahoma	Tom Bergman Bonnie McKelvey	405-702-1013 405-521-2481	tom.bergman@deq.ok.gov bonnie.mckelvey@oem.ok.gov
Texas	Bernardine Zimmerman Gabriela Stermolle	800-452-2791 512-424-5989	Bernardine.zimmerman@dshs.state.tx.us gabriela.stermolle@dps.texas.gov

Emergency Response Numbers			
Arkansas Dept. of Emergency Management	800-322-4012		
Louisiana State Police	877-925-6595		
New Mexico State Police	505-827-9126		
Oklahoma Dept. of Environmental Quality	800-522-0206		
Texas Environmental Hotline	800-832-8224		
National Response Center	800-424-8802		
EPA Region 6	866-372-7745		
CHEMTREC	800-424-9300		



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