ALABAMA DEPARTMENT OF PUBLIC HEALTH RECOMMENDATIONS
CONCERNING MERCURY IN HEALTHCARE FACILITIES
February 16, 2009

Background:

The potential for toxic effects from exposure to elemental (metallic) mercury has been well documented. The physical properties of elemental mercury made it an ideal material for use in devices used for measuring temperature and pressure. Many of these applications were found in healthcare equipment. Healthcare facilities are under increasing pressure to remove the mercury-containing apparatus. Alternative equipment exists for almost every piece of equipment in which mercury has been used.

Recommendations:

The Alabama Department of Public Health (ADPH) recommends that healthcare facilities safely collect and package any mercury-containing equipment/apparatus or free elemental mercury for storage and subsequent removal.

Procedure:

1. Assessment of mercury in your facility - the Safety or Quality Assurance Officer for your facility, accompanied by each department head should make an inventory of any item that may contain elemental mercury. This list should include, but not be limited to:
   a. Thermometers
   b. Manometers
   c. Mercury Switches
   d. Sphygmomanometers

2. Obtain a commitment - the director of the facility should engage in a top-down campaign for the facility to become mercury-free. A program leader should elicit support from a key member of each department who has authority to make departmental changes. This commitment should include, but not be limited to:
   a. Removal of mercury and mercury-containing items from the department.
   b. Replacement of mercury and mercury-containing items with acceptable alternatives.

3. Mercury management - until **all** mercury and mercury-containing items have been removed, the facility should develop and promulgate a mercury management policy. This policy should contain, but not be limited to:
   a. Mercury-free purchasing policy.
   b. Employee education program (required) covering all mercury use and disposal issues.
   c. Spill prevention and education program designed toward spill prevention and response actions. If a spill should occur and is manageable in scope (e.g., mercury thermometer breakage), the following procedures must be followed:

      i) Immediately after a spill, keep all people away from the spill area. To minimize the amount of mercury in the air, turn off all heaters in the area any central heat and air conditioners (to avoid spreading/circulating the

mercury contamination to other parts of the building,) and adjust the room air conditioner (if present) to lower the temperature as low as possible/practical. This will slow the mercury from vaporizing. Ventilate the area by opening windows. If possible, keep the windows open for at least two days to allow any residual mercury to leave the building.

ii) Never use a regular vacuum cleaner to clean up mercury. The mercury will contaminate the entire vacuum and the heat from the vacuum will accelerate mercury vaporization. The vacuum will also blow mercury-tainted air through the room. The only type of vacuum appropriate for cleaning up mercury spills is a specialized mercury vacuum with an activated carbon filter to absorb and contain the mercury vapors. Also, never use a broom to clean up mercury. It will only divide the mercury up into smaller beads, thereby increasing the total surface area, increasing the rate of vaporization. Additionally, this will contaminate the broom.

iii) Assemble the necessary supplies before attempting a clean-up. These include gloves, an eyedropper, and two stiff pieces of paper or cardboard, two plastic bags (size depends on the size of the spill), a large tray or box, two labels (to put on the plastic bags), a marker or pen, duct tape or packing tape, a flashlight, and a wide-mouthed container with a lid. Remember that any tools used for clean-up should be considered contaminated and should be disposed of with the mercury.

iv) Do not touch the mercury**.** Remove all jewelry and watches from your hands, as mercury will bond with the metal. Put on gloves (preferably rubber gloves or a non-porous equivalent) to minimize the contact with mercury. Use the flashlight to locate all of the mercury. Mercury is a reflective element and the mercury beads can easily be located with a bright light.

v) Clean up the spill with procedures appropriate to the type of surface in the spill area.

• On a hard surface or tightly woven fabric, use stiff-backed paper to push the beads of mercury together. If you do not have a tray or box nearby to catch any additional spills, use the eyedropper to suction the beads of mercury. If you are working over a tray (to catch spills), lift the beads of mercury with the stiff paper. Carefully place the mercury into a wide-mouthed container. Pick up any remaining beads of mercury with sticky tape and place the contaminated tape in a plastic bag along with the eye-dropper, stiff paper, and gloves. Label the plastic bag as 'MERCURY WASTE ': Place this bag and sealed container in the second plastic bag and also label this bag 'MERCURY WASTE ': Contact the Alabama Department of Environmental Management (ADEM) to determine appropriate disposal regulations and locations.

• On a carpet or rug**,** the mercury-contaminated section should be cut out with the scissors. The cut section, along with cleanup items (scissors included), should be placed in a plastic bag. Label the bag as 'MERCURY WASTE" and contact ADEM for appropriate disposal regulations and locations.

• In a sink of water, mercury will sink to the bottom. Remove as much water as possible without disturbing the mercury. Use the

eyedropper to recover the mercury. Place the mercury into a wide-mouthed container, close the lid and seal it with tape. Label the bag as 'MERCURY WASTE." Review ADEM Administrative Code Division 14 (available online at www.adem.alabama.gov) for instructions on disposal of waste containing mercury. ADEM can be contacted for further assistance at 334/271-7730.

• In a drain, mercury will settle to the bottom and get caught in the sink trap. Place a box or tray under the pipes to prevent any further spills. Remove the trap and pour the contents into a large mouthed container. Close the container lid and seal with tape. Label the bag as 'MERCURY WASTE" and contact ADEM for appropriate disposal regulations and locations.

vi) Mercury thermometers contain approximately 0.8 g. of mercury. When this is released, a certain amount will become airborne, this amount being contingent upon the type of surface upon which the thermometer has broken. On solid, non-permeable surfaces (e.g., steel, tile, glass, etc.) the extent of the spread of the mercury can be relatively easily determined. This mercury can be scooped to a central point and be picked up for removal. However, if the thermometer broke on a carpeted surface, an area of the carpet one foot in each direction from the farthest point mercury can be seen must be excised and packaged for removal as hazardous waste. If a thermometer breaks and one is sure of the extent of the dispersion, it can be removed and no notifications need be performed.

vii) If the mercury source is larger than that contained in a mercury thermometer, individuals in the building should be evacuated and the windows and doors should be opened to facilitate ventilation. The County Environmentalist must be notified. Notifications can then be made through the ADPH Bureau of Environmental Services and/or the State Toxicologist, who will then notify the appropriate personnel in the Alabama Department of Environmental Management to effect proper clean-up and subsequent testing of ambient mercury vapor in the atmosphere in the facility.

4. Replacement of medical equipment- once you have conducted the inventory of all mercury and mercury-containing items in your facility, you can develop a plan for removal/elimination, in a logical, time and cost effective manner.
   a. Replace mercury thermometers with electronic devices.
   b. Develop a plan for the replacement of more costly mercury containing devices (e.g., sphygmomanometers) over a time phased-in period. A consideration that may facilitate development of this plan is the cost of a clean-up of a mercury spill compared to the cost of replacement of the item.

5. Replacement of facility equipment - included in the inventory conducted in Step 1 above, all light switches, fluorescent tubes, x-ray tubes, thermostats, etc., should be tagged and replaced with mercury-free alternatives. These items, following removal, can be safely disposed of as universal waste (See 7. below.)

6. Replacement of laboratory chemicals - each laboratory should construct an action plan including operational and policy issues to a phased-in approach to prioritizing mercury reduction of chemicals that contain mercury. These should include, but not be limited to:
    a. Fixatives and stains that contain significant amounts of mercury.
        1) B 5 Fixative
        2) Harris Haematoxylin
        3) Zenker's Solution
        4) Schaudinn's fixative
    b. Identification of other mercury-containing chemicals for which no mercury-free alternative is available. The operational plan should include a periodic review of this list to determine whether any mercury-free substitute has been developed.

7. Universal waste - some mercury and mercury-containing items where mercury is present in low levels is considered safe for disposal as universal waste, only for intact items (not cleanup residue.) This includes, but is not limited to:
    a. Batteries (button or mercuric oxide-containing batteries)
    b. Mercury-containing lamps
    c. Thermostats
    d. Pesticides (older stocks of mercury containing items)
    e. Possibly cathode ray tubes
    f. Thermometers
    g. Manometers
    h. Mercury Switches
    i. Sphygmomanometers

.

Disposal of universal waste in Alabama should comply with requirements stated in Alabama Department of Environmental Management, Land Division - Hazardous Waste Program Administrative Code (Chapter 335-14-11 Standards for Universal Waste Management).