

# Healthcare Facility Pollution Prevention Planning Kit

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## *The Ohio Healthy Hospitals Pollution Prevention Initiative*



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## **I. Introduction**

### **I. A. Pollution Prevention Planning**

- What is it? Why do it?

# Ohio EPA and Ohio Hospital Association Sign Pollution Prevention Agreement

Ohio EPA will work with OHA: The Ohio Hospital Association to reduce the generation of hospital waste, including mercury, which hospitals commonly have in thermometers, blood pressure monitors and other equipment. A formal agreement between the two organizations was signed as part of Ohio Pollution Prevention Week, September 20-24, 1999. The Ohio Healthy Hospitals Pollution Prevention Initiative is based on a voluntary working agreement between the U.S. EPA and the American Hospital Association. The goal of the program is to provide tools to support hospitals' continued efforts to minimize the production of pollutants and reduce the amount of waste generated.

As part of the agreement Ohio EPA and the OHA agree to create and implement programs to:

- virtually eliminate mercury-containing waste from the health care industry's waste stream;
- reduce the total volume of waste created by the industry;
- educate health care professionals on pollution prevention activities they can implement;
- reduce the amount of chemicals used by the industry; and
- monitor the industry's progress in implementing pollution prevention initiatives over time.

Nationally it has been acknowledged that through their operations hospitals are major consumers of materials, energy and waste, and producers of wastes. Those wastes, produced in providing quality health care services, are diverse, and in some cases represent very real occupational and community health threats. Pollution prevention planning is one way to mobilize the resources that hospitals need to prevent that threat from producing real harm in the community or to workers. The agreement that the Ohio Hospital Association signed with the Ohio EPA is designed to build a greater understanding of what the problem is and how it can be addressed through strategic partnerships and voluntary efforts.

In addition, the JCAHO Standards for the Environment of Care (Standard EC.1.3) calls for a documented plan for the management of hazardous materials and wastes. Further, the standards (EC.2.3) call for the implementation of such plans in such a manner that the hospital “maintains documents, including required permits, licenses and adherence to other regulations.” The standards (EC.2.8) indicate that planning and implementation must be reflected in general staff knowledge and skills to adequately address the safe selection, handling, use, treatment and disposal of hazardous materials and wastes, and proper response to emergency procedures for spills and exposures. Finally, each hospital must demonstrate that it regularly surveys the facility (EC.2.10.1) for hazards and has a program in place to collect information and take steps to correct environmental deficiencies (EC.4.1)

A pollution prevention plan calls for:

- I. Awareness of the activities that create and materials that contribute to pollution from hospital operations. This is accomplished through the conducting of a waste assessment at your facility.
- II. Putting together a comprehensive set of programs, policies and information (the Plan) that provides a road map to addressing the goals that the institution has set.
- III. Implementation of the programs and policies is of course the critical component. No plan is worth anything if it is not acted on.
- IV. Evaluation is a critical component of the Pollution Prevention Planning process. As programs and policies are rolled out there must be feedback mechanisms to assess whether these programs are having the desired impact. As programs are initiated, staff and other participants may also have additional ideas that would increase the effectiveness of the effort.

**I.A.1. Creating a Pollution Prevention Plan: Key components**

## a. Scope

- A. GOAL: What will the hospital accomplish by developing the plan?
- B. WHO: Who is involved? Who will provide leadership? Who will manage the program?
- C. WHAT: What materials and what wastes will the plan address?
- D. CURRENT SITUATION: What are the current generation rates and disposal practices?
- E. COMMITMENT: A firm policy commitment from top administration that they understand that a policy on hazardous waste reduction has been created and that the hospital is committed to following it, and reducing hazardous waste.

## b. Specific Objectives

- A. BASE LINE: Creation of a base line index - what are the current generation rates of specific hazardous wastes and what is the percentage of hazardous waste generation compared to the overall waste generation? This measure can be an effective way of measuring the decline of hazardous waste as an overall percentage of the waste stream as one measure of progress.
- B. FINAL GOAL: Create specific goals for each hazardous waste stream (% decrease or total elimination), and an overall goals for total system management of hazardous materials.
- C. TIME LINE: Set specific dates by which individual and collective goals will be achieved, with individual bench marks along the way.

## c. Strategies for Implementation

- A. ASSESSMENT: Describe the means by which you will monitor and document progress toward the established goals.
- B. RESOURCES: What resources (money, equipment, personnel) will be needed to accomplish the goals, and how will these resources be secured and allocated.
- C. APPROACHES: Identify specific approaches (e.g., product substitution, process changes) for each material.
- D. TRAINING AND EDUCATION: Specify what steps will be taken to train staff to safely handle hazardous materials and wastes, and what policies and procedures will be in place to handle emergency spills or disposal problems. What general education will be made available to all organizational staff on hazardous substance minimization efforts? Demonstrate an ongoing commitment to education and investigation of alternatives.
- E. RESPONSIBILITY: Who will be responsible for implementation? What are the credentials of the person(s) in charge of managing hazardous wastes.

It is important to note that a plan is not a static document. Since procedures and materials will change over time, a plan will need constant updating to keep up with new developments and new regulations. It is also important for the planners to remember that plans do not implement themselves. Many good plans are written. All too many of them end up collecting dust on shelves. Before the planning process begins the organization must make a full commitment to implementing the plan.

**I. B. The Costs of Planning and of Not Planning**

Planning, when done correctly, will enable any institution to address the real costs of waste management. These real costs include:

- < Purchase cost of chemicals and other hazardous substances for use.
- < Administrative and management costs of record keeping, regulatory reporting, employee training, emergency response training and equipment, MSDS management, Hazard Communication Plan.
- < Clean-up and disposal costs for spills or other improperly handled materials.
- < Waste disposal costs (on-site labor, safe and legal storage, off-site collection and disposal)
- < Hospital liability costs (clean-up, employee exposure, community image, legal fees, insurance)

Planning and implementing a plan to minimize hazardous wastes will help facilities to reduce these costs significantly, and will potentially reap a number of other benefits.

- < Increase worker safety
- < Decrease facility liability
- < Reduce purchase costs of toxic and hazardous materials
- < Reduce disposal costs
- < Decrease the need for emergency response equipment and clean-up services
- < Decrease the administrative costs of properly managing these materials and their disposal

These costs can be significant, and in an era of cost containment mandates, hazardous waste minimization can be an easy and effective cost reduction program.

## **I. C. Taking the first steps and keeping the process moving**

1. Document support from top management
2. Establish WHO will be working on the plan
  - Who “owns” the process and will coordinate the effort?
  - Where does the plan “live”?
  - Who are the key players who need to be involved for the plan to be comprehensive and successful?
3. Establish a baseline –
  - What materials and wastes will be covered by the plan?
  - Quantify these. Where are they used, where are wastes generated?
  - What are the current management strategies for selection, handling, treatment and disposal?
  - What does it cost to currently run your system?
  - What are the current regulations and requirements that you must meet to have hazardous materials present, and to generate hazardous wastes?
4. Determine what resources will be necessary and are available to develop and run a program.
  - People, training, money (operating and capital), facilities
5. Develop a communications plan
  - Properly using and disposing of hazardous materials is a process that affects all hospital personnel. In order to implement a feasible plan you will need to engage every employee at some level.
  - Determine how you can best reach all employees.
  - Remember to set goals, and celebrate success when you achieve it.
  - Set milestones – establish a timeline that is realistic and allows you a measuring device against which to judge your progress.

**Pollution Prevention Plan Check List for Getting Started**

- OVERVIEW – While this is not mandatory, it is a useful exercise to write a short overview to introduce the P2 plan. The overview establishes:
  - the goals of the effort,
  - designates who the central coordinator is,
  - lists the prior accomplishments,
  - identifies key barriers to moving the program ahead, and
  - sets some specific objectives for the coming year.

The Overview is re-written each year by the pollution prevention team.

- ORGANIZATIONAL POLICY STATEMENT – A formal statement, preferably from the CEO, should be written. This statement should indicate what the big picture goals of doing a P2 plan are, and why it is an organizational priority. This is a public statement to the employees and to the public and regulators.

- ESTABLISH THE SCOPE OF THE PROGRAM (See I.A.1.)

Think about these components and chose those that seem relevant to your situation. Check them of to refer to later. Remember that each P2 plan will be unique. There may be issues unique to your organization that need to be addressed.

- Why will the hospital develop a plan?
  - To support the OHA – Ohio EPA MOU
  - To comply with Joint Commission standards for the environment that requires our organization to have a documented management plan that considers hazardous materials and hazardous wastes
  - To reduce the pollution created by hospital operations
  - To improve hospital's community relations
  - To add to the hospital's Community Benefit Inventory of Social Accountability
  - To protect the safety and health of employees
  - Other \_\_\_\_\_
- Who is involved in the program?
  - List out who will be responsible for participating in the planning process
  - Identify an individual and department who will have responsibility for coordinating the efforts
- What materials and wastes will the program address?
  - Hazardous materials in the following departments: \_\_\_\_\_
  - RCRA hazardous wastes only
  - Solid Waste

- Biohazard Waste
- Radioactive waste

NOTE: If you do not include a waste stream in the plan, indicate why and where the plan for managing that waste stream is located.

□ ESTABLISH SPECIFIC OBJECTIVES FOR THE PLAN

- Do a baseline survey so you know what materials and wastes you have to deal with, properly characterizing them and quantifying them (NOTE: if you did not conduct a baseline survey as part of the OHA project in 1999, contact the OHA for a copy of the survey form)
- Establish a set of final goals.
  - Overall: to reduce all waste streams (as defined in the scope) to the extent technically feasible and economically practical. We will prioritize the following wastes: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
  - To reduce or eliminate specific waste streams, e.g., to become a mercury-free facility by 2003.
  - NOTE: Each hazardous waste stream, and each identified waste (sometimes divided by department where they are generated) will need to be assigned an objective, e.g., decrease the amount of xylene disposed of by the lab by 95%.
- Establish a Timeline for each objective.
  - Become a mercury – free facility by 2003
  - Reduce xylene and alcohol wastes from the lab through recycling by 95% within three months of installing a recovery technology.
  - Establish a recovery program for fluorescent lights to recover 100% of all lamps for recycling by June 2002.

□ DESIGNATE SPECIFIC STRATEGIES FOR REACHING YOUR OBJECTIVES

There are a number of specific strategies that you can incorporate into your plan. In this overview think of what you can commit to know, and list out what you know you will explore. Some possible strategies include:

- Regular waste reduction and pollution prevention assessments of the facility
- Making a waste reduction and pollution prevention checklist for the teams that already do fire, safety and other compliance checks
- Incorporate the development of the plan and specific strategies into our JCAHO readiness effort

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- ❑ Incorporate pollution prevention and waste reduction goals into new employee orientation
- ❑ Develop an employee training program for Pollution Prevention specific to each department
- ❑ Review all purchasing processes for materials to minimize the purchase of hazardous materials and identify product substitutes where appropriate
- ❑ Budget for new equipment to recover and recycle (material specific)
- ❑ Establish a new inventory control systems (department specific)
- ❑ Charge waste management costs to each generating department
- ❑ Improve waste segregation
- ❑ Establish employee incentives for improving waste reduction and P2 efforts

Take this summary outline or list, and condense it into a one or two page document. This is the starting point for your plan. You are now ready to proceed.

□ **D. The Plan**

**I.D.1. The Mission and how to communicate it**

The mission of the Pollution Prevention Plan should be directly tied to the mission of the hospital. If the hospital's mission is to improve community health, or to provide an environment for disease prevention and healing, the impetus to prevent pollution and properly manage materials and wastes that are discharged into the community is greatly enhanced.

**EXAMPLE**

The Good Neighbor Ohio Hospital has a commitment to providing a safe and supportive environment for patients and other individuals utilizing the services we provide. Toward this end our mission is to evaluate and minimize the use of hazardous materials and the generation of wastes, especially hazardous wastes, that may have an adverse impact on human health and the environment.

The Good Neighbor Ohio Hospital is committed to a leadership role in protecting the environment. Whenever feasible, we will eliminate, reduce, or recycle our wastes. Our commitment is to be in full compliance with all Federal and State environmental regulations.

The Good Neighbor Ohio Hospital is committed to the proposition that its employees should be fully aware of all hazardous and potentially dangerous chemicals or equipment used in the hospital, and that staff should be fully trained to use, store, treat and dispose of them in a completely safe manner. Employees will be informed and included in the hospital's efforts to reduce wastes.

As part of our commitment with the Ohio Hospital Association to improve Ohio's ranking of the healthiest states by 25% from 2001 to 2004 we will participate in the Mercury Challenge program in an effort to become a Mercury-free facility by 2003.

## I.D.2. Understanding Pollution Prevention Strategies

Waste minimization can be achieved through a variety of techniques, some as simple as product substitution, and some as complicated as a total process change requiring new training and equipment. Each material and each department will have to make a full analysis of the options and then select the best approach to meet their goals. The approach may change over time as resources are allocated, or new options become available. For example a facility-wide procedure of rigorous segregation may be a first step, followed up by specific changes in procurement and process.

Pollution Prevention focuses on *Source Reduction* as the preferred method. Source reduction can be accomplished by one of a number of methodologies: change in procurement practices to reduce waste, substitution of a non-hazardous or less hazardous material, process change, improving inventory control, staff training to reduce waste, or maintenance of equipment and materials. The goal of source reduction is to eliminate the use of materials which create wastes in the first place. This is the fastest way to achieve cost savings, and meet minimization goals.

Not all hazardous wastes will be able to be eliminated at the source. Certain processes will continue to require the use of materials which will produce hazardous wastes. The second approach must therefore be the *Recovery and Reuse or Recycling* of wastes. Industries around the country now routinely recapture wastes and re-process them for reuse or recycle them. There are some opportunities with hospital wastes (e.g. xylene, ethanol, oil and batteries) for the wastes to be recovered and reprocessed (e.g. distillation, re-use, recycling).

When recovery for reuse or recycling is not feasible, the next step is *Treatment* of the wastes to render them non-hazardous. This can be done through neutralizing the waste or diluting the waste. Currently this is the first choice for many wastes, where options for source reduction and recycling have not yet been considered.

The final option is of course *Disposal*. Disposal of hazardous wastes must be through permitted haulers and waste management companies. Hazardous materials cannot legally be disposed of in municipal landfill or incinerators.

While many materials discussed thus far are legally designated as hazardous with specific handling and disposal regulations, some materials are not, despite their hazardous nature. One example of this is fluorescent lamps. Fluorescent lamps contain mercury in high enough quantities to be banned from landfill disposal in some states. Many hospitals and other institutions still dispose of spent lamps as solid waste. An individual institution may send thousands of spent lamps to a landfill at a time during a facility wide re-lamping program. This can create a major problem for the landfill, and, if on-site crushing of the lamps is practiced as a volume reduction method, this can mean serious health risk for employees. The option of recycling these lamps has emerged in the last several years, and options are now available to most facilities anywhere in the country. While the U.S. E.P.A. has not declared these lamps a hazardous waste, it has left that option open for individual states to do so, and several have already done that. Hospitals need to be proactive and anticipate these changes. Often, simply doing the right thing, whether it is required or not at the time, will prepare a hospital to meet future challenges in a timely and less costly manner, then if left to force of regulation.

## PROCUREMENT GUIDELINES

Any hazardous waste minimization program must begin with an examination of an organization's purchasing program. Purchasing programs that are less than optimally managed can contribute significantly to the generation of hazardous wastes through

- < duplication of ordering
- < purchasing in small quantities when bulk purchasing could be used (the opposite can also be true of some materials which are purchased in quantities far exceeding their usage - in these cases small units would make the most sense)
- < not tracking current stocks and expiration date
- < continuing purchasing of materials no longer in use
- < not coordinating requests for materials from multiple departments
- < research labs often have independent funding that covers purchase of materials but not disposal

Procurement guidelines can be established to overcome many of these problems and lead to significant savings in both purchasing and disposal.

- < Centralize purchasing of chemicals and hazardous materials, even for research labs
- < Monitor usage with requesting departments to establish real quantity needs
- < Make use of a Just-in-time inventory system where appropriate
- < Work with suppliers to explore the return of unused or expired chemicals
- < Work with suppliers to provide smaller quantities quickly on demand
- < Require departments using hazardous materials to conduct regular inventory of supplies

## INVENTORY CONTROL

Good management of inventory will benefit both the purchaser and the user. The user requires that materials be in stock when needed. To ensure this, and meet the need for cost containment and waste reduction, the user will need to form a partnership with purchasing to manage inventory together. Inventory control measures may include:

- < Centralized distribution of hazardous materials
- < Coordination of users requiring the same materials
- < Accurate tracking of expiration dates of in-stock materials
- < Uses materials in first-in, first-out order
- < Inventory procedures for all departments stocking chemicals
- < Ensure clear labels of all chemical containers, and storage cabinets and areas
- < Train personnel in material handling and usage to ensure safe use, spill prevention, and minimal wastage

## PRODUCT SUBSTITUTIONS

There are reliable alternatives for some of the hazardous chemicals and substances used in hospitals which should be considered as part of a hazardous waste minimization effort. Not all substitutes are effective in all situations, but much more can be done by hospitals to evaluate alternatives. A continuous process of

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researching alternatives should be incorporated into the procurement process for hazardous chemicals. Some examples of product substitution include:

- < *Xylene*: Xylene is a solvent that was actually introduced into laboratory usage as a less toxic substitute for Benzene. There are now a number of xylene substitutes on the market, including citrus based substitutes that can be researched.
- < *Formaldehyde*: Formaldehyde is used (as formalin) to disinfect dialysis machines and dialyzers. Some machines are now designed to use alternative disinfectants such as bleach or peracetic acid. Check with your machine vendor for information
- < *Mercury*: Mercury is primarily found in thermometers and blood pressure instruments. The easiest way of addressing mercury is a total substitution of the equipment by electronic sensing devices. These devices have a higher initial cost, but they eliminate the costly clean-ups and hazards from glass breakage and spills that plague hospitals using mercury based technology. Evaluate the continued use of Cantor Tubes which contain significant amounts of mercury. Look at substitutes for mercury fixatives (Zinc fixatives can substitute in some but not all cases).

## SEGREGATION

All materials designated for special handling should be strictly segregated from other wastes. Wastes need to be treated in a fashion consistent with the most hazardous component in them. Well labeled waste containers need to be placed in every area where wastes are generated. Alternative containers, clearly labeled for solid wastes need to be present as well. In many cases, an area might have only one waste container, therefore all wastes generated, including paper and packaging, will have to be treated as hazardous waste if it is mixed together greatly increasing waste disposal costs. Training of staff is a key component in ensuring effective and reliable waste segregation. While segregation should be a facility wide program to maximize wastes in recycling and solid waste streams, it is also an important component of minimizing RMW and hazardous wastes. An example of a specific case for segregation include:

- < Chemotherapy wastes need to be carefully segregated from other wastes. Staff training and well labeled and placed containers in chemotherapy drug handling areas is essential. Disposable protective garments may be disposed of as solid waste if no chemotherapy agents were spilled during handling. Gloves, however, should be assumed to be contaminated.

One approach that can spur on rigorous segregation, as well as make department evaluate minimization approaches is the allocation of waste handling and disposal costs to the departments that generate wastes.

## RECOVERY & RECYCLING

Some hazardous materials used in hospitals can be recovered for re-processing and reuse within the hospital environment. These include such materials as xylene, toluene, ethanol and formalin. Others can be recovered for recycling by an industrial processor. These include silver from x-ray film and developing solutions, mercury, and florescent lamp bulbs and ballasts.

For example, xylene recovery offers an excellent opportunity to minimize hazardous waste generation in hospital histology labs. Cost-effective distillation technology is available which can produce a distilled xylene product which often exceeds virgin xylene quality. Hospitals can evaluate whether this method would not only eliminate the need for disposal

of xylene as a hazardous waste, but would also have a substantial impact on the procurement of xylene. In evaluating this option labs should make sure that they take into account all necessary safety and fire precautions to have this industrial equipment in the lab.

Silver reprocessing and recycling is an example of a process that can be partially accomplished in house, but needs to employ a recycler to maximize the gain. Silver can be removed from the fixing bath through two common methods; metallic replacement or electrolytic replacement. This recovered material can be sold directly to a metals recycler. X-ray film also has recoverable amounts of silver which can be removed by a recycler. Once silver is removed, the remaining X-ray film is a recyclable polyester.

## PROCESS CHANGE

Changing the process by which one conducts a procedure or uses a material has the potential to greatly reduce material wastage, and the generation of hazardous wastes. In its simplest form this involves staff training in safety and efficiency to avoid spills, and to know the right amount of material to use at the right time. Improved and regular staff training can often have a major impact on waste production.

Making specific changes in a process can also minimize usage of a substance and waste:

- ! Formalin, if used as a disinfectant for machines (e.g. dialyzers) does not have to be in concentrations any greater than 4 percent. Concentrations above that are wasteful.
- ! Mercury can be greatly reduced by switching to electronic sensing devices
- ! The life of photo processing chemicals can be greatly enhanced by storing them under conditions cited on the labels. The life of fixing baths can be extended by adding ammonium thiosulfate, using an acid stop bath prior to the fixing bath, or adding acetic acid to the fixing bath as needed to keep the pH low. These solutions can be neutralized and then disposed of to a sanitary sewer.
- ! Photoprocessing chemical life spans can also be extended by mechanical means such as using squeegees in non-automated processing systems to wipe the excess liquid from the film and paper, reducing chemical carryover from one process bath to the next by up to 50%. In photographic processors, countercurrent washing can replace the commonly used parallel tank system to reduce the amount of waste water generated.
- ! Use of solvents in laboratories for extractions and fixation can be greatly reduced or in many cases eliminated through the use of monoclonal antibodies, radioisotope-labeled immunoassays, and ultra-sensitive analytical devices. Calibrated solvent dispensers or unitized test kit use can also reduce solvent wastes.
- ! Waste anesthetic gases can be better controlled through the use of low-leakage anesthetic equipment and scavenging equipment, combined with a regular maintenance routine, and testing of equipment before usage.
- ! Finally, the segregation of wastes after generation offers more opportunities for proper and inexpensive disposal or recycling. Mixing wastes such as formalin, alcohol, xylene and chromic acid to consolidate liquid wastes is not only possibly dangerous if the substances are not compatible, but actually can create a more expensive hazardous waste liability.

## INSPECTION PROGRAM

A good inspection program can expose problems and new issues in managing wastes, as well as be an opportunity to conduct on the spot staff education. Once a plan is in place and use of hazardous materials in all departments is clearly documented, a regular program of inspection and review, department by department can be established over the course of each year.

### **I.D.3. The Role of Purchasing in P2**

#### Purchasing and Pollution Prevention

The hospital's purchasing policies and purchasing staff are in an opportune position to make great strides in pollution prevention. Careful purchasing practices and policies that specify criterion for products can eliminate or minimize much of the pollution generated by a health care facility.

#### GPO's and Vendors

Most hospitals belong to one or more group purchasing organizations (GPO's). These collective buying groups have clout with many healthcare suppliers. Using that clout to negotiate for less toxic, less pollution and environmentally preferable products is a no-cost way for hospitals to engage in pollution prevention efforts. Each hospital can develop their own specific language around 'product preferences' and 'product specifications' for various items. These preferences and specifications can be forwarded to manufacturers through GPO's. In some cases, the preferences can be sent directly to the vendors.

#### Vendors/Manufacturers

Hospitals spend thousands of dollars each month on products obtained from vendors. Everything from IV bags to paper cups are purchased. Communicating your organization's goals around pollution prevention directly to your vendors sends a strong message to them. You are the customer. They want you to keep purchasing their products. If there are features about their products that are undesirable and decrease the likelihood that your organization will continue to purchase their products, chances are they will want to hear about it. Telling manufacturers what's wrong with their products or what features their products SHOULD have to help your organization meet its environmental goals is a very important part of delivering environmentally responsible healthcare.

- I. Eliminate pollution problems  
Many pollution problems that hospitals have could be completely eliminated at the source if 'importation' of a particular product or products were ceased, and an alternative product were identified for purchase and use. In recent times, problem 'materials' are being identified and suppliers are responding. An example of this is the material 'mercury.' Mercury is found throughout hospitals in many products and devices from thermometers, blood pressure monitoring

units, to fluorescent light bulbs to thermostats, batteries and switches. Organizations that develop and adhere to a No-Mercury/mercury phaseout policy essentially prevent the continual entry of mercury into their systems and phase out this problematic material from their facilities.

## II. Reduce Pollution, minimize PBT's

In some cases, it is not entirely possible to eliminate certain products or substances. Persistent bioaccumulative toxic substances (PBT's) are a list of substances identified by the US EPA as problematic in nature, since they are persistent, they bioaccumulate in living organisms, and they are toxic to living entities. Learning about PBT's and what products they might be found in, allows hospitals to seek out other products and make other choices that allow the same function to occur, only using less toxic products in the process. Examples of this are substituting various laboratory and cleaning chemicals used within a facility. Developing purchasing policies that identify a specific list of undesirable chemicals or substances allows the purchasing department to be on the lookout for opportunities to practice this type of pollution prevention.

## III. Encourage waste minimization

Purchasing staff can make inquiries about

- a. product packaging
- b. product composition
- c. options for reusable versus disposables

Reducing product packaging on a single product can result in substantial waste minimization, especially if the multiplier effect is considered if the product is purchased in vast quantities. This effort can be extended to new and existing products in use. For every item purchased, ask the simple question: What impact will this product have on our waste streams? By doing so, this raises the thinking to consider what waste stream will the product be disposed of in? Solid waste or regulated medical waste or hazardous waste? How is the product packaged? What waste stream will the packing end up in?

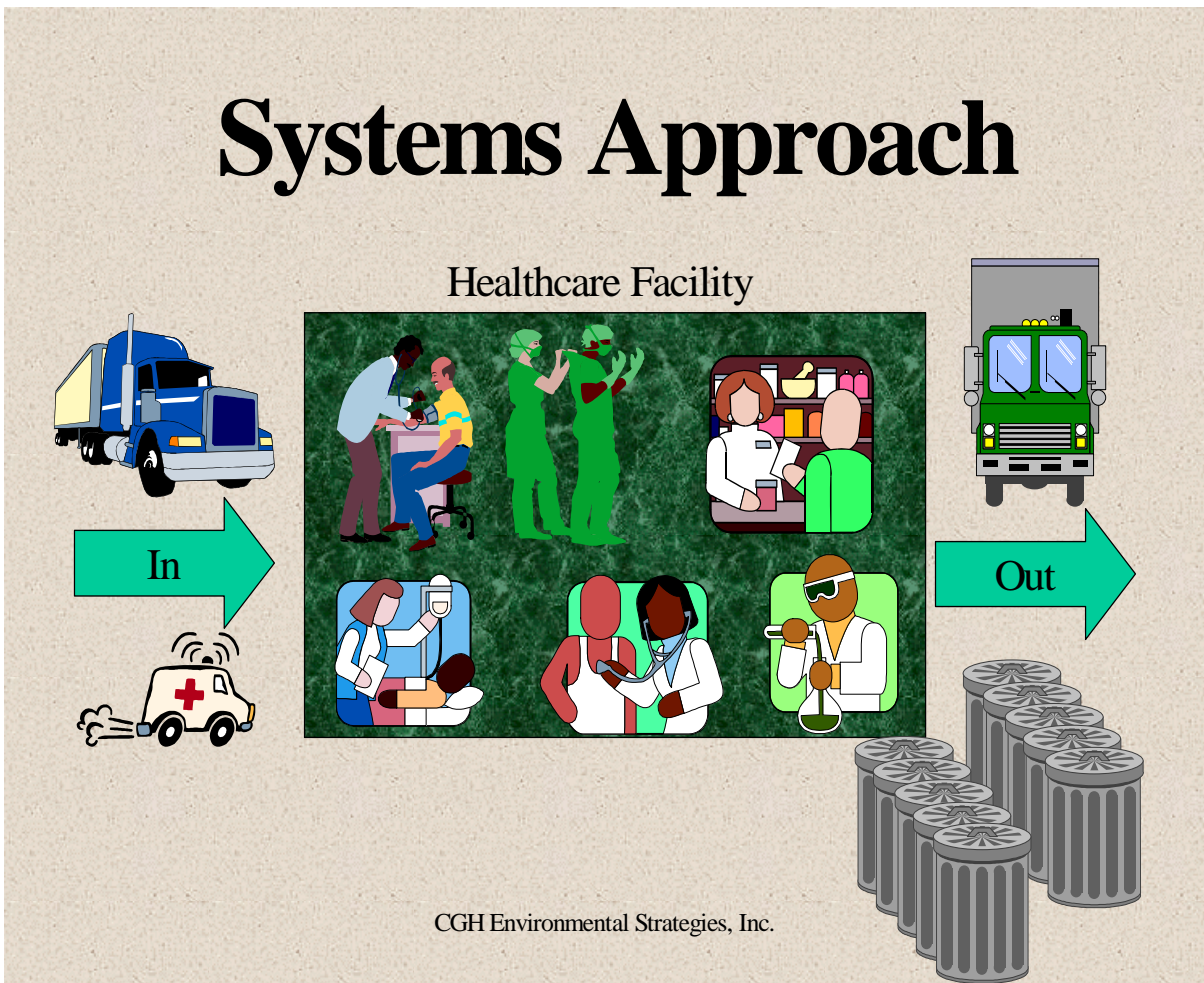
## IV. Recycling

If the product is designed to be recyclable, is it recyclable in your community? Ask if the product and or package is recyclable.

### I.D.4. Waste Management

#### I.D.4.a. Systems Approach

To have a credible approach your hospital will have to recognize, and put on the record that it recognizes, that Pollution Prevention requires a systems approach to problem solving and program implementation. The systems model recognizes the complexity and dynamic connections within and between divisions within a hospital.



### **I.D.4.b. Policy Development**

The Pollution Prevention Council will coordinate the development of organizational policies that support and further pollution prevention activities within the institution. These policies will support the elimination of hazardous substances wherever possible, the minimization of use of substances containing persistent bioaccumulative toxic substances, resource conservation, waste minimization, and a collaborative approach to problem solving with vendors, staff and the community at large.

Policies to develop:

- Purchasing Policy
- Mercury Phaseout Policy
- PVC Phaseout Policy
- Energy Conservation Policy
- Hazardous Materials Purchasing Policy and Guidelines
- Waste Minimization Policy
- Water Conservation Policy
- Resource Conservation Policy
- Latex Policy
- Construction and Renovation Policy

Note: Some policies are organization-wide, others may be department specific.

### **TYING POLLUTION PREVENTION TO OTHER COMPLIANCE EFFORTS**

There are also opportunities to tie pollution prevention efforts to other compliance efforts that already have full organization support. One of these opportunities is the JCAHO environment of care standards. Many of the pollution prevention programs you may establish (including writing a pollution prevention plan) assist your organization in meeting those standards. For an introduction to this see Appendix B.

### **I.D.4.c. The Waste Streams**

#### **Waste Management Programs**

- Background and descriptive information:
  - What is waste management?
  - Do you have a system in place?
  - If so, for what wastes?
  - Who characterizes wastes prior to disposal?
  - Who manages?

Develop a plan for each waste stream. A tool to assist with this process is available on how to do an assessment of your current situation around wastes.

The plan should include specific sections on each waste stream listed below.

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### **Waste Management Section**

#### **I. Solid waste and Recycling**

- Solid Waste
  - Name of vendor(s)
  - Disposal site information
  - Costs
  - Logistics of program
    - Include a schematic of site if possible
  - Contact person for managing this program
  - In-house policies and procedures

#### **II. Regulated Medical Waste ( infectious waste, /biohazard waste)**

- Name of vendor if treated and disposed of off-site
- Disposal site information
- Vendor's waste acceptance protocol
- Logistics of program
  - Include outline of how waste is collected, stored and disposed of. Include who is responsible for packaging wastes. Describe relevant training
- Contact person for managing this program
- In-house policies and procedures
- Spill prevention plans

### III. Hazardous Waste

- Details of facility's program including waste generator status information, EPA ID number, recordkeeping and reporting
- Name of vendor if treated and disposed of off-site
- Disposal site information
- Vendor's waste acceptance protocol
- Logistics of program
  - Include outline of how waste is collected, stored and disposed of. Include who is responsible for packaging wastes. Describe relevant training
- Contact person for managing this program
- In-house policies and procedures
- Spill prevention plans

### IV. Radioactive Waste

- Radiation safety officer contact information
- Radioactive waste plan
- Name of vendor disposing of waste
- Disposal site information

### V. Other Initiatives

- Universal Wastes
- Special Wastes
- Reuse

#### NOTE:

While wastewater is not generally part of a waste plan, it is helpful to include some information about this aspect of facility operations. Specifically, there should be policies and procedures that govern what is permissible to be disposed of down the drain in each department. The Clean Water Act applies to hospitals, and an evaluation should be conducted to ensure that only permissible items are disposed of down the drain.

POTW – Policy on what goes down the drain – eg. Silver, lab chemicals, glutaraldehyde, kitchen grease. Note: the clean water act applies to hospitals. Dilution is not always the solution to pollution.

#### **I.D.4.d. Resources**

**The Ohio Hospital Association** maintains a link to hospital pollution prevention resources on its web site. You can access it through:

**<http://www.ohanet.org/>**

This site contains specific information and resources that are designed to assist Ohio Hospitals in fulfilling their commitments to advancing pollution prevention as detailed in the MOU

**The Ohio Environmental Protection Agency's Pollution Prevention Office** maintains an excellent web site with information on hospital pollution prevention.

**<http://www.epa.state.oh.us/opp/hospital.html>**

EPA also has other web resources focusing on regulation and resources, including the listing of vendors who can assist your organization. These resources and access to their databases can be accessed at:

Recycling: **<http://www.epa.state.oh.us/opp/wastex.html>**

Technical Assistance: **<http://www.epa.state.oh.us/opp/tarp/tarp.html>**

EPA Inspection checklists for solid waste and infectious waste generators can be found at: **[http://www.epa.state.oh.us/dsiwm/pages/cmeu\\_docs.html](http://www.epa.state.oh.us/dsiwm/pages/cmeu_docs.html)**

EPA fact sheets on hazardous and universal wastes can be found at:

**<http://www.epa.state.oh.us/dhwm/factsheet.html>**

Other particularly helpful programs include:

**The Sustainable Hospitals** group at the University of Massachusetts/Lowell also provides a number of resources about products and purchasing essential to finalizing any P2 plan.

**<http://sustainablehospitals.org>**

**Bowling Green State University's** mercury program offers a free service to pick up elemental mercury from your facility if it is uncontaminated. For a thorough review of their program and its technical support services:

**<http://www.bgsu.edu/offices/envhs/mercury.htm>**

### **I.D.5. Staff Education and Training**

Training, Education, Orientation and Safety

See haz communication as an example

## **I.D.6. Record Keeping and Evaluation**

### **Pollution Prevention Goals and Evaluation Measures**

To determine the effectiveness of a plan, it is helpful to have specific evaluation measures outlined ahead of time. These measures serve as a 'yardstick' to measure the plan's success. Sample goals for hospitals working on pollution prevention might include the following:

**Goal: Minimize the adverse environmental impact in the community**

**Objectives:**

- Eliminate mercury containing products
- Eliminate all non-essential incineration of wastes
- Reduce biohazard waste by 20% ( less waste requiring special treatment)
- Reduce solid waste by 20% ( through a combination of waste diversion and purchasing practice modifications)
- Increase recycling by 15% ( all recyclable wastes)
- Evaluate alternative disposal for select chemical wastes including xylene, alcohol, and formalin.

**Goal: Document pollution prevention efforts to demonstrate environmental commitment to community**

**Objectives:**

- Develop policies to support pollution prevention goals, including a policy to discontinue purchase of mercury containing products and devices
- Discontinue practice of sending new parents home with mercury fever thermometers
- Develop purchasing criterion to be applied to all new product purchases
- Record reductions in emissions to air, water and soil

## **II. The Pollution Prevention Plan Template**

<<*TITLE PAGE*>>

# Pollution Prevention Plan

<*YOUR Hospital*>  
<*address*>

November 2001

Prepared by:  
<*contact*>

1. Overview

The purpose of this pollution prevention plan is to outline the programs for *<your hospital>* that are part of a coordinated management strategy to minimize the amount of pollution generated as a result of healthcare delivery and services.

A team of designated staff members participate in the pollution prevention effort by overseeing P2 efforts in their respective divisions, and exploring opportunities for continuous quality improvement initiatives that improve environmental performance. This team is designated as the Pollution Prevention team for *<your hospital>*.

A P2 team coordinator is designated and shall serve as the overall coordinator for the organizations' efforts and serve as the collector of information representative of *<your hospitals>* pollution prevention measurement data.

P2 Team Coordinator: \_\_\_\_\_ Dept.: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Pager: \_\_\_\_\_ Email: \_\_\_\_\_  
 DATE: \_\_\_\_\_

The P2 team coordinator reports to *<safety, risk management, VP Facilities, CEO – you decide>* and documents, at least annually, *<your hospital's>* P2 progress and program status. The current P2 team and contact information is listed in Appendix *<X>*.

The P2 program is linked to the JCAHO Standards for the Environment of Care, the Safety Committee, Risk Management, Facilities Management, Community Benefit Inventory for Social Accountability Program, Public Relations, and Performance Improvement efforts. *<Add any other links you wish to establish to embed the P2 program in the organizational performance review process>*

Mission

The purpose of this program is to set forth the management strategy *< your Hospital>* will employ to assure that hazardous materials and wastes that pose significant risk to human health and the environment are appropriately handled. In so doing, this program will comply with the regulatory requirements set forth the Environmental Protection Agency ( EPA) under it's Resource Conservation and Recovery Act ( 40 CFR) and the Department of Transportation (DOT).

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Our facility's commitment to waste minimization and pollution prevention.

Statement from the CEO.

May add in the signed P2 Agreement.

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### Scope

This program applies to all <*your hospital*> facilities and entities. This program will apply to the handling of all hazardous wastes as defined by 40 CFR part 261. This program also applies to the handling of infectious, non-hazardous and radioactive wastes. This plan is a comprehensive program to ensure that <*your hospital*> is fully cognizant of and plans for waste products generated in the process of healthcare delivery. Further, this plan sets forth the need to evaluate products as they are purchased to ensure that such products do not create sources of environmental harm.

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## Pollution Prevention Council Membership (suggested)

&lt;&lt;Please complete this chart for easy reference &gt;&gt;

AREA	DEPARTMENT CONTACT	P2 Initiatives/ Coordination
Laboratory	Name: Phone: Pager: Email:	<ul style="list-style-type: none"> <li>- Solvent recovery</li> <li>- Formaldehyde recovery</li> <li>- Picric acid phaseout</li> <li>- Alcohol recovery</li> <li>- Other</li> </ul>
Pharmacy	Name: Phone: Pager: Email:	<ul style="list-style-type: none"> <li>- RCRA Hazardous Pharmaceuticals management</li> <li>- Other</li> </ul>
Radiology	Name: Phone: Pager: Email:	<ul style="list-style-type: none"> <li>- Coordination of recovery of Lead aprons, silver from x-ray film, silver from fixer/developer solutions</li> <li>- Track data</li> <li>- Champion digital imaging systems</li> </ul>
Facilities: Boiler, Maintenance	Name: Phone: Pager Email:	<ul style="list-style-type: none"> <li>- Proper management of Cutting oils, freon, solvents, compressed gases,</li> </ul>
Print Shop	Name: Phone: Pager: Email:	<ul style="list-style-type: none"> <li>- Coordination of management of waste oils, solvents</li> </ul>
Oncology	Name: Phone: Pager Email:	<ul style="list-style-type: none"> <li>- Coordination of proper segregation and disposal of cytotoxic wastes and RCRA compliance</li> </ul>
Dialysis	Name: Phone: Pager Email:	<ul style="list-style-type: none"> <li>- Coordination and minimization of use of Formaldehyde and other hazardous substances association with hemodialysis</li> </ul>
Endoscopy	Name: Phone: Pager Email:	<ul style="list-style-type: none"> <li>- Coordinate phase out of Mercury filled dilators</li> </ul>
Housekeeping: Chemicals	Name: Phone: Pager Email:	<ul style="list-style-type: none"> <li>- Coordinate product substitution</li> <li>- Coordinate phaseout of products containing PBT's</li> <li>- Coordinate integrated pest management program</li> </ul>
Central Sterile Reprocessing	Name: Phone: Pager Email:	<ul style="list-style-type: none"> <li>- Coordinate phase out/minimization of Ethylene Oxide</li> </ul>

Policy Development Initiatives

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The Pollution Prevention Council will coordinate the development of organizational policies that support and further pollution prevention activities within the institution. These policies will support the elimination of hazardous substances wherever possible, the minimization of use of substances containing persistent bioaccumulative toxic substances ( see PBT list in appendix), resource conservation, waste minimization, and a collaborative approach to problem solving with vendors, staff and the community at large.

Policies Developed:	Appendix where attached	Date
- Purchasing Policy		
- Mercury Phaseout Policy		
- PVC Phaseout Policy		
- Energy Conservation Policy		
- Hazardous Materials Purchasing Policy and Guidelines		
- Waste Minimization Policy		
- Water Conservation Policy		
- Resource Conservation Policy		
- Latex Policy		
- Construction and Renovation Policy		

<<*insert copies of policies in place*>>>

Note: Some policies are organization-wide, others may be department specific.

### Internal Management of Resources

<Your hospital> is making a dedicated effort to manage resources internally in ways that support pollution prevention goals. All P2 council members are charged with continually exploring best practices and strategies to reduce resource consumption, seek out less toxic alternatives and minimize residuals left over from activities.

<Your hospital> administrators are charged with supporting, wherever feasible, practices and procedures that minimize the ecological impact of providing care.

Examples of these activities include:

- Environmentally Responsible Purchasing practices. This amounts to source reduction. If the hospital does not import materials that will become problematic wastes they do not have to have systems to manage or dispose of them.
- Product or Process change: In many cases a new less hazardous product can be substituted for one that represents a greater hazard to manage and dispose of without altering processes or practices. In other cases, a process change can make a significant contribution to waste minimization and diminishing the toxicity of wastes (e.g., digital imaging).
- Increasing the recycling or reuse of materials. (*link to mandatory recycling ordinance wherever possible*)
  - Educating staff on most efficient and effective techniques for waste segregation
  - Educating staff on how to reduce biohazard waste
  - Educating staff to recognize hazardous materials and ensure their proper disposal.
  - Establishing programs to recover and reprocess materials where feasible

<< *Insert pages outlining specific programs – budgetary needs – and specific departments or areas needing to be targeted.* >>

## PURCHASING

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### Purchasing and Pollution Prevention

Most products purchased by <your hospital> eventually become wastes. The purchasing department is charged with exercising pollution prevention in product purchasing. This includes evaluating products for their environmental impact, packaging, type of waste they will become and exploring any vendor information on product disposal. Purchasing will communicate the intent and need for support in achieving pollution prevention and waste reduction goals to affiliated Group Purchasing Organizations and Vendors on at least an annual basis.

#### Specific Goals:

- Language will be inserted into our purchasing contracts that specifies that mercury containing products and devices will not be acquired.
- To instruct the product standard committee to include environmental criteria in their assessment of new products.
- To actively research alternatives to products now being used in the hospital that have been identified as producing Persistent Bioaccumulative Toxins (PBTs) in their manufacture or disposal; products that in their manufacture or disposal may create and release dioxins (e.g., chlorine containing products and PVC containing products and packaging).
- To review the use of chemicals in clinical, diagnostic, facilities, environmental services and other departments to evaluate whether less hazardous materials may be available.

<<add whatever language best suits your organization here to describe how purchasing is involved as a first line of defense>

Some organizations, such as Dartmouth Hitchcock Medical Center in Lebanon, NH have established lists of chemicals explicitly banned (except under extraordinary circumstances) CHMC calls this group the “dirty dozen” and it contains:

A P2 purchasing policy may also commit to using the Health Care Environmental Purchasing Tool as a screen for future product purchases.

SEE: **[http://128.11.25.80/hcept/cs\\_a.html](http://128.11.25.80/hcept/cs_a.html)**

## Material Management

### Goals:

1. Ensure that the purchase and distribution to patients and staff of mercury fever thermometers is halted immediately.
2. Identify all mercury containing products and devices in clinical areas and establish a phase-out initiative to safely remove all of these items (e.g., thermometers, sphygmomanometers, esophageal dilators)
3. To evaluate the use of all laboratory chemicals and pharmaceutical products that contain mercury, and establish a program of investigating and reviewing alternative products.
4. To assess all other mercury containing products and devices (e.g., batteries, switches, cleaning chemicals, identify alternatives and establish a time line for replacement of products where feasible.

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## WASTE MANAGEMENT SYSTEMS

### Regulatory Compliance

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<Your Hospital> seeks to achieve the highest level of compliance possible with environmental regulatory requirements. We recognize that waste management practices must comply with a host of regulatory requirements including:

- DOT – Department of Transportation
- NRC – Nuclear Regulatory Commission
- EPA – Clean Air Act
- EPA – Clean Water Act
- EPA – Resource Conservation and Recovery Act
- State regulations for solid, biohazard and hazardous wastes
- Local regulations for waste and wastewater
- OSHA – worker safety guidelines for handling waste, labeling waste
- DEA – drug enforcement agency regulations for disposing of controlled substances
- POTW – publicly owned treatment works – wastewater facilities
- Local/State recycling requirements
- NFPA and local fire codes ( storing waste)
- Health Department – waste outside facility
- HIPPA – patient confidentiality

Other regulations may affect waste management as well, and <Your Hospital> legal staff serves as liaison to the Pollution Prevention Council to ensure that all relevant regulatory requirements are addressed in program development and implementation

### Vendor Stipulations

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<Your Hospital> performs due diligence on vendors engaged in providing service or product to the organization. For waste vendors, <Your Hospital> will ascertain that all necessary permits are in place to accept the different waste types, and that the vendor can provide reasonable documentation that wastes will be handled in the designated fashion.

*( e.g make sure that hazardous wastes are being properly disposed of)*

For product vendors, due diligence will also be undertaken to ensure that hazardous substances are not inadvertently imported to the organization

*( e.g cadmium free trash bags, mercury free thermometers)*

<Your Hospital> will communicate it's pollution prevention goals and mission statement to relevant vendors and ask that they support these ends, and in relation to regulatory requirements provide the hospital with documentation of their compliance.

WASTE MANAGEMENT SYSTEM OVERVIEW

<Your Hospital>'s goal is to establish a cost-effective system to significantly reduce waste and pollution from our facility.

**WASTE MANAGEMENT: SOLID WASTE**

**Goals**

1. To reduce the overall amount of Solid Waste being disposed of by 50% by 2010 through diversion (recycling), and minimization efforts through purchasing, reuse and other efforts.

**Sample Table of Contents to a Solid Waste P2 Management Plan**

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## WASTE MANAGEMENT: BIOHAZARDOUS / INFECTIOUS WASTE

## Goal:

1. To minimize the generation of infectious wastes through rigorous segregation of wastes and continuous staff education.
2. To minimize the amount of products and packaging containing PVC from being disposed of as infectious waste.
3. To establish specific programs through education, signage and outreach to minimize the contamination of infectious waste with hazardous chemical waste. This will include programs to separately collect batteries, mercury and broken thermometers. A rigorous training program will also be conducted to educate staff on the proper disposal of oncology wastes and pharmaceutical wastes.

## Sample Table of Contents to a Biohazardous / Infectious Waste P2 Management Plan

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1.0	Purpose
2.0	Scope
3.0	Definitions
4.0	Responsibilities
5.0	Waste Management Practices
5.1	Ohio Medical Waste Regulations
5.2	DOT rules for transporting medical waste
5.3	OSHA requirements labeling and handling
5.4	OSHA Bloodborne pathogens standard & OSHA Revised compliance standard
5.4.1	The Mixture Rule (from RCRA)
5.4.1.1	Pharmaceutical wastes
5.4.1.2	Mixed wastes – Pathological and Chemical
5.5	Biohazard waste collection and storage
5.5.1	Blood spill prevention and preparedness
5.5.2	Biohazard waste storage area inspections
5.6	Biohazard waste treatment and disposal
5.6.1	Biohazard waste vendor
5.6.1.1	Permit information, licensure
5.6.1.2	Contingency plans
5.6.1.3	Contract information
5.6.2	Waste collection schedule
5.6.3	Waste packaging specifications
5.6.4	Waste labeling specifications
5.7	Specific Waste Stream handling
5.7.1	Products of conception
5.7.2	Pathological wastes
5.7.3	Sharps waste

- 5.7.4 Mixed wastes
- 5.7.5 Home care sharps
- 5.7.6 Home care chemo
- 5.7.7 Waste from affiliated clinicians offices
- 5.8 Special provisions
  - 5.8.1 Waste minimization
  - 5.8.2 Training
  - 5.8.3 Auditing

Attachments:

- Attachment I: Sample Waste tracking form (manifest)
- Attachment II: Ohio Medical Waste Definitions/regulations
- Attachment III: Examples of labels used for medical waste containers
  - Biohazard waste, 'incinerate only' for pathological waste
  - Chemotherapy waste
- Attachment IV: Blood Spill clean up protocol example
- Attachment V: Tracking log for record keeping
- Attachment VI: DOT registration form – (registered as an 'offeror" of Class 6 [biohazard] waste

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## WASTE MANAGEMENT: HAZARDOUS WASTE

## Goals:

1. Establish systems to capture and recycle all fluorescent lamps and other mercury containing light bulbs by \_\_\_\_\_.
2. To establish emergency spill response plans for mercury spills, and ensure that there are trained staff to carry them out.
3. To identify a date after which the hospital will be declared “mercury free.”
4. To establish a maintenance plan to systematically conduct drain trap clean-outs throughout the entire facility, with the aim of identifying and safely managing mercury wastes in the drains.

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 Sample Table of Contents for Hazardous Waste Management & P2 Program

1.0	Purpose
2.0	Scope
3.0	Definitions
4.0	Responsibilities
5.0	Waste Management Practices
5.1	Site Generator Status Determination
5.2	Waste Analysis Plan
5.2.1	Waste Determination
5.2.2	Generator Knowledge
5.2.3	The Mixture Rule
5.2.4	Records Handling
5.2.5	Re-Analysis
5.3	Waste Accumulation and Satellite Accumulation Practices
5.3.1	Waste Accumulation
5.3.2	Satellite Accumulation Area(s)
5.4	Labeling of Hazardous Waste Containers
5.5	Weekly Accumulation Area Inspections
5.6	Hazardous Waste Shipments
5.6.1	Hazardous Waste Manifests
5.6.2	Land Ban Notification
5.6.3	DOT Emergency Response Guide
5.6.4	Placarding
5.6.5	Hazardous Waste Transporters
5.6.6	Emergency Response and Clean Up
5.6.7	Disposal Facilities
5.7	Specific Waste Stream Handling
5.7.1	Lab Packs

- 5.7.2 Recyclable Batteries
  - 5.7.2.1 Lead Acid Batteries
  - 5.7.2.2 Nickel-Cadmium Batteries
- 5.7.3 Precious Metal Recovery (silver)
- 5.7.4 Hazardous Pharmaceutical Wastes

## 6.0 Special Provisions

- 6.1 Waste Minimization
- 6.2 Training
- 6.3 Auditing

## Attachments

- Attachment I: Sample Monthly Tracking Form
- Attachment II: EPA Registered Hazardous Waste Generator Form
- Attachment III: Hazardous Waste Determination Flow Chart
- Attachment IV: Examples of Completed Labels
- Attachment V: Sample Weekly Inspection Form
- Attachment VI: Sample Land Ban Notification Form

## Definitions:

**Hazardous Waste**, the component of waste defined by the Resource Conservation and Recovery Act.

**Corrosivity ( D002):** a waste is hazardous for corrosivity if it is not excluded under 40 CFR 261 and fulfills any of the following criteria.....

- 1) It is aqueous and has a pH less than or equal to 2 or greater than 12.5 or
- 2) It is a liquid and corrodes steel at a rate greater than 6.35 mm/yr @ 130F

**DOT:** Department of Transportation

**Ignitability (D001):** A waste is hazardous for ignitability if it is not excluded under 40 CFR 261 and fulfills any of the following criteria.....

- 1) a liquid with a flash point <140 F
- 2) It is not a liquid and is capable under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes, and when ignited burns so vigorously and persistently that it creates a hazard, or
- 3) It is ignitable compressed gas or is an oxidizer under 49 CFR ( DOT regulations)

**Large Quantity Generator:** A facility that generates greater than 2,204 pounds of hazardous waste in any one month. Large quantity generators can accumulate hazardous waste for 90 days on site.

**Listed Hazardous Waste:** A waste is a hazardous waste if it is included on any of the P, U, F, or K lists detailed under 40 CFR 261.33 ( P-U), 262.31 (F), and 262.32 (K) respectively.

**Reactivity (D003):** A waste is hazardous for reactivity if it is not excluded under 40 CFR 261 and fulfills any of the following criteria....

- 1) It reacts violently with water
- 2) It is normally unstable and violently detonates.
- 3) It is a cyanide or sulfide bearing waste which when exposed to pH conditions between 2 and 12.5 can generate toxic gases.

**Small Quantity Generator:** A facility that generates greater than 220.4 ound (25 gallons) and less than 2,204 pounds ( 300 gallons)

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**WASTE MANAGEMENT: RADIOACTIVE WASTE**

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**Radionuclides:**

- \* Use less hazardous isotopes whenever possible.
- \* Segregate and properly label radioactive wastes, and store short-lived radioactive wastes in isolation on site until decay permits disposal in trash.

Radioactive wastes cannot be treated or neutralized. Therefore, source reduction and substitution are the primary waste minimization strategies for such materials. Knowledge of the physical and biological properties of the various nuclides is required to enable assessment of environmental hazards associated with waste products.

**Table of Contents to a Radioactive Waste P2 Management Plan**

- \* ID all areas where radioactive materials are used and stored
- \* ID protocols for procurement, handling, storage and disposal of all materials

-- May include Radioactive materials safety plan here --

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## STAFF EDUCATION AND TRAINING

< *Your hospital*> recognizes that for the program to achieve success, staff members need to be educated on how they can participate in pollution prevention efforts. Hospital wide and department specific inservice presentations will be supported and delivered on a regular basis to ensure that staff members are active participants on a daily basis in meeting pollution prevention goals. This effort is key to achieving success with process improvement. Environmental education has been added to the annual mandatory inservice programs that every staff member receives.

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