PACKAGING, TRANSPORTATION, AND DISPOSAL OF WASTES OFF CAMPUS

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This paper is presented to assist academic institutions in meeting state and Federal regulations concerning the packaging, transportation, and disposal of wastes. Because the Resource Conservation and Recovery Act (RCRA) was primarily designed to regulate the chemical manufacturing industry, institutions (both hospitals and universities) are forced to comply with regulations that are, in many ways, vague or nonapplicable to their operations.

TYPES OF WASTES

Wastes are divided into three categories. The first is general refuse (i.e., garbage), which is nonhazardous, is not stringently regulated, and poses little or no disposal problem. The second type is radioactive waste, currently regulated by the Nuclear Regulatory Commission and some state agencies. The third waste category is our problem child--hazardous chemical wastes. This material is now regulated by the Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), and state environmental protection agencies. This paper addresses disposal of hazardous chemical wastes and compliance with applicable DOT, U.S. EPA, and state EPA regulations.

RESPONSIBILITIES OF CHEMICAL WASTE GENERATORS

The generator is legally responsible for proper disposal of hazardous chemical wastes. The generator's responsibilities include the notification by the generator to the U.S. EPA of hazardous waste generation, arrangement with a licensed disposal facility to accept the wastes, correct packaging of the wastes in accordance with DOT regulations, accurate completion of permits and shipping manifests, and proper transportation to the disposal facility.

To clarify the entire procedure, let's review a step-by-step description of chemical waste disposal. First, you must read the U.S. Federal Register of May 19, 1980, particularly Parts I through V. Note carefully which materials are hazardous and which are nonhazardous. If hazardous wastes are being generated, the law requires notification form [EPA

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Next, contract a licensed disposal facility to accept the hazardous waste. If the facility is in Illinois, list the hazardous waste on a supplemental permit and obtain approval from the Illinois EPA. Because approval is subject to waste compatibility segregation, especially in the case of laboratory waste, determine general chemical families based on reactivity. All laboratory waste packed in a single drum must be compatible to avoid violent reactions. For example, one drum may be packed with inorganic acids and oxidizers; another may contain insecticides, pesticides, herbicides, heavy metals and their salts, reducing agents, alkaline caustics, cyanides, sulfides, and chlorides; and a third drum may contain organic solvents, organic acids, and inert organic chemicals. Each drum containing laboratory wastes must have an itemized list showing the name and quantity of every chemical in the drum. This list must be attached to the permit.

After approval by the disposal facility and state EPA, proper packaging is the next step. An acceptable packaging procedure is as follows. Place approximately 2 to 3 inches of absorbent material in the bottom of an open-head, DOT-approved, 55-gallon steel drum. Fill it one-third full with containers of laboratory waste, add a sufficient amount of absorbent material, and gently agitate the drum to allow absorbent material to fill in spaces around the containers. This process will reduce breakage in transit. Pack the middle one-third of the drum in an identical manner. Repeat the procedure for the top third of the drum, but allow 2 to 3 inches at the top of the drum for more absorbent material. The large size bolt (5/8) and ring should be used for locking the lid on the drum to ensure integrity during shipment and disposal.

A manifest itemizing the contents of each drum must accompany the shipment. The DOT regulations for labeling drums of hazardous chemicals (whether waste or raw materials) must be observed. Consult Title 49 of the Code of Federal Regulations for lists of regulated chemicals, proper shipping names, hazard classes, labeling requirements, exceptions, and packaging requirements. Determine the hazard class for drum of laboratory wastes (e.g., corrosive, poison A, poison B, flammable liquid, flammable solid, poison gas, oxidizer, or organic peroxide) and affix the proper hazard label to the drum. When properly packaged and labeled, the drums are ready for shipment.

The final step is shipment of the drums to the contracted licensed disposal facility. In some states (e.g., Illinois), a licensed waste hauler must be employed.

SUMMARY

Proper disposal of wastes will require considerable effort. An institution, may need to develop a new department for waste disposal. Also, the possibility of recycling some chemical wastes should be investigated, because reuse would be economically desirable and because landfill space is limited. As technology progresses, incineration is another alternative to be considered.

The reluctance of many people to accept disposal facilities, especially in their own neighborhoods, threatens the survival of the dispos-

al industry. The industry desperately needs assistance in public education from all waste generators. Chemical waste is generated during the manufacture of every product. Therefore, everyone must either assume responsibility for pollution control and promote environmentally sound disposal of chemical waste or do without these products that contribute to our high standard of living.