EPA/310-R-05-002

EPA Office of Compliance Sector Notebook Project

Profile of the Healthcare Industry

Chapters IV., V. and VI.

February 2005

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U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW (MC 2224-A)
Washington, D.C. 20460

http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/health.html

IV. WASTE AND EMISSIONS PROFILE

This section provides information on the volume of waste released by the healthcare industry. The Toxics Release Inventory (TRI) is a publicly available EPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. Because only federal facilities in the healthcare industry are required to report pollutant release and other waste management information to TRI, little quantitative waste information is available for this sector. The data provided in this section are for hospitals, the segment of the healthcare industry for which the most data are available.

IV.A. Solid, Biohazardous, and Hazardous Waste Production Data for the Healthcare Industry

According to the information published in the SHEA[9] position paper on medical waste, the United States healthcare industry generates 6,670 tons per day of waste, most of which is solid or municipal waste. In January 1992, it was estimated that about 15 percent of this waste was infectious waste, or about 1,000 tons per day. A small fraction of healthcare waste is hazardous chemical or radioactive waste.

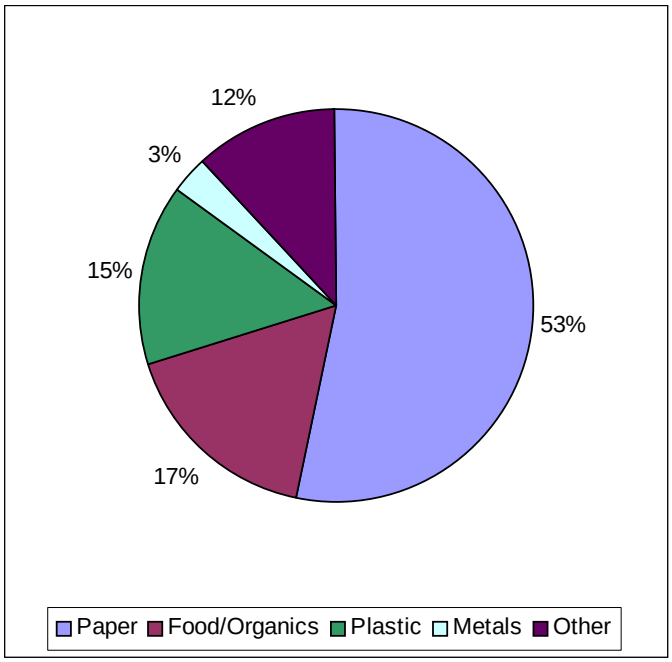
There have been limited studies evaluating healthcare waste comprehensively. Those studies were often conducted in preparation for a waste treatment technology, or were conducted on a small segment of healthcare wastes. Healthcare waste has continued to shift qualitatively as medical advances have occurred, changing the nature of many procedures, and thus wastes, within the industry. Laparoscopic procedures, cautery devices, and laser surgery have all contributed to procedures that generate less biological waste. Advances in pharmaceutical technology have reduced the need for surgical interventions. Adjustments in healthcare reimbursements have contributed to decreased length of stay in hospitals and increases in home care and outpatient or ambulatory healthcare. The supply industry has streamlined many aspects of product packaging, and the use of plastics instead of glass has lessened the weight of many products. Medical waste definitions vary from state to state, which can impact the waste segregation programs set up in a given facility.

IV.A.1. Municipal Solid Waste

Of the about 3.4 billion pounds of solid waste produced annually by hospitals, more than half is composed of paper and cardboard. Figure IV-1 demonstrates the composition of hospital solid waste.

[9] Rutala WA, Mayhall CG, "The Society for Hospital Epidemiology of American (SHEA) Position Paper: Medical Waste." *Infection Control Hospital Epidemiology*. 1992; 13:38-48.

Figure IV-1: Hospital Solid Waste Composition



Source: Healthcare Without Harm, "Setting Healthcare's Environmental Agenda" Conference Proceedings: Waste Management White Paper.

Much of the waste that is considered municipal solid waste (MSW) is composed of corrugated cardboard, paper, glass, plastics, wood, metals, food waste, leaf and yard waste, and a variety of mixed materials. For hospitals in areas that have community infrastructures to support recycling, up to 40 percent of the solid waste can be recyclable. Other wastes that can also be recycled include kitchen grease, durable goods (furnishings), toner cartridges, and X-ray film.

IV.A.2. Biohazardous Waste

As stated above, in January 1992, it was estimated that about 15 percent (an estimated 1,000 tons per day) of hospital waste was infectious waste. Biohazardous waste, also referred to as infectious waste or regulated medical waste, is that component of healthcare waste that includes sharps, pathological waste, blood and blood products, blood-soaked items, and non-regulated chemotherapy waste.

In evaluating biohazardous waste handling, it is important to understand the distinctions between state EPA biohazardous waste definitions, which help define this category of waste for treatment and disposal, and Universal Precautions, an OSHA blood-borne pathogens (BBP) rule, which is designed to protect workers from exposure to blood-borne diseases. The OSHA BBP rule provides guidance on the use of personal protective equipment when caring for patients, and has requirements for labeling and handling biohazardous waste, along with other types of waste.

It is not uncommon for workers in a healthcare facility to refer to biohazardous waste as contaminated trash, infectious waste, medical waste, medical infectious waste, regulated medical waste, or some other similar term. From a regulatory perspective, this waste stream should be collected in a consistent manner, with sharps being segregated at the source of generation in leakproof, puncture-resistant containers, and other regulated medical waste collected in biohazard containers or bags. Pathological wastes, or tissue waste, are also considered biohazardous waste, and should be collected and labeled for disposal via incineration (or as otherwise regulated by the state). Nonregulated chemotherapy wastes are also collected in distinctive containers with the chemotherapy label, packaged for disposal along with biohazardous waste, and labeled for incineration only (or other technologies that may become available).

IV.A.3. Hazardous Chemical Waste

The healthcare industry is not required to report pollutant release and other waste management information to the TRI. Therefore, little quantitative hazardous chemical waste generation information is available for this sector. However, healthcare facilities tend to generate small quantities of various hazardous chemicals relative to the amount of municipal solid waste or biohazardous waste. The amount and type of hazardous chemical waste generated is directly related to the type of facility and the quantity of various products used.

Hazardous chemical waste generation is related to key functions within the healthcare sector. These include laboratory testing areas, facility maintenance areas, groundskeeping areas, and some diagnostic areas. Facilities that include research units usually generate greater volumes and more diverse hazardous chemicals. A small amount of pharmaceuticals commonly in use are also listed or characteristic RCRA wastes. EPA has found that many hospitals are small quantity generators unless they are part of a large facility, such as a university or military base, in which case they tend to be large quantity generators. Facilities may also be temporarily large quantity generators when disposing of waste chemicals during laboratory cleanouts.

IV.B. Wastewater Discharge Data for the Healthcare Industry

A majority of healthcare facilities discharge wastewater to POTWs. These facilities complete discharge monitoring reports (DMR) according to their state, tribal, and local water discharge guidelines, but there is not a centralized data collection system for the information.

Facilities that discharge directly to waters of the United States are considered direct dischargers. Effluent discharge data from these facilities are collected in EPA's Permit Compliance System (PCS). According to calendar year 2000 data from PCS, there are only three major dischargers in the healthcare industry. Dischargers are classified as major based on an assessment of six characteristics: (1) toxic pollutant potential; (2) flow/stream flow volume; (3) conventional pollutant loading; (4) public health impact; (5) water quality factors; and (6) proximity to nearby coastal waters.

The database includes data for only a limited set of minor dischargers when the states choose to include these data. As a consequence, extensive data are not available for minor dischargers in PCS; data for 103 minor direct dischargers are in PCS.

The 106 direct dischargers in healthcare that are included in PCS fall into the categories in Table IV-1 (note that PCS uses Standard Industrial Classification (SIC) codes).

Table IV-1: Direct Dischargers Included in PCS

SIC Code	SIC Description	Minor Dischargers	Major Dischargers
8011	Offices & Clinics of Medical Doctors	4	0
8021	Outpatient Care Facilities	2	0
8051	Skilled Nursing Care Facilities	21	0
8052	Intermediate Care Facilities	18	0
8059	Nursing and Personal Care, NEC	18	0
8062	General Medical & Surgical Hospitals	20	2
8063	Psychiatric Hospitals	7	1
8069	Specialty Hospitals, Except Psychiatric	4	0
8071	Medical Laboratories	3	0
8082	Home Health Care Services	1	0
8092	Kidney Dialysis Centers	1	0
8099	Health & Allied Services, NEC	4	0
	Total	**103**	**3**

Source: PCS 2000 data.

Table IV-2 provides the total pounds of pollutants discharged annually by these 106 facilities. The totals shown are a result of summing the pounds per year contained in the PCS 2000 data. Note that only annual discharges of one pound or greater are shown.

Table IV-2: Pollutant Discharge from Direct Discharging Healthcare Facilities

Parameters	Pounds Per Year
Solids, Total Dissolved	8,065,304
Oxygen, Dissolved (DO)	822,943
Phosphorus, Total (As P)	739,632
Solids, Total Dissolved- 180 Deg. C	430,840
Oil & Grease Freon Extr-grav Meth	300,913
Solids, Total Dissolved (TDS)	199,682
Chloride (As Cl)	190,842

Table IV-2: Pollutant Discharge from Direct Discharging Healthcare Facilities (Continued)

Parameters	Pounds Per Year
Solids, Total Suspended	100,996
BOD, 5-day (20 Deg. C)	36,244
BOD, Carbonaceous 05 Day, 20C	20,821
Sulfate (As S)	15,504
Nitrogen, Ammonia Total (As N)	10,061
Hardness, Total (As CaCO3)	7,796
Oxygen Demand, Chem. (Low Level) (Cod)	4,961
Chlorine, Total Residual	1,374
Nitrogen, Total (As n)	730
Nitrite Plus Nitrate Total 1 Det. (As N)	632
Nitrogen, Nitrate Total (As N)	547
Nitrogen, Kjeldahl Total (As N)	413
Carbon, Tot Organic (TOC)	205
Oxygen Demand, Chem. (High Level) (COD)	176
Sulfide, Total (As S)	106
Magnesium, Total (As Mg)	77
Bromine Chloride	40
Zinc, Total (As Zn)	30
Fluoride, Total (As f)	16
Copper, Total (As Cu)	9
Hydrocarbons, in H2O, IR, CC14 Ext. Chromat	4
Surfactants (MBAS)	3
Zinc Total Recoverable	2
Copper Total Recoverable	2
Silver, Total (As Ag)	1

Source: PCS 2000 data.

IV.C. Air Emissions from the Healthcare Industry

Hospitals generate air emissions from medical waste incinerators, boilers, sterilization chemicals, air conditioning and refrigeration, and laboratory fume hoods. Air emissions data for certain pollutants are available from the National Emission Trends (NET) database (1999), and hazardous air pollutant emissions data are available from the National Toxics Inventory (NTI) database (1996). These databases have since been replaced by the National Emission Inventory database, but no final data are yet available. For the SIC codes

80xx (Health Services), the total emissions for volatile organic compounds (VOC), nitrogen oxides (NO_x) and hazardous air pollutants (HAPs) are shown in Table IV-3.

Table IV-3: Total Emissions for VOC, NOx, and HAPs (Tons/Year)

SIC Code	SIC Description	VOC	NOx	HAP
8011	Offices and Clinics of Medical Doctors	7	74	5
8051	Skilled Nursing Care Facilities	16	88	0
8052	Intermediate Care Facilities		1	5
8059	Nursing And Personal Care, NEC	9	228	0
8061	Hospitals	0	6	
8062	General Medical & Surgical Hospitals	1,204	12,440	607
8063	Psychiatric Hospitals	115	3,412	53
8069	Specialty Hospitals, Except Psychiatric	53	760	31
8071	Medical Laboratories	17	15	15
8081	Outpatient Care Facilities (1977)		0	
8082	Home Health Care Services			1
8092	Kidney Dialysis Centers	2	126	0
8093	Specialty Outpatient Clinics, NEC	0	2	
8099	Health And Allied Services, NEC	16	68	14
8050	Nursing and Personal Care Facilities	0	4	
	Total, All Health Services Subsectors	1,445	17,429	731

Source: Environmentally Conscious Manufacturing Strategic Initiative Group at the National Center for Manufacturing Sciences (NCMS).

Incinerator Emissions

In the September 15, 1997 Federal Register Notice (FRN) for the Hospital/ Medical/Infectious Waste Incinerators (HMIWI) Final Rule, EPA identified about 1,139 small HMIWI, 692 medium HMIWI, 463 large HMIWI, and 79 commercial HMIWI in operation. EPA estimated that, as a result of the final rule, 93 to 100 percent of small ‘‘nonremote’’ HMIWI, 60 to 95 percent of medium HMIWI, and as many as 35 percent of large HMIWI would cease operation. All 79 commercial units and 114 small units meeting the ‘‘remote’’ criteria were assumed to remain in operation. Facilities that ceased operation were assumed to find alternate methods of waste disposal.

As a result of the HMIWI rule, most facilities have phased out their on-site incinerators. Based on the January 2004 inventory conducted of the existing hospital/infectious/ medical waste incinerators, only 111 units are in operation in all the EPA regions. A list of those facilities currently operating incinerators can be found at: *http://www.epa.gov/ttn/atw/129/hmiwi/2004hmiwi_inventory.xls*.

Boilers

Many hospitals operate industrial boilers, which can generate criteria pollutants (e.g., NO_x, SO_2, particulates, CO) and hazardous air pollutants (HAPs). NO_x emissions from combustion in boilers and waste incinerators is the most serious criteria air pollutant generated by the healthcare industry. Currently, information is not available on the number of boilers, and their associated emissions, in the healthcare industry. EPA recently finalized a rule for industrial/commercial/institutional boilers. EPA's air toxics web site *http://www.epa.gov/ttn/atw/boiler/boilerpg.html* provides information regarding EPA's HAP regulations for industrial/commercial/institutional boilers and process heaters. Because the rule only applies to major sources (i.e., those that emit at least 10 tons per year of a specific HAP or a combined total of 25 tons per year of all HAPs), most medical facilities will be exempt from the regulations. However, medical facilities that are colocated with other HAP-emitting facilities, such as on military bases or college/university campuses, could be subject to the new standards if the "site" as a whole meets the definition of major.

Most hospital boilers are subject to the federal New Source Performance Standards (NSPS) regulations. The applicable regulations can be found at 40 CFR Part 60 Subparts Db and Dc. Depending on the type of fuel combusted, the regulations have emission standards for sulfur dioxide, nitrogen oxides and particulate matter. Additionally, expansion of the facility may lead to Clean Air Act Prevention of Significant Deterioration (PSD)/New Source Review (NSR) requirements. See Section VI of this Notebook for more information.

V. POLLUTION PREVENTION OPPORTUNITIES

Pollution prevention is a way to reduce the impact that a business makes on the environment. This includes reducing waste, emissions, accidental releases, fires, global waste and emissions, and depletion of raw materials and using nonrenewable energy. The healthcare industry has numerous opportunities to prevent pollution. By implementing well-planned pollution prevention strategies, facilities can improve efficiencies, save money, minimize adverse environmental impacts, and offer a healthier workplace. Opportunities vary from facility to facility and relate to the volumes and types of activities.

This section is intended to provide the reader with an understanding of some of the most common pollution prevention opportunities available to the healthcare industry. Many programs are not specifically covered by this document. For more information on the various pollution prevention opportunities available to the healthcare industry, visit the industry web sites discussed in Section VIII of this document.

V.A. General Pollution Prevention Opportunities

V.A.1. Environmental Management Systems (EMS)

Environmental Management Systems work to apply the building blocks of effective organizational management (accountability, assigned responsibilities, employee involvement, written policies, training, periodic review and corrective action, senior management support and involvement) to environmental performance. They do this by challenging a hospital to identify all of its significant environmental impacts, determine which are most important, and set performance-based objectives and targets to minimize these impacts on an ongoing basis. A comprehensive EMS will include all feasible aspects of pollution prevention.

EPA has developed a resource titled "Healthcare Guide to Pollution Prevention Implementation through Environmental Management Systems," which is a comprehensive resource for understanding the components of an EMS and for developing an EMS specific to a healthcare facility. The first edition of this document can be found at: *http://www.epa.gov/region02/healthcare/*.

V.A.2. Purchasing/Product Substitution/Source Reduction

Selection of less toxic or less polluting products can reduce pollution generation. Source reduction opportunities exist in many functional areas within healthcare. Purchasing products with minimum waste or minimum toxicity (i.e., environmentally preferable purchasing (EPP) strategy) can reduce the waste generated at the facility. Web sites with resource information for source reduction include Hospitals for a Healthy Environment (H2E) at *www.h2e-online.org* and the Sustainable Hospitals project at *www.sustainablehospitals.org.*

Examples of these approaches in healthcare include:

- **Non-mercury-containing products and devices** - Purchasing and using non-mercury-containing fixatives in the laboratory and technologies for vital sign monitoring (thermometers and sphygmomanometers) help to reduce mercury pollution.

- **Purchasing a less hazardous product for use in adhering electrodes to the scalp for EEGs** - Using less hazardous products instead of flexible collodion, which is made from alcohol and ether, is a direct strategy for source reduction.

- **Mattress selection (reduces solid waste generation)** - Using mattresses with built-in egg crates reduces the need for foam mattress overlays. Healthcare bedding items are changed out every 5 to 7 years, or more frequently depending on usage. Patient comfort, ease of cleaning, and bed sore prevention are goals to be considered in bedding purchases. Selecting mattresses with built-in, rather than disposable, egg-crate foam layers, allows for the desired attributes to be available in a semidurable, versus readily disposable, product.

- **Respiratory care products (reduces solid waste generation)** - Using reusable respiratory therapy products can help reduce waste volumes. Specific products such as ambu bags (used in respiratory resuscitation) and ventilator circuit tubing (used as a channel for air in ventilators) are available as reusable products. The energy, chemicals, labor, and space needs for having a reusable/reprocessing function on site should be evaluated. In cases where the cost benefit is favorable, this strategy makes sense.

- **Microfiber mopping** - This type of product substitution can have multiple benefits including reduced water and cleaner/disinfectant use and disposal (reduces cost, chemical hazards, storage space), less weight to lift (ergonomic benefit, lower potential for injury), reduced mopping time (more productive use of staff, lower labor cost), reduced opportunity for slips and falls on a wet floor, no cross-contamination, and preferred by patients because it is quieter and less intrusive.

V.A.3. Process Change

Process changes are intentional modifications in activities that reduce pollution. Examples of this are abundant in healthcare. Some of the process changes that have environmental benefits also have other benefits, such as cost containment or improved quality of a service or product.

Examples of process changes in healthcare include:

- **Switch to digital imaging for radiology processing (reduces silver waste outputs)**. Digital imaging and PAX-it brand systems use digital images instead of silver-laden X-ray films; this negates the need for fixer/ developer solutions, which also contain silver, and reduces water consumption.

- **Right-sizing formaldehyde collection containers (reduces formalin waste outputs)**. This practice involves having a variety of sizes of collection containers filled with the preserving fluid (usually formalin), and matching the tissue sample to the appropriate container size. Previously, many facilities stocked only a few sizes of container, with the smallest being a 4-ounce container. Carrying seven or eight different size containers allows the practitioner to select the most appropriate size container based on specimen size. In one case study, this approach reduced formalin use by as much as 70 percent, and minimized waste formalin by a similar amount. The facility saved money by using less formalin, purchasing smaller containers, and saving on space, as greater quantities of the smaller containers could be stored on site.

- **Pharmaceutical Return Programs (reduces pharmaceutical product outputs).** Implementing a pharmaceutical returns program can be a valuable practice in reducing pollution associated with pharmaceuticals. The change involves switching from disposal via drains, solid waste receptacles, and biohazard waste receptacles to a system where unused and partially used pharmaceutical products are returned to a reverse distribution company for cataloging, return credit, characterization, and disposal. Note, reverse distribution should only be used for items that are not expired and not for pharmaceuticals that are obviously waste with no potential for reuse. More information on the return program can be found at *http://www.returnsindustry.com*.

- **Improve pharmaceutical dispensing practices and minimize product packaging.** Minimizing the amount of wasted pharmaceuticals produced through inefficient dispensing practices can help reduce the amount of pharmaceuticals that the healthcare facility needs to purchase. Additionally, minimizing the amount of packaging will help reduce the amount of municipal waste produced.

- **Improved segregation and management of chemotherapy medications**. Setting up concise waste segregation programs for managing chemotherapy wastes can reduce pollution and improve worker safety. Some chemotheraputic drugs are RCRA listed. Other chemotherapy medications may be RCRA characteristic. Best management of such wastes involves setting up management programs to

separate bulk chemotherapy wastes (where there is an identifiable residual amount present) from non-regulated chemotherapy wastes (e.g., gloves, personal protective equipment, and packaging from non-regulated materials), which can usually be packaged and disposed of with biohazard waste. These are fine distinctions and require careful planning and staff education. This type of program, coupled with a reverse distribution program for unused pharmaceutical products, can mitigate pharmaceutical waste outputs that can impact all media.

- **Improved waste segregation systems (reduces biohazardous waste outputs, can increase solid waste outputs and recyclable waste outputs).** Establishing waste segregation systems that allow for the separate collection of solid wastes, recyclable wastes, and biohazardous wastes increases the likelihood that wastes can be collected and handled in the most appropriate and cost-effective fashion. In the case of biohazardous waste collection, by implementing staff education, installing appropriately labeled and convenient containers, and establishing relevant collection schedules, an organization can realize substantive reductions in biohazardous waste outputs and costs. In large part, this results from staff having the option to discard packaging wastes and other waste materials that are not contaminated, as solid waste or a recyclable waste.

V.A.4. Recycling

Waste volumes can dramatically be reduced if systems are in place to capture recyclable materials such as cardboard, paper, glass and aluminum beverage containers, scrap metals, wood waste, kitchen grease, and selected plastics. Recycling success and opportunities are usually linked to recycling infrastructure at the community level.

Opportunities for Reducing Solid Waste

Setting up programs to recycle paper, cardboard, glass, plastic, wood and other types of waste can dramatically reduce a facility's solid waste output. Other factors to consider include:

- Paper wastes - measures must be implemented to ensure the confidentiality of patient information.

- Beverage container collection/recycling (aluminum and plastic) - suitable storage and timely collection schedules are needed to prevent rodent and insect problems and foul odors, and to minimize the environmental benefit if the facility has to use pesticides.

- Durable goods such as furniture, equipment, pallets - these items can be recycled and reduce waste volumes. Mattresses are a bulky and

problematic waste for many facilities; they can hire companies that recycle bedding materials to collect and recycle bedding.

- Environmentally Preferable Purchasing (EPP) - Purposely purchasing recycled materials or materials made of recycled products in place of non-recycled materials reduces solid waste generation. Examples of products containing recycled materials are available on *www.epa.gov/cpg*.

- Universal Wastes - Collecting universal wastes separately helps streamline recycling efforts for facilities as these wastes are regulated by streamlined management rules. Universal wastes found in healthcare facilities include nickel cadmium or sealed lead-acid batteries, mercury-containing thermostats, and lamps that have a hazardous component.

Opportunities for Reducing Hazardous Waste Through Recycling Initiatives

As technologies continue to advance, more opportunities for recycling hazardous waste become available. For example,

- Reducing waste solvents, alcohols, formalin, and formaldehyde - hospital laboratories can use technologies that recycle solvents, formalin, and alcohols, making them essentially continually reusable products, that can be used over and over. There is a very small residual, referred to as 'still bottoms' that is generated during the recycling process and requires disposal as a hazardous waste. Healthcare facilities should check with their state regulations before installing recycling units.

- Reducing fluorescent bulb wastes - Collecting fluorescent bulbs for recycling as a universal waste reduces the measurable volume of hazardous waste.

V.B. Pollution Prevention Opportunities by Waste Type

Table V-1 highlights some examples of pollution prevention and waste management strategies by each waste type. Facilities can use this table with Table III-2 in Section III of this Notebook to help recognize the areas where these waste categories are generated. These strategies are meant to be illustrative examples and not a comprehensive list. For more information on recycling opportunities in the healthcare industry, visit the web sites discussed in Section VIII of this document.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Municipal Solid Waste	Cardboard, paper, boxboard, magazines, newspaper, metals (steel and aluminum), glass, plastics, food waste, leaf and yard waste, mixed materials, mattresses, furniture, pallets, carpet, packaging materials	Work with suppliers to reduce the amount of packaging waste that must be disposed of. Recycle materials as local infrastructure permits. Donate durable/bulky goods for reuse in other settings (consider zoos, veterinary clinics, local shelters, etc.). Collect packaging materials for reuse (foam peanuts, foam inserts, airbag inserts). Recycle mattresses and carpeting with specialty recyclers. Consider composting programs (on site or off site) for organic wastes such as food waste, leaf and yard wastes. Provide food scraps that can't be used as livestock feed to local farms. Educate employees about the importance of source reductions, reuse, and recycling. Reduce packaging, use double-sided printing capabilities, reuse items when feasible, use e-mail and electronic communications among staff, and use electronic forms. Change to reusable drapes, gowns, and linens where appropriate. Purchase mattresses with built-in comfort pads to eliminate the use of disposable ones. File insurance claims and purchase orders electronically instead of mailing paper forms.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category (Continued)

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Municipal Solid Waste (Continued)		Place standard forms on the computer to view and send electronically. Reduce cafeteria waste by offering discounts for those who use their own coffee mugs, soda cups, and food trays. Use old linens as rags. Develop reusable containers for vendor shipments. Switch to reusable plates for patient care. Switch from cloth sterilization wrappers to reusable sterilization canisters. Reduce duplicate items in admissions kits. Purchase recycled-content products and supplies for the cafeteria and office areas as well as for maintenance and janitorial operations. Look for information and consider implementing a municipal waste reduction strategy under the EPA WasteWi$e program, which provides technical assistance, goal setting, and recognition for accomplishments: *www.epa.gov/wastewise*.
	Construction and demolition wastes (C&D)	Much construction and demolition waste consists of wood waste, mortar products, metals, and mixed materials. Separate these wastes by material type and recycle or reuse them in other settings. Conduct drain trap cleanouts prior to construction and renovation projects, especially in areas where activities that used mercury-containing products were conducted (e.g.: former patient care areas, former laboratory settings, former reprocessing and supply decontamination areas, former dental suites/ clinics). Handle C&D wastes that contain lead, asbestos or mercury as hazardous waste or in adherence to regulatory guidelines.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category (Continued)

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Biohazardous Waste, Regulated Medical Waste (RMW)	Sharps waste, blood and blood products, pathological waste, selected isolation wastes, cultures and stocks from laboratories, blood-soaked bandages, etc.	Sharps - collect sharps waste in leakproof, puncture-resistant, cadmium-free containers. In some regions, reusable sharps collection container programs are available. This can reduce overall volumes associated with collection container wastes. Educate staff to ensure that sharps containers are solely for sharps, and items such as batteries or broken mercury thermometers should NEVER be discarded in such containers. RMW - use cadmium-free red bags to collect waste. Where feasible, explore using reusable packing/shipping containers to eliminate cardboard shipping boxes. Ensure that staff have proper education about what items can be discarded into biohazardous waste containers/red bags. Note: in Oncology and Pharmacy, ensure that only non-regulated chemotherapy is disposed of in biohazard waste containers. Non-regulated chemotherapy waste is allowed to be discarded in biohazardous waste in some states while other states require that it is collected in yellow bags. Set up systems that collect 'soft' non-regulated chemotherapy wastes in the required bags and 'sharp' non-regulated chemotherapy wastes in rigid leakproof containers. This measure will reduce the volume of packaging wastes. Label this waste 'for incineration only" (or for other technologies as they become available) and label the waste at point of generation. Pathological waste - label pathological wastes for appropriate treatment such as incineration only, or other treatment technologies that become available such as plasma arc or alkaline treatment. Ensure that formalin or formaldehyde has been decanted from specimens prior to packaging for disposal. Pollution prevention strategies for this category of wastes can also be associated with selection of disposal route/technology.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category (Continued)

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Biohazardous Waste, Regulated Medical Waste (RMW) (cont.)		These can include: 1) Minimizing use of incineration. 2) Consider on-site treatment technologies such as autoclaving or chemical/mechanical systems for the majority of RMW to reduce pollution associated with transporting wastes great distances over roadways. 3) Use drain disposal for liquid wastes (such as common body fluids) that are routinely generated and flushed down the toilet in household settings.
Hazardous Waste	Solvents Selected pharmaceuticals Ethylene oxide (EtO) Mercury-containing equipment or compounds Lead-containing equipment	Collect and recycle solvents. Identify RCRA listed and characteristic pharmaceuticals. Implement inventory control and management options. As a product management strategy, use a reverse distribution company for unused/unexpired product returns. Monitor auto dispensing machines for expired pharmaceuticals. Dispose of residual amounts of liquid properly. Minimize use of EtO where possible. Discontinue use of mercury-containing instruments and chemicals. Notify suppliers/vendors of NO MERCURY policy. Send mercury-containing products for reclamation (retorting). Identify lead-containing supplies and equipment, particularly in radiology areas, and designate for reuse, recycling or hazardous waste disposal. Note: Much lead-shielding material, when no longer suitable for use in intended purpose, can be adapted for other uses within the radiology department.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category (Continued)

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Hazardous Waste (cont.)	Hazardous chemicals	Implement chemical purchasing, inventory and management systems in laboratory settings, plant operations, boiler areas, paint, electric and plumbing shops, and other areas. Label and store waste in accordance with RCRA regulations. Use secondary containment measures for storage of hazardous chemicals and storage of hazardous chemical wastes. Develop appropriate facilities to store hazardous chemical wastes. Have spill preparedness systems in place, secondary containment, neutralizing agents, and other resources to minimize problems associated with managing hazardous materials and wastes. Seek less harmful alternatives through environmentally preferable products from such places as the Sustainable Hospital Project (*www.sustainablehospitals.org*).
Radioactive Wastes	Radioactive materials and residues in drains and piping	Work with radiation safety officer to establish protocols for radioactive waste decay, strategies to minimize the amounts of radioactive wastes generated, etc.
Pressurized Containers	Gas cylinders, gas cartridges, aerosol cans, oxygen farms	Eliminate any gas cylinders on site that are not currently in use or that do not have a specific purpose. Return to vendor for recycling where possible.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category (Continued)

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Universal Wastes	Mercury-containing thermostats, and spent fluorescent lamps and other hazardous lamps. Hazardous waste batteries, hazardous waste pesticides - recalled or sent to collection program. States may have additional universal wastes such as electronics.	Collect and recycle mercury-containing bulbs and thermostats. Develop a separate storage area for universal wastes; use proper labeling and storage methods. Contact the vendor or service representative to determine if mercury-free alternatives exist. Discontinue use, where feasible, of mercury-containing switches, thermostats, etc. Clearly label the device as one containing mercury and requiring special care and handling. Maintain a list of where mercury-containing devices are located in the facility. Train and advise maintenance staff to routinely monitor for leakage and to respond appropriately if a leak occurs. Develop a maintenance protocol for when the article needs to be recalibrated, handled, or replaced. Have mercury spill cleanup materials available in areas where mercury cannot be phased out in the near term (e.g., boiler switches in boiler room areas). When the device needs replacement due to age or efficiency, replace it with a nonmercury alternative.
Construction and Demolition Debris containing asbestos or other hazardous material	Asbestos Mercury Lead PCBs from old fluorescent lights and transformers	Conduct thorough walk-throughs prior to renovations to identify possible sources of asbestos, mercury, or lead materials. Conduct drain trap cleanouts prior to renovations in areas that once used mercury-containing products or materials. Work with a certified vendor to manage lead or PCB waste materials as they are encountered during renovations.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category (Continued)

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Wastewater	Potentially, any hazardous substance in any clinical area Oils Hydraulic fluid Chemical spills Recycle and heat recovery from boilers, cooling towers, and laundry facilities wastewater	Identify all direct discharge drains within the facility. Examine materials used and stored in proximity to the drains. If materials are potentially problematic (e.g., oils, hydraulic fluids, formaldehyde, or other hazardous chemicals), ensure that drain mat covers, spill cleanup materials, and training for spills are part of the operations plan for the area. Examine decontamination areas in emergency departments (areas where victims of chemical or biological exposures are cleansed prior to receiving medical treatment) to ensure that systems are in place to capture contaminated fluids resulting from decontamination activities.
Stormwater	Runoff from building, lawns, parking areas, underground storage tank areas, aboveground storage tank areas, disturbed soils during construction	Identify storm drains outside the facility, and explore what substances might be inadvertently discharged into them. For example, if the on-site solid waste compactor is uphill from the nearest storm drain, ensure that spill cleanup materials are nearby in the event of a hydraulic fluid leak in the compactor. If the loading dock (shipping and receiving) is near a storm drain, ensure that spill cleanup materials are nearby in the event of a chemical spill (e.g., from a large barrel of floor stripper or other potentially toxic substance). Minimize use of fertilizers and pesticides. Clean oil spills from vehicles. Cover storage tanks areas. Have spill cleanup materials readily available in relevant locations. Ensure staff have adequate training to respond to spills to minimize resulting damage. For construction project, use stormwater best practices to keep sediment and other contaminants out of run-off.

Table V-1: Pollution Prevention and Waste Management Strategies by Waste Category (Continued)

Waste Category	Specific Wastes/Emissions Found in this Category	Waste Management Strategy
Air Emissions	Air conditioning and refrigeration units	CFC/Freon management systems.
	Boilers	Use steam generated from incinerators to partially replace boilers. Purchase ENERGY STAR qualified boilers, which use about 10% less energy than a standard boiler.
	Medical waste incinerators	Minimize biohazardous waste quantities to reduce frequency of needing to run incinerator. Establish definitive waste segregation programs to minimize inappropriate segregation of hazardous wastes (e.g., mercury spill cleanup materials) in biohazardous waste stream. Minimize the use of PVC (polyvinyl plastic) products and packaging materials to reduce the likelihood of creating dioxin emissions (2,3,7,8 dioxin).
	Asbestos removal	Work with a certified vendor to conduct this process safely.
	Paint booths	Install a filtering ventilation system to collect paint fumes.
	EtO sterilizers	Minimize use of EtO where feasible. Use EtO scavenging units on external stacks. Use air monitoring systems within the facility to monitor for EtO leaks.
	Anesthesia services	Employ scavenger systems.

VI. SUMMARY OF FEDERAL STATUTES AND REGULATIONS

This section discusses the federal regulations that may apply to the healthcare sector. The purpose of this section is to highlight and briefly describe the applicable federal requirements, and to provide citations for more detailed information. The four following subsections are included:

- Section VI.A contains a list of regulations specific to this industry;
- Section VI.B contains a list of regulations by waste category;
- Section VI.C contains a list of pending and proposed regulatory requirements; and
- Section VI.D contains a list of additional applicable non-EPA regulations.

The descriptions within Section VI are intended solely for general information. While EPA has made every effort to ensure the accuracy of this information, depending upon the nature or scope of the activities at a particular facility, these summaries may or may not necessarily describe all applicable environmental requirements. Moreover, they do not constitute formal interpretations or clarifications of the statutes and regulations. States and local regulating bodies may impose more stringent requirements than those established by EPA and other federal agencies. It is beyond the scope of this compliance chapter to list the requirements of all federal, state and local regulatory bodies. For further information, consult the Code of Federal Regulations (CFR) and other state, tribal, or local regulatory agencies.

To search the CFR, go to the Electronic Code of Federal Regulations (e-CFR) at *http://www.gpoaccess.gov/ecfr/*. The e-CFR consists of two linked databases: the "current Code" and "amendment files." The Office of Federal Register updates the current Code database according to the effective dates of amendments published in the *Federal Register*. The *Federal Register* is the official daily publication for rules, proposed rules, and notices of federal agencies and organizations, as well as executive orders and other presidential documents. The *Federal Register* can be searched at *http://www.gpoaccess.gov/fr/index.html*.

VI.A. Industry-Specific Requirements

The healthcare industry is affected by multiple federal environmental statutes. In addition, the industry is subject to numerous laws and regulations from state, tribal, and local governments designed to protect and improve the nation's health, safety, and environment. Table VI-1 summarizes the major federal regulations affecting air, water, and waste outputs from the healthcare industry.

Table VI-1: Summary of Potentially Applicable EPA Regulations

Water Programs (CWA and SWDA)	
40 CFR Part 112	Oil Pollution Prevention
40 CFR Part 122	EPA-Administered Permit Programs: The National Pollutant Discharge Elimination System
40 CFR Part 141	National Primary Drinking Water Regulations
40 CFR Part 142	National Primary Drinking Water Regulations Implementation
40 CFR Part 143	National Secondary Drinking Water Regulations
40 CFR Part 144	Underground Injection Control ("UIC") Program
40 CFR Part 145	State UIC Program Requirements
40 CFR Part 146	UIC Program: Criteria and Standards
40 CFR Part 147	State UIC Programs
40 CFR Part 148	Hazardous Waste Injection Restrictions
40 CFR Part 403	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR Part 430	Effluent Guidelines for Direct Dischargers
40 CFR Part 460	Effluent Guidelines for the Hospital Point Source Category
Solid and Hazardous Wastes (RCRA)	
40 CFR Part 260	Hazardous Waste Management System
40 CFR Part 261	Identification and Listing of Hazardous Waste
40 CFR Part 262	Standards Applicable to Generators of Hazardous Waste
40 CFR Part 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR Part 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR Part 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR Part 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR Part 268	Land Disposal Restrictions
40 CFR Part 273	Standards for Universal Waste Management
40 CFR Part 279	Standards for the Management of Used Oil
40 CFR Part 280	Technical Standards and Corrective Requirements for Owners and Operators of Underground Storage Tanks ("USTs")
Hazardous Substances and Chemicals, Environmental Response, Emergency Planning, and Community Right-to-Know Programs (CERCLA and EPCRA)	
40 CFR Part 302	Designation, Reportable Quantities, and Notification
40 CFR Part 355	Emergency Planning and Notification
40 CFR Part 370	Hazardous Chemical Reporting: Community Right-to-Know
40 CFR Part 372	Toxic Chemical Release Reporting: Community Right-to-Know

Table VI-1: Summary of Applicable EPA Regulations (Continued)

Air Programs (CAA)	
40 CFR Section 52.21	Prevention of Significant Deterioration of Air Quality
40 CFR Part 60	Standards of Performance for New Stationary Sources
40 CFR Part 61	National Emission Standards for Hazardous Air Pollutants, Subpart M, National Emission Standard for Asbestos
40 CFR Part 62 Subpart HHH	Federal Plan Requirements for Hospital/Medical/Infectious Waste Incinerators
40 CFR Part 63	National Emission Standards for Hazardous Air Pollutants for Source Categories (all applicable provisions)
40 CFR Part 68	Chemical Accident Prevention Provisions
40 CFR Part 70	State Operating Permit Programs
40 CFR Part 82	Protection of Stratospheric Ozone
All applicable provisions of State Implementation Plan Regulations (promulgated pursuant to Section 110 of the Clean Air Act) including the New Source Review regulations	
Toxic Substances (TSCA)	
40 CFR Part 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
40 CFR Part 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
40 CFR Part 763	Asbestos
Pesticide Programs (FIFRA)	
40 CFR Part 160	Good Laboratory Practice Standards
40 CFR Part 162	State Registration of Pesticide Products
40 CFR Part 170	Worker Protection Standard
40 CFR Part 171	Certification of Pesticide Applicators
40 CFR Part 172	Experimental Use Permits

Note that, in the healthcare industry, compliance with environmental regulations may be handled in many different ways. Though ideally all employees should help comply, official responsibility could lie at the corporate level, it could lie within the healthcare facility as either a centrally or non-centrally organized activity, or it could be part of a function for vendored-out services. EPA observes that the organizations that successfully achieve compliance engage all or many employees in the various facility operations.

Clean Water Act

The primary objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's surface waters. Pollutants regulated under the CWA are classified as either “toxic” pollutants (priority pollutants); “conventional” pollutants, such as biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease,

and pH; or "nonconventional" pollutants, including any pollutant not identified as either conventional or priority.

The CWA regulates both direct (those that discharge directly to waters of the United States) and indirect dischargers (those who discharge to POTWs). The National Pollutant Discharge Elimination System (NPDES) permitting program (CWA Section 402) controls direct discharges into navigable waters. NPDES permits, issued by either EPA or an authorized state (EPA has authorized 45 states, one territory, and no tribes to administer the NPDES program), contain industry-specific, technology-based and water-quality-based limits and establish pollutant monitoring and reporting requirements. A facility that proposes to discharge into the nation's waters must obtain a permit prior to initiating a discharge. A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set forth the conditions and effluent limitations under which the facility may discharge.

EPA has established technology-based discharge standards for hospitals that are direct dischargers. These standards limit 5-day biochemical oxygen demand (BOD_5) and total suspended solids as a mass value calibrated per 1,000 occupied beds. pH is also limited. In contrast, water-quality-based discharge limits are based on federal or EPA-approved state or tribal water quality criteria or standards that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technology-based standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from state to state and site to site, depending on the use classification of the receiving body of water. Most states and territories follow EPA effluent guidelines, which propose aquatic life and human health criteria for many of the 126 priority pollutants. The permitting agency (EPA or the authorized state) is obligated to impose the more stringent of these two types of limits in the permit issued to the applicable hospital.

As stated in Section III.B.4 of this document, healthcare facilities wastewater sources include sinks, drains, showers, toilets, and tubs; photographic development drains from radiology (X-rays), other imaging, and dentists; and stormwater. The healthcare industry is subject to various provisions of the CWA including:

- Wastewater Discharges - NPDES Effluent Limitations and Guidelines for Direct Dischargers (guidelines for direct discharging hospitals with more than 1,000 occupied beds) and General Pretreatment Standards.

- Stormwater Permits: Municipal separate storm sewer systems (MS4), such as those from hospitals, and construction activities are subject to stormwater permitting requirements.

- Oil Pollution Prevention Requirements: Hospitals that have a total aboveground oil storage capacity exceeding 1,320 gallons or an underground storage capacity exceeding 42,000 gallons are subject to spill prevention control and countermeasure (SPCC) plan requirements.

Wastewater Discharges

As stated above, the water regulations establish different permitting programs for direct and indirect wastewater discharges. EPA's NPDES web site *http://cfpub.epa.gov/npdes* provides technical and regulatory information about the NPDES permit program that controls water pollution by regulating point sources (e.g., pipe, ditch) that discharge pollutants into waters of the United States. Most hospitals are indirect dischargers.

- Indirect Dischargers: Hospitals that are indirect dischargers are subject to regulations by the local sewer authority. At present, about 1,500 of the nation's largest municipalities are required to implement industrial pretreatment programs that include issuing industrial user permits to significant industrial users. Some municipalities have determined hospitals to be significant industrial users.

  Most municipalities have established local prohibitions that apply specifically to medical waste discharges. For example, some municipalities have set a prohibition on "all medical waste." Other prohibitions include, for example, no discharge of discernible body parts, no human remains greater than 0.5 inches in diameter, and or no radioactive wastes. The ability of municipalities to establish prohibitions to meet their specific needs/interests is very flexible.

  Federal Pretreatment Regulations prohibit discharges of fire or explosion hazards; corrosive discharges (pH < 5.0); solid or viscous pollutants; heat (in amounts that cause the treatment plant influent to exceed 104 degrees F); pollutants that cause toxic gases, fumes, or vapors; and any other pollutant (including oil and grease) that will interfere with or pass through the treatment plant.

- Direct Dischargers: There are very few direct discharging hospitals as reported to PCS in 2004 (e.g., 11 with non-major NPDES permits and 1 with major NPDES permit using SIC Code 806). Hospitals that are direct dischargers of process and sewer wastes must be permitted (i.e., obtain a permit) for any point source discharge of pollutants to waters of the United States. These permits are issued either by EPA or the state, where the state has been authorized to implement the NPDES Permit Program. The federal regulations establish the permit application and permit requirements. Specific numeric limitations that apply to a medical facility depend on the more stringent limits determined by the applicable technology-based discharge standards (40 CFR 460) and water quality standards for the receiving stream of the discharge. For detailed information on numeric limitations, contact your EPA Regional pretreatment coordinator. Contact information can be found at the following web site.
  http://cfpub.epa.gov/npdes/contacts.cfm?program_id=0&type=NPDES

Stormwater Discharges

The stormwater program is part of the NPDES program and is designed to prevent the discharge of contaminated stormwater into navigable waters. See the web site at: *http://cfpub.epa.gov/npdes/home.cfm?program_id=6*

Phase I of the stormwater program was promulgated in 1990 and applied to medium and large municipal separate storm sewer systems (MS4), certain industrial facilities (not hospitals), and any construction activity disturbing greater than 5 acres (large construction sites).

Phase II of the stormwater program was promulgated in 1999 and applies to small municipal separate storm sewer systems (MS4) and construction activity greater than 1 acre and less than 5 acres (small construction sites). Hospitals located in urbanized areas are regulated under this new rule. Any hospital located in urbanized or rural areas that are planning construction activities should look into obtaining a stormwater NPDES permit for construction.

The term MS4 does not solely refer to municipally owned storm sewer systems, but rather is a term with a much broader application that can include, in addition to local jurisdictions, state departments of transportation, universities, local sewer districts, hospitals, military bases, and prisons. A MS4 also is not always just a system of underground pipes - it can include roads with drainage systems, gutters, and ditches. Hospitals in urbanized areas should consult with their state NPDES authority to evaluate whether a permit authorization is required.

The regulatory definition of an MS4 is provided in 40 CFR 122.26(b)(8). General stormwater information can be found at *http://cfpub.epa.gov/npdes/home.cfm?program_id=6* and the Stormwater Phase II Compliance Assistance Guide, at *http://www.epa.gov/npdes/pubs/comguide.pdf.*

Aboveground or Underground Oil Storage Containers

EPA's oil spill program web site, *http://www.epa.gov/oilspill/*, provides information about EPA's program for preventing, preparing for, and responding to oil spills that occur in and around inland waters of the United States. If a hospital uses or stores oil it may be subject to the Spill Prevention Control Countermeasure (SPCC) rule. Hospitals with an above ground oil storage capacity of greater than 1,320 gallons, or total completely buried oil storage capacity greater than 42,000 gallons must prepare and implement a SPCC plan to prevent any discharge of oil into or upon navigable waters of the United States or adjoining shorelines.

On July 16, 2002, EPA promulgated a revised final SPCC Regulation which became effective August 17, 2002. EPA subsequently extended the regulatory compliance schedule included in the new SPCC rule.

The current compliance dates for the new rule are:

- February 17, 2006: Facilities must prepare and a Professional Engineer (P.E.) certify an SPCC Plan in accordance with the new SPCC rule by this date.

- August 18, 2006: The revised SPCC Plan must be implemented.

In the interim, facilities are required to maintain their existing SPCC Plan and amend it in accordance with 40 CFR §112.5.

CWA Common Areas for Inspections

While an EPA inspector is authorized to examine a wide range of documents and operations, he/she will probably be interested in three areas of a hospital: wastewater discharges, stormwater discharges, and any aboveground or underground oil storage containers.

Typical Records an EPA Inspector May Ask to Review under the CWA

- Industrial User permit (IU permit) for discharges to the local municipality (indirect discharge). Most hospitals are indirect dischargers.

- Spill Prevention, Control, and Countermeasure (SPCC) Plan. The plan is to prevent any discharge of oil into or upon navigable waters of the United States or adjoining shorelines.

- Phase II stormwater permits under the NPDES program for public hospitals located in an urbanized area.

- NPDES construction stormwater permits (Phase I and Phase II) are also required for any construction activity greater than 1 acre for any hospital located in urban or rural areas.

- NPDES general permit for discharging directly to a water body (direct discharge).

EPA's Office of Water operates a Water Resource Center with a 24-hour voice mail system for publication orders or reference questions at (202) 566-1729 (e-mail address: center.water-resource@epa.gov). Long-distance callers in the United States may also use the Wetlands Helpline ((800) 832-7828), operating weekdays from 8:30 a.m. to 4:30 p.m., EST, excluding federal holidays. Visit the Office of Water web site (http://www.epa.gov/water/) and the NPDES web site (http://cfpub.epa.gov/npdes/) for additional material.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) mandates that EPA establish regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and to create a joint federal-state (or federal-tribal) system to ensure compliance with these standards. The SDWA also directs EPA to protect underground sources of drinking water by controlling underground injection of fluid wastes.

EPA has developed primary and secondary drinking water standards under its SDWA authority. EPA and authorized states and territories enforce the primary drinking water standards, which are contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary drinking water standards consist of maximum contaminant level goals (MCLGs), which are nonenforceable health-based goals, and maximum contaminant levels (MCLs), which are enforceable limits set generally as close to MCLGs as possible, considering cost and feasibility of attainment.

A hospital would be considered a nontransient, noncommunity water system (i.e., a public water system) if it regularly serves at least 25 of the same persons 6 months per year from its own water source. The hospital would thus be required to comply with SDWA monitoring and reporting requirements. Healthcare facilities that have their own drinking water treatment to comply with MCLs should be aware that they could generate hazardous or radioactive waste (e.g., some areas have elevated arsenic levels in groundwater.)

Part C of the SDWA mandates EPA to protect underground sources of drinking water from inadequate injection practices. EPA has published regulations codified in 40 CFR Parts 144 to 148 to comply with this mandate. The Underground Injection Control (UIC) regulations break down injection wells into five different types, depending on the fluid injected and the formation that receives it. The regulations also include construction, monitoring, testing, and operating requirements for injection well operators. All injection wells have to be authorized by permit or by rule depending on their potential to threaten Underground Sources of Drinking Water (USDW). RCRA also regulates hazardous waste injection wells and a UIC permit is considered to meet the requirements of a RCRA permit. EPA has authorized delegation of the UIC for all well classes in 34 states, implements the program directly in 10 states and all Indian country areas, and shares responsibility with 6 states. For a hospital, an injection well can constitute any bored, drilled or driven shaft or a dug hole, where the depth is greater than the largest surface dimension that is used to discharge fluids underground as well as any on-site drainage systems, such as septic systems, cesspools, and stormwater wells, that discharge fluids only a few feet underground. Hospitals and doctors' offices must make sure that what they pour down a drain goes to a sewer, and not to a drywell or septic system.

The SDWA also provides for a federally implemented Sole Source Aquifer program, which prohibits federal funds from being expended on projects that may contaminate the sole or principal source of drinking water for a given area, and for a state-implemented Wellhead Protection program, designed to protect drinking water wells and drinking water recharge areas.

EPA's Safe Drinking Water Hotline, at (800) 426-4791 (or (703) 412-3330 for local and international calls), answers questions and distributes guidance pertaining to SDWA standards (e-mail: hotline-sdwa@epa.gov). The Hotline operates from 9:00 a.m. through 5:00 p.m., EST, excluding federal holidays. Visit the web site at www.epa.gov/ogwdw for additional material.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) aims to manage the disposal of waste from municipalities and industries. It regulates facilities that generate, transport, treat, store, or dispose of hazardous waste. Under RCRA, most healthcare facilities are hazardous waste generators. RCRA hazardous waste regulations are in the Code of Federal Regulations (CFR), Title 40, Parts 260 to 280. A series of hazardous waste evaluation flowcharts are available on EPA Region 2's web site at *http://www.epa.gov/region02/healthcare/*. The flowcharts are based on the federal requirements. Most states are authorized the hazardous waste program and may have more stringent requirements. Healthcare facilities should check with their states for additional requirements.

Although RCRA is a federal statute, most states are authorized to administer the RCRA hazardous waste program under their own authority. Currently, EPA has authorized 48 of the 50 states and two United States territories to administer various provisions of RCRA Subtitle C. States must have regulations consistent with and at least as stringent as the federal program; some states have additional reporting requirements. Healthcare facilities should contact their state or tribal authority to determine which state or tribal requirements apply to their business. RCRA does not enable EPA to authorize tribal hazardous waste programs in lieu of the federal program; therefore, EPA directly implements RCRA hazardous waste programs in Indian country, but tribes may have their own, independent hazardous waste programs.

RCRA defines hazardous waste as a subset of solid waste. Solid waste is defined as garbage, refuse, sludge, or other discarded material (including solids, semisolids, liquids, and contained gaseous materials). Once a waste is considered solid waste, determine if it is hazardous waste. EPA defined hazardous wastes as either listed or characteristic. If a waste is specifically named on one of four lists of hazardous wastes, it is a listed waste. If a waste exhibits one of four characteristics, it is a characteristic waste. Section III.B.3 describes the listed and characteristic hazardous wastes commonly found in the healthcare field.

Under RCRA, a facility must determine its generator status. Reporting and other regulatory requirements are different for each generator type. Hazardous waste generators are divided into three categories, according to how much hazardous waste they generate in a calendar month:

- **Large Quantity Generators** (LQGs) generate greater than or equal to 1,000 kg (about 2,200 lbs) of hazardous waste per month, or greater than 1 kg (about 2.2 lbs) of acutely hazardous waste per month. EPA considers acute hazardous wastes the P-listed wastes. If facilities generate more than 1 kg (about 1 quart) of acutely hazardous waste, then they are LQGs

and must comply with all LQG reporting requirements. See Table III-1 for a list of some common acute and toxic healthcare hazardous wastes.

- **Small Quantity Generators** (SQGs) generate greater than 100 kg (about 220 lbs) but less than 1,000 kg of hazardous waste per month and or less than 1 kg (about 2.2 lbs) of acutely hazardous waste per month.

- **Conditionally Exempt Small Quantity Generators** (CESQGs) generate less than or equal to 100 kg of hazardous waste per month, and less than or equal to 1 kg of acutely hazardous waste per month. Not all states recognize the CESQG classification.

- **Large Quantity Handler of Universal Waste** (LQHUW) store greater than 5,000 kg of universal waste on site.

- **Small Quantity Handler of Universal Waste** (SQHUW) store less than 5,000 kg or about 11,000 lbs of universal waste (all types combined) on any given day during the calendar year.

Entities that generate hazardous waste are subject to Federal standards applicable to generators of hazardous waste (e.g., hazardous waste manifest, pre-transportation, recordkeeping and reporting, etc). Storage of hazardous waste generally requires a permit under RCRA hazardous waste regulations, but provisions under RCRA do allow generators to "accumulate" hazardous waste on site without a permit or interim status as long as they comply, among other things, with the technical standards for the containment unit(s). The length of time a generator is allowed to accumulate hazardous waste on site without a permit or interim status depends on the generator's classification. For instance, Large Quantity Generators may accumulate any quantity on-site for 90 days or less without a permit or interim status. Small Quantity Generators may accumulate no more than 6,000 kg of hazardous waste without a permit or interim status for 180 days or less (or for 270 days or less depending on transport distance). CESQGs may accumulate 1,000 kg of waste, 1kg acute waste, or 100 kg residue or contaminated soil from a cleanup of an acute hazardous waste spill. Generators also may treat hazardous waste in accumulation tanks or containers (in accordance with the requirements of 40 CFR Part 262.34) without a permit or interim status. Facilities that treat, store, or dispose of hazardous waste generally are required to obtain a RCRA permit.

Generator status is determined by calendar month; therefore, one month a facility may be a CESQG, and the rest of the year it may be an SQG. In this case, it might be easier to comply with SQG reporting requirements for consistency. On the other hand, if the facility is usually an SQG, a store room or laboratory cleanout might push it into being an LQG. In exceptional cases like this when it is a one time occurrence, some states have made exceptions so that the cleanout does not trigger LQG status.

Generators “count” the amount of waste generated, by adding up the total weight of all quantities of characteristic and listed waste generated at a particular facility. Certain wastes, such as those that are reclaimed or recycled continuously on site, are not counted under

the federal regulations but might be counted under some state regulations. Facilities should also determine if their state has adopted the universal waste rule, which would cover mercury-containing thermostats, certain batteries, and fluorescent light bulbs. Universal wastes do not count toward determining generator status.

Most RCRA requirements are not industry-specific but apply to any company that generates, transports, treats, stores, or disposes of hazardous waste. Below are some important RCRA regulatory requirements that apply to healthcare facilities:

Identification of Solid and Hazardous Wastes (40 CFR Part 261) establishes the standard to determine whether the material in question is considered a solid waste and, if so, whether it is a hazardous waste or is exempted from regulation.

Standards for Generators of Hazardous Waste (40 CFR Part 262) establishes the responsibilities of hazardous waste generators including obtaining an EPA identification number, preparing a manifest, ensuring proper packaging and labeling, meeting standards for waste accumulation units, and recordkeeping and reporting requirements. Generators can accumulate hazardous waste on site for up to 90 days (or 180 days depending on the amount of waste generated) without obtaining a permit. If the waste must be transported more than 200 miles away for recovery, treatment, or disposal, the generator may accumulate the waste for up to 270 days.

Standards for Transporters of Hazardous Waste (40 CFR Part 263) apply to persons transporting manifested shipments of hazardous waste within the United States. Transport requires an EPA identification number, a hazardous waste manifest, compliance with Department of Transportation (DOT) requirements, and proper recordkeeping.

Land Disposal Restrictions (LDRs) (40 CFR Part 268) are regulations prohibiting the disposal of hazardous waste on land without prior treatment. Under the LDRs program, materials must meet treatment standards prior to placement in a RCRA land disposal unit (landfill, land treatment unit, waste pile, or surface impoundment). Generators of waste subject to the LDRs must provide notification of such to the designated TSD facility to ensure proper treatment prior to disposal.

Used Oil Management Standards (40 CFR Part 279) impose management requirements affecting the storage, transportation, burning, processing, and re-refining of used oil. For parties that merely generate used oil, regulations establish storage standards. A party considered a used oil processor, re-refiner, burner, or marketer (one who generates and sells off-specification used oil directly to a used oil burner), must meet additional tracking and paperwork requirements.

RCRA contains unit-specific standards for all units used to store, treat, or dispose of hazardous waste, including Tanks and Containers. Tanks and containers used to store hazardous waste with a high volatile organic concentration must meet emission standards under RCRA. Regulations (40 CFR Part 264-265, Subpart CC) require generators to test the waste to determine the concentration of the waste, to satisfy tank and container emissions standards, and

to inspect and monitor regulated units. These regulations apply to all facilities that store such waste, including large quantity generators accumulating waste prior to shipment off site.

Underground Storage Tanks (USTs) containing petroleum and hazardous substances are regulated under Subtitle I of RCRA. Subtitle I regulations (40 CFR Part 280) contain tank design and release detection requirements, as well as financial responsibility and corrective action standards for USTs. The UST program also includes upgrade requirements for existing tanks that were to be met by December 22, 1998.

Boilers and Industrial Furnaces (BIFs) that use or burn fuel containing hazardous waste must comply with design and operating standards. BIF regulations (40 CFR Part 266, Subpart H) address unit design, provide performance standards, require emissions monitoring, and, in some cases, restrict the type of waste that may be burned.

Imminent Hazard RCRA Section 7003 gives EPA a broad and powerful enforcement tool to use in abating imminent hazards caused by hazardous or solid wastes. Section 7003 states that upon receipt of evidence that the past or present handling, storage, treatment, transportation, or disposal of any solid waste or hazardous waste may present imminent and substantial endangerment to human health or the environment, EPA may bring suit against any person who has contributed or who is contributing to the handling of the waste to restrain the person, order the person to take any action that may be necessary, or both. This authority is used only in extreme circumstances.

Some wastes have special exclusions for practices that are not considered to be hazardous, as determined by federal policy. Several exclusions and exemptions pertain specifically to healthcare facilities. Keep in mind that some states do not recognize the federal exclusions. Some federal exclusions, exemptions, and other special circumstances that are relevant to healthcare facilities are listed below:

- **Domestic Sewage Exclusion**. Mixtures of domestic sewage and other wastes that discharge to a sewer system to a POTW for treatment are excluded from the definition of solid waste. For example, employees may generate a hazardous waste by washing hands with a soap containing a listed hazardous waste. The mixture will be going through a POTW; therefore, it is excluded from the facility's hazardous waste "count." Generators need to contact their local POTW for prior approval. Note that wastes must actually reach the POTW to be covered by this exclusion. Waste that volatilizes in the drain or corrodes the pipes does not reach the POTW.

- **Point Source Exclusions**. Point source discharges of industrial waste waters that are subject to regulation under Section 402 of the CWA are excluded from the definition of solid waste.

- **De Minimis Exclusion**. Small quantities of some solvents and other chemicals are exempt from the regulations when they are mixed with

wastewater in a wastewater treatment system discharging, according to the Clean Water Act.

- **Elementary Neutralization Unit**. Tanks used for neutralizing waste that is hazardous solely because of its corrosive characteristic are excluded from the permitting requirements.

- **Nitroglycerine Formulation**. As of August 14, 2001, federal regulations of nitroglycerine formulations are exempt from hazardous waste regulation as long as they do not exhibit the characteristic of reactivity. Medicinal nitroglycerine are typically not reactive and therefore would not be regulated. This interpretation is based on the revised mixture and derived-from rules [40 CFR 261.3(g)(1)]. Healthcare facilities should check with their state environmental regulatory agency to see if this rule applies in the state in which they operate.

- **Wastewater Treatment Unit**. Any hazardous waste tank system used to store or treat the wastewater that is managed at an on-site wastewater treatment facility with an NPDES permit or that discharges to a POTW is exempt from the RCRA regulations. Most healthcare facilities do not perform this type of wastewater treatment but instead perform elementary neutralization, discussed below.

- **Mixed Wastes**. In May 2001, EPA issued a rule offering a conditional exemption from RCRA requirements for mixed waste as long as it is managed in accordance with NRC or Agreement State licenses (40 CFR Part 266, Subpart N). This exemption covers on-site storage and means that facilities no longer have to obtain RCRA storage permits for mixed waste stored beyond 90 days. The rule has been adopted by 20 states, but is authorized in only two.

- **Reverse Distribution of Pharmaceuticals**. Unused pharmaceutical products shipped to reverse distributors are not considered discarded and are therefore not classified as hazardous waste. The materials must be shipped as product and not identified as waste. Check with state regulatory authorities to understand specific restrictions or requirements in each state.

- **Epinephrine Syringes**. Epinephrine residue in syringes is not considered P042 under federal RCRA hazardous waste rules. Some states may not have adopted this policy. See also *http://www.epa.gov/epaoswer/hotline/94report/12_94.txt*. Note that this federal interpretation does not apply to epinephrine in other formulations (such as vials), and note that the syringe may still be hazardous waste by characteristic.

Typical Physical Features to Inspect under RCRA

- Universal waste storage area;
- Used oil storage areas;
- Vehicle maintenance facilities;
- Battery storage areas;
- Building maintenance and repair shops;
- Laboratories;
- Bulk storage tank farms;
- Transfer terminals;
- Secondary containment structures;
- Tank peripheral piping, manifolds, filling and dispensing areas;
- Dispenser pumps and check valves;
- Tank sumps, manway areas;
- Leak detection equipment;
- Overflow alarms or other audible and visual alarms, sight gauges;
- Fill ports, catchment basins;
- Oil/water separators;
- Cleanup equipment (e.g. absorbent materials, fuel recovery pumps, personal protective gear);
- Hazardous waste generation sites (x-ray, chemotherapy, morgue, pathology);
- Waste storage areas;
- Satellite accumulation points;
- Vehicles used for transport;
- Container storage areas; and
- Shop activities.

Typical Records an Inspector May Ask to Review under RCRA

- Notification of Hazardous Waste Activity (EPA ID No.);
- Hazardous waste manifests;
- Manifest exception reports;
- Biennial reports;
- Inspection logs;
- Land disposal restriction certifications;
- Employee training documentation;
- Hazardous substance spill control and contingency plan;
- Material Safety Data Sheets (MSDSs);
- Inventory records;
- Spill records - Spill Prevention Control and Countermeasure (SPCC) Plans;
- Emergency plan documents;
- Placarding of hazardous waste and hazardous materials;
- Permits, if issued;
- Waste analysis plan(s);

- Operating record;
- Universal waste transportation/shipping records;
- Used oil analysis records;
- Used oil transportation related documentation; and
- Underground Storage Tanks (UST) leak detection performance and maintenance including the following:

  — Monitoring results over the last 12 months,
  — Most recent tank tightness test(s),
  — Manual tank gauging records,
  — Copies of performance claims provided by leak detection equipment manufacturers,
  — Records of recent maintenance, repair and calibration of on-site leak detection equipment,
  — Records of required inspections and test of corrosion protection systems,
  — Records of repairs or upgrades of UST systems,
  — Site assessment results of closed USTs,
  — Results of AST integrity assessments, sampling, monitoring, inspection and repair work,
  — Notification forms and registration records for all in-service, temporarily out-of service, and permanently closed tanks, and
  — Waste determinations.

RCRA information is available to the public on the web at www.epa.gov/osw. The Office of Solid Waste (OSW) has also compiled a list of phone numbers and waste program web sites maintained by EPA Regional offices and state environmental agencies to help users locate site-specific information on RCRA facilities within their states. This compilation is found at www.epa.gov/epaoswer/osw/comments.htm. This site also provides links to the RCRA OnLine database (www.epa.gov/rcraonline), to a searchable database of Frequently Asked Questions (FAQs) about RCRA, and to an on-line order form for RCRA publications (www.epa.gov/epaoswer/osw/publicat.htm). More information on RCRA Subtitle C can be found at www.epa.gov/epaoswer/osw/hazwaste.htm. State specific information related to RCRA can be found at www.herc.org.

See Section VI.C of this document for information pertaining to pending regulations under RCRA.

Universal Waste Rule

EPA created the Universal Waste Rule to encourage and streamline recycling efforts. It allows facilities to count wastes as universal instead of hazardous, which does not count toward generator status. Segregating universal wastes from the rest of the hazardous waste streams can save hospitals money on disposal costs, as well as on recordkeeping. Federal universal wastes include hazardous waste batteries, mercury-containing thermostats, certain pesticides, and fluorescent light bulbs. Facilities should make sure that their state or territory has

adopted these universal wastes. Some states may have additional types of waste such as electronics on their list of universal wastes. Section III.B.3 also discusses this rule.

Medical Waste Tracking Act

In 1988, Congress enacted the Medical Waste Tracking Act under RCRA Subtitle J, which directed EPA to begin a two-year demonstration program for medical waste tracking. The demonstration program operated from June 1989 to June 1991. The program is expired and no federal tracking requirements are in place; however, many states have developed similar tracking and management programs.

Emergency Planning And Community Right-To-Know Act

This act, also known as Superfund Amendments and Reauthorization Act (SARA) Title III, was designed to promote emergency planning and preparedness at both the state and local level. It provides citizens, local governments, and local response authorities with information regarding the potential hazards in their community. EPCRA requires the use of emergency planning and designates state and local governments as recipients of information regarding certain chemicals used in the community. SARA Title III, better known as EPCRA, originated from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or better known as the Superfund law). Like EPCRA Section 304, CERCLA also has hazardous substance release reporting regulations under CERCLA Section 103; 40 CFR Part 302. Under CERCLA, the person in charge of a facility is required to report to the National Response Center ((800) 424-8802 or www.nrc.uscg.mil) "immediately upon knowledge of a reportable release" any environmental release of a listed hazardous substance that equals or exceeds a reportable quantity.

EPCRA establishes the following types of reporting obligations for facilities that store or manage specified chemicals:

Emergency Planning (Sections 302 and 303)

Any healthcare facility that has any chemical listed on the extremely hazardous substances list at or above its planning threshold quantity must perform the following:

- Notify the State Emergency Response Commission (SERC) and Local Emergency Planning Committee (LEPC) within 60 days of receiving the shipment (or producing the substance) on site;
- Provide the LEPC with a facility representative who will participate in the emergency planning process; and
- Provide requested information for the LEPC necessary for development and implementation of the emergency plan.

Emergency Release Notification (Section 304)

If there is a reportable release into the environment of a hazardous substance, healthcare facilities must provide an emergency notification and a written follow-up notice to the LEPC and SERC (for any area likely affected). A release is reportable under EPCRA Section 304 if the amount of hazardous substance releases meets or exceeds the minimum reportable quantity set in the regulations. Two types of chemicals fall under this regulation: 1) extremely hazardous substances; and 2) CERCLA hazardous substances.

Annual Inventory (Sections 311 and 312)

Under EPCRA Section 311 requirements, healthcare facilities must submit copies of hazardous chemical material safety data sheets (MSDS) or a list of MSDS chemicals to the LEPC, SERC, and local fire department. Under Occupational Safety and Health Administration (OSHA) regulations, employers must maintain a MSDS for any hazardous chemical stored or used in the work place.

Under EPCRA Section 312, healthcare facilities that meet Section 311 requirements for a hazardous chemical must submit an annual inventory report for that chemical. The inventory report (called a Tier II report) must be submitted to the LEPC, SERC, and local fire department by March 1 of each year.

Certain chemicals are exempt from the EPCRA Section 311 and 312 definition of a hazardous chemical. One exemption that applies to the healthcare industry is the exemption of medical and research lab materials (i.e., any substance, to the extent it is used in a research laboratory or a hospital or other medical facility under the direct supervision of a technically qualified individual). A technically qualified individual meets the following definition:

- Capable of understanding the health and environmental risks associated with the chemical substance that is used under his or her supervision because of education, training, or experience, or a combination of these factors;

- Responsible for enforcing appropriate methods of conducting scientific experimentation, analysis, or chemical research to minimize such risks; and

- Responsible for the safety assessments and clearances related to the procurement, storage, use, and disposal of the chemical substance as may be appropriate or required within the scope of conducting a research and development activity.

In addition, EPCRA requirements do not apply to the transportation, including storage, of any substance, with the exception of Section 304 reporting. Therefore, materials being distributed or stored incident to transportation (i.e., under active shipping papers) would not be included in a facility threshold determination under Sections 311 and 312.

EPCRA Section 313 (Toxic Release Inventory, TRI)

The healthcare industry primarily falls under SIC codes 0741 and 0742 (veterinary services), 4119 (land ambulances), 4522 (air ambulances), 80 (hospitals and doctors' offices/clinics), 83 (social services), and 8734 (veterinary testing laboratories). These SIC codes are not required to report to TRI (i.e., submit annual reports of toxic chemical releases) under EPCRA Section 313. Federal facilities however, are subject to EPCRA Section 313. These include federal hospitals such as veterans hospitals, military hospitals, or clinics in federal prisons.

Healthcare facilities that are defined as auxiliary facilities (i.e., supports another establishments's activities) can assume the SIC code of the covered establishment that it supports. For the purposes of TRI, auxiliary facilities are defined as one primarily engaged in performing support services for another establishment(s) of a facility (in a covered SIC code) and is in a different physical location than the primary facility. If the healthcare facility meets this definition, the facility meets the SIC code criterion.

Typical Records an EPA Inspector May Ask to Review under the EPCRA

- Proof of notification for all environmental releases of a listed hazardous substance. "Failure to notify" violation will be sited if the National Response Center, State Hotline, and LEPC is not notified in a timely fashion.
- Emergency Response Plans.
- MSDS.
- Tier I or Tier II inventory reporting forms. This inspection is done together with the MSDS. The inspector will look at what materials are stored and in what quantity and if they are subject to reporting requirements. The federal government prefers the more detailed Tier II inventory form.
- EPA Toxic Release Inventory Form R for federal healthcare facilities report on every chemical manufactured, processed, or used. Form R contains facility identification information and chemical specific information (toxic chemical identity; mixture component; activity and uses; maximum amount of chemical on site during calendar year; quantity; transfers; discharges; on-site waste treatment; on-site energy recovery; on-site recycling; source reduction/recycling).

Visit these web sites for more information: http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/EPCRA.htm and http://www.epa.gov/ceppo/pubs/hotline/hazchem.html. Visit the TRI web site (http://www.epa.gov/tri/) for more details. ***"List of Lists"*** *is a consolidated list of chemicals subject to EPCRA and CAA Section 112(r) used to help facilities*

handling chemicals determine whether they need to submit reports under Sections 302, 304, 311, 312, or 313 of EPCRA and, for a specific chemical, what reports may need to be submitted. It will also help facilities determine whether they will be subject to accident prevention regulations under CAA Section 112(r) and lists "unlisted hazardous wastes" under RCRA. It is available at http://www.epa.gov/ceppo/pubs/title3.pdf

Clean Air Act

The CAA and its amendments are designed to "protect and enhance the nation's air resources so as to promote the public health and welfare and the productive capacity of the population." The CAA consists of six sections, known as Titles, which direct EPA to establish national standards for ambient air quality and for EPA, states, and tribes to implement, maintain, and enforce these standards through a variety of mechanisms. Under the CAA, many facilities are required to obtain operating permits that consolidate their air emission requirements. State, tribal, and local governments oversee, manage, and enforce many of the requirements of the CAA. CAA regulations appear at 40 CFR Parts 50-99.

As discussed in Section III.B.4 of this document, healthcare air emissions come from air conditioning and refrigeration, boilers, medical waste incinerators (if on site), asbestos, paint booths, ethylene oxide sterilization units, emergency generators, anesthesia, laboratory chemicals, and laboratory fume hoods.

Pursuant to Title I of the CAA, EPA has established national ambient air quality standards (NAAQSs) to limit levels of "criteria pollutants," including carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. Geographic areas that meet NAAQSs for a given pollutant are designated as attainment areas; those that do not meet NAAQSs are designated as nonattainment areas. Under Section 110 and other provisions of the CAA, each state must develop a State Implementation Plan (SIP) to identify sources of air pollution and to determine what reductions are required to meet federal air quality standards. Tribes may, but are not required, to develop Tribal Implementation Plans (TIP), which play the same role as SIPs, but apply within Indian country. Revised NAAQS for particulates and ozone became effective in 2004.

Title I also authorizes EPA to establish New Source Performance Standards (NSPS), which are nationally uniform emission standards for new and modified stationary sources falling within particular industrial categories. NSPSs are based on the pollution control technology available to that category of industrial source (see 40 CFR Part 60).

New Source Performance Standards

NSPS at 40 CFR 60 include process-specific operational standards. Individual states may impose stricter requirements. The following NSPS are particularly relevant to the healthcare industry:

- **Boilers -** Most hospital boilers are subject to the NSPS regulations. The applicable regulations can be found at 40 CFR Part 60, Subparts Db and

Dc. Subpart Db applies to the larger boilers (greater than 100 million BTU/hr) that were constructed after June 19, 1984. Subpart Dc applies to the smaller boilers (between 10 and 100 million BTU/hr) that were built after June 8, 1989. Depending on the type of fuel combusted, the regulations have emission standards for sulfur dioxide, nitrogen oxides, and particulate matter. The NSPS also have requirements for monitoring and recordkeeping. *http://www.epa.gov/ttn/atw/boiler/boilerpg.html*.

- **Medical Waste Incinerators** - Under the CAA, EPA regulates air emissions from hospital and or medical/infectious wastes incinerators (HMIWI). The applicable regulations can be found at 40 CFR Part 60, Subparts Ec and Ce. Subpart Ec applies to HMIWI that were constructed after June 20, 1996. Subpart Ce applies to HMIWI that were constructed before June 20, 1996. When burned, medical waste may emit air pollutants, including hydrochloric acid (Hal), dioxins and furans, and metals, such as lead (Pb), cadmium (Cd), and mercury (Hg). Therefore, EPA has developed emission standards that apply to incinerators used by hospitals and healthcare facilities as well as those used by commercial waste treatment and disposal companies to treat medical waste. The emission guidelines are intended to meet the requirements of the CAA, and states must establish standards that are at least as protective. These standards will result in reductions in the air emissions of concern from HMIWI. For additional information visit: *http://www.epa.gov/ttn/atw/129/hmiwi/rihmiwi.html*.

Hazardous Air Pollutants

Under Title I, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), nationally uniform standards oriented toward controlling specific hazardous air pollutants (HAPs). Section 112(c) of the CAA further directs EPA to develop a list of source categories that emit any of 188 HAPs, and to develop regulations for these categories of sources. To date, EPA has listed 185 source categories and developed a schedule for establishing emission standards. The emission standards are being developed for both new and existing sources based on "maximum achievable control technology" (MACT). The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors. Air toxics regulations apply to several operations at healthcare facilities. The NESHAPs that apply to the industry are:

- **Asbestos** (40 CFR 61 Subpart M) - A hospital that performs demolition and renovation operations will be subject to the CAA NESHAP for asbestos. Asbestos must be removed prior to demolition or renovation and proper precautions must be made such as wetting down the material to keep in intact. No asbestos is to be stripped, removed, or otherwise handled or disturbed unless at least one authorized representative trained in NESHAP asbestos regulations is present. A written notice of intention

to demolish or renovate must be submitted to EPA at least 10 working days prior to the start of construction.

- **Industrial, Commercial and Institutional Boilers and Process Heaters** (40 CFR 63 Subpart DDDDD) - This NESHAP may apply at hospitals that are major hazardous air pollutant emitters under the CAA. A major emitter is defined as emitting 10 tons/year of a single HAP or 25 tons/year of combined HAPS. For additional information visit: *www.epa.gov/ttn/atw/boiler/boilerpg/html*.

Chemical Accident Prevention Provisions

The CAA sets forth a list of regulated substances and thresholds, a petition process for adding or deleting substances to the list of regulated substances, requirements for owners or operators of stationary sources concerning the prevention of accidental releases, and state accidental release prevention programs.

Title V Permits

Title V of the CAA requires that all "major sources" (and certain minor sources) obtain an operating permit. Healthcare facilities that qualify as a major source are required to have a Title V permit, and may be required to submit information about emissions, control devices, and the general process at the facility in the permit application. Permits may limit pollutant emissions and impose monitoring, recordkeeping, and reporting requirements.

Monitoring requirements for many facilities with Title V permits are specified in the Compliance Assurance Monitoring (CAM) regulations. For facilities that meet emissions requirements on their permits by using pollution control equipment, CAM may require that the facilities monitor the control equipment to assure that it is operated and maintained as prescribed in their permits.

Refrigerant Recycling Rule

The purpose of Section 608 of the CAA is to maximize the recovery and recycling of refrigerants during the servicing and disposal of stationary air conditioning and refrigeration equipment. Requirements include prohibition of venting, service requirements, equipment certification, leak repair, proper disposal, and recordkeeping. More information can be found at *http://www.epa.gov/region02/cfc/*.

EPA's Clean Air Technology Center, at (919) 541-0800 (in Spanish: (919) 541-1800) or http://www.epa.gov/ttn/catc, provides general assistance and information on CAA standards (e-mail: catcmail@epamail.epa.gov). The Stratospheric Ozone Information Hotline, at (800) 296-1996, or the Ozone Depletion web site (www.epa.gov/ozone), provides general information about regulations promulgated under Title VI of the CAA. RCRA information pertaining to questions about accidental release prevention under CAA Section112(r), is available in the RCRA OnLine database (www.epa.gov/rcraonline), a searchable database of

Frequently Asked Questions (FAQs) about RCRA, and through an on-line order form for RCRA publications (www.epa.gov/epaoswer/osw/publicat.htm). Information on air toxics can be accessed through the Unified Air Toxics web site at http://www.epa.gov/ttn/atw/. In addition, the Clean Air Technology Center's web site includes recent CAA rules, EPA guidance documents, and updates of EPA activities. Visit the Office of Air and Radiation (OAR) homepage for more information: (http://www.epa.gov/air/).

See Section VI.C of this document for information pertaining to pending regulations under CAA.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) granted EPA authority to create a regulatory framework to collect data on chemicals in order to evaluate, assess, mitigate, and control risks that may be posed by their manufacture, processing, and use. TSCA provides a variety of control methods to prevent chemicals from posing unreasonable risk. It is important to note that pesticides as defined in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) are not included in the definition of a "chemical substance" when manufactured, processed, or distributed in commerce for use as a pesticide. Healthcare facilities may be subject to TSCA through:

- Lead hazard reduction regulations;
- Hexavalent chromium regulations under 40 CFR 749.68, replace hexavalent chromium compounds with phosphate based chemicals for water treatment in industrial cooling towers;
- Polychlorinated Biphenyls (PCB) hazard reduction regulations; and
- Asbestos hazard reduction regulations.

TSCA Regulations for Lead

- **National Lead Laboratory Accreditation Program** (TSCA Section 405(b)) establishes protocols, criteria, and minimum performance standards for laboratory analysis of lead in paint, dust, and soil.
- **Hazard Standards for Lead in Paint, Dust, and Soil** (TSCA Section 403) establishes standards for lead-based paint hazards and lead dust cleanup levels in most pre-1978 housing and child-occupied facilities.
- **Training & Certification Program for Lead-Based Paint Activities** (TSCA Section 402/404) ensures that individuals conducting lead-based paint abatement, risk assessment, or inspection are properly trained and certified, that training programs are accredited, and that these activities are

conducted according to reliable, effective, and safe work practice standards.

- **Pre-Renovation Education Rule** (TSCA Section 406(b)) ensures that owners and occupants of most pre-1978 housing are provided information concerning potential hazards of lead-based paint exposure before beginning certain renovations on that housing.

- **Lead-Based Paint Disclosure Rule** (TSCA Section 1018) requires disclosure of known lead-based paint and or lead-based paint hazards by persons selling or leasing housing constructed before the phase-out of residential lead-based paint use in 1978.

TSCA Regulations for PCBs

The PCB regulations and requirements apply to both PCB waste materials and PCBs still in use. Because of potential harmful effects on human health and the environment, federal law banned U.S. production of PCBs as of July 2, 1979. However, PCB-containing materials may be present at facilities and PCB-laden wastes may be generated during renovations.

Items with a PCB concentration of 50 ppm or greater are regulated for disposal under 40 CFR Part 761. Some potential sources of PCBs include:

- Mineral-oil filled electrical equipment such as motors or pumps manufactured prior to July 2, 1979;

- Capacitors or transformers manufactured prior to July 2, 1979;

- Plastics, molded rubber parts, applied dried paints, coatings or sealants, caulking, adhesives, paper, Galbestos, sound-deadening materials, insulation, or felt or fabric products such as gaskets manufactured prior to July 2, 1979;

- Fluorescent light ballasts manufactured prior to July 2, 1979;

- Waste or debris from the demolition of buildings and equipment manufactured, serviced, or coated with PCBs; and

- Waste containing PCBs from spills, such as floors or walls contaminated by a leaking transformer.

The general requirements for handling PCB materials and equipment include: identifying and labeling the material, notifying EPA, properly storing the material, and properly disposing of the material.

TSCA Regulations for Asbestos

EPA and the OSHA have promulgated rules regulating asbestos production, use, and disposal. OSHA regulates private sector and some public sector employees' exposure to asbestos and specifies work practices and engineering controls for removing and handling asbestos. Along with EPA and OSHA, some states also have established asbestos requirements that extend the federal requirements. Asbestos programs implemented under TSCA include the following:

- Asbestos Hazard Emergency Response Act (AHERA), which regulates asbestos contained in schools and all public and commercial buildings including hospitals; requires the development of management plans; specifies work practices and engineering controls for removing and handling asbestos; and sets emissions limitations in schools after an abatement activity is completed. EPA Region 6 provides a list of suspected asbestos-containing materials at: *http://www.epa.gov/Region06/6pd/asbestos/asbmatl.htm*.

Typical Physical Features to Inspect for Lead-based Paint, PCBs, and Asbestos under TSCA

- PCB storage areas;
- Equipment, fluids, and other items used or stored at the facility containing PCBs. PCBs are most likely to be found in electrical equipment such as transformers, capacitors, and possibly fluorescent light ballasts (in older fixtures);
- Pipe, spray-on, duct, and troweled cementitious insulation and boiler lagging; and
- Ceiling and floor tiles.

EPA's TSCA Assistance Information Service, at (202) 554-1404 (e-mail: tsca-hotline@epa.gov), answers questions and distributes guidance pertaining to TSCA standards. The Service operates from 8:30 a.m. through 5:00 p.m., EST, excluding federal holidays. For more information on TSCA programs for lead, visit the web site www.epa.gov/lead/regulation.htm. EPA's PCB Homepage includes links to the regulatory text (40 CFR Part 761) as well as lists of approved PCB waste handlers: http://www.epa.gov/pcb/. EPA operates the Asbestos Ombudsman Clearinghouse/Hotline ((800) 368-5888, or (202) 260-0490) to provide general asbestos information. Also visit the EPA Asbestos Management & Regulatory Requirements web site (http://www.epa.gov/asbestos/help.html) for additional material.

Federal Insecticide, Fungicide and Rodenticide Act

FIFRA was first passed in 1947 and amended numerous times, most recently by the Food Quality Protection Act (FQPA) of 1996. FIFRA provides EPA with the authority to oversee, among other things, the registration, distribution, sale and use of pesticides. The Act applies to all types of pesticides, including insecticides, herbicides, fungicides, rodenticides and antimicrobials. FIFRA covers both intrastate and interstate commerce.

Product Registration

Under Section 3 of FIFRA, all pesticides (with few exceptions) sold or distributed in the United States must be registered by EPA. Pesticide registration is very specific and generally allows use of the product only as specified on the label. Each registration specifies the use site (i.e., where the product may be used) and the amount that may be applied. The person who seeks to register the pesticide must file an application for registration. The application process often requires either the citation or submission of extensive environmental, health, and safety data.

Use Restrictions

As a part of the pesticide registration, EPA classifies the product as unclassified, general use, or restricted use (40 CFR Section 152.160(a)). The Administrator may prescribe restrictions relating to the product's composition, labeling, or packaging. For pesticides that may cause unreasonable adverse effects on the environment, including injury to the applicator, EPA may require that the pesticide be applied either by, or under the direct supervision of, a certified applicator.

Good Laboratory Practices

EPA prescribes good laboratory practices under 40 CFR Part 160 for conducting studies that support research or marketing permits for pesticide products regulated by EPA. These practices are intended to assure the quality and integrity of the submitted research data.

Typical Physical Features to Inspect for under FIFRA

- Personnel protection equipment;
- Pesticide application equipment;
- Pesticide storage areas, including storage containers; and
- Cleaning disinfectants and labels.

Typical Records a EPA Inspector May Ask to Review under the FIFRA

- Records of pesticides purchased (purchase orders, inventory);
- Pesticide application records;
- Description of the pest control program;
- Certification status of pesticide applicators;

- Pesticide disposal manifests;
- Contract files; and
- Recent ventilation rating for pesticide fume hood and pesticide mixing/storage areas.

Antimicrobials

In healthcare settings, EPA regulates disinfectants that are used on environmental surfaces (housekeeping and clinical contact surfaces). Disinfectants intended for use on clinical contact surfaces (e.g., light handles, radiographic-ray heads, or drawer knobs) or housekeeping surfaces (e.g., floors, walls, or sinks) are regulated by EPA, under the authority of FIFRA. Under FIFRA, any substance or mixture of substances intended to prevent, destroy, repel, or mitigate any pest, including microorganisms but excluding those in or on living man or animals, must be registered before sale or distribution. To obtain a registration, a manufacturer must submit specific data regarding the safety and the effectiveness of each product.

FIFRA requires users of products to follow the labeling directions on each product explicitly. The following statement appears on all EPA-registered product labels under the Directions for Use heading: "**It is a violation of federal law to use this product inconsistent with its labeling**." This means that users, including the healthcare industry, must follow the safety precautions and use directions on the labeling of each registered product. Not following the specified dilution, contact time, method of application, or any other condition of use is considered misuse of the product.

The Centers for Disease Control (CDC) recommends disinfecting environmental surfaces or sterilizing or disinfecting medical equipment, and medical facilities should use products approved by EPA unless no such products are available for use against certain microorganisms or sites. However, if no registered or approved products are available for a specific pathogen or use situation, medical facilities are advised to follow the specific guidance regarding unregistered or unapproved (e.g., off-label) uses for various chemical germicides. For example, no antimicrobial products are registered for use specifically against certain emerging pathogens (e.g., Norwalk virus), potential terrorism agents (e.g., variola major or *Yersinia pestis*), or Creutzfeldt-Jakob disease agents.

Microorganisms vary in their resistance to disinfection and sterilization, enabling CDC's designation of disinfectants as high-, intermediate-, and low-level, when compared with EPA's designated organism spectrum. However, exceptions to this general guide exist, and manufacturers' label claims and instructions should always be followed.

For more information on the use of hospital disinfectants, refer to: MMWR Recommendation and Report on Dental Infection Control Guidelines, (*http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm*) and Guidelines for Environmental Infection Control in Health-Care Facilities, (*http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm*).

Additional information on FIFRA and the regulation of pesticides can be obtained from a variety of sources, including EPA's Pesticide Program at

http://www.epa.gov/pesticides , EPA's Office of Compliance, Pesticide Compliance Assistance at http://www.epa.gov/compliance/assistance/pesticides/index.html, EPA's Office of Compliance Agriculture and Ecosystem Division at http://www.epa.gov/compliance/assistance/sectors/agriculture.html, or The National Agriculture Compliance Assistance Center, (888) 663-2155 or http://www.epa.gov/agriculture/ (e-mail: agcenter@epa.gov). Other sources include the National Pesticide Information Center, (800) 858-7378 or http://npic.orst.edu/, and EPA's Antimicrobial hotline , (703) 308-0127, operating weekdays from 9:00 a.m. to 4:00 p.m., EST, excluding federal holidays (e-mail: info_antimicrobial@epa.gov) or web site, http://www.epa.gov/oppad001/.

VI.B. Regulations by Waste Category

Table VI-2 lists the applicable regulations for each waste category.

Table VI-2: EPA Regulations by Waste Category

Waste Category	Specific Wastes Found in this Category[1]	Applicable Statute
Municipal Solid Waste	Cardboard, paper, boxboard, magazines, newspaper, metals (steel and aluminum), glass, plastics, food waste, leaf and yard waste, mixed materials, mattresses, furniture, pallets, carpet, packaging materials	RCRA, EPCRA, FIFRA
Biohazardous Waste, Regulated Medical Waste (RMW)	Sharps waste, blood and blood products, pathological waste, selected isolation wastes, cultures and stocks from laboratories, non-regulated chemotherapy waste, blood-soaked bandages, etc.	RCRA, CAA
Hazardous Waste	Solvents, selected pharmaceuticals, ethylene oxide (EtO), mercury-containing equipment or compounds, lead-containing equipment, hazardous chemicals	RCRA
Pressurized Containers	Gas cylinders, gas cartridges, aerosol cans, oxygen farms	RCRA
Universal Wastes	Mercury-containing thermostats, and spent fluorescent lamps and other hazardous lamps. Hazardous waste batteries, hazardous waste pesticides - recalled or sent to collection program	RCRA
Construction and Demolition Debris	Asbestos, mercury, lead, C&D debris	RCRA, CWA, CAA, TSCA
Wastewater	Potentially, any hazardous substance in any clinical area, oils, hydraulic fluid, chemical spills	CWA
Stormwater	Contaminated runoff from building, lawns, parking areas, underground storage tank areas, aboveground storage tank areas, and disturbed soils from construction sites	CWA, FIFRA

Table VI-2: EPA Regulations by Waste Category (Continued)

Waste Category	Specific Wastes Found in this Category[1]	Applicable Statute
Air Emissions	Air conditioning and refrigeration, boilers, medical waste incinerators, asbestos, paint booths, sterilization using ethylene oxide, emergency generators, anesthesia	CAA, EPCRA

[1]See Section III for more examples.

VI.C. Pending and Proposed Regulatory Requirements

The following pending and proposed regulations affect the healthcare industry:

Clean Water Act

EPA is working with dental offices to begin collecting dental amalgam before it enters the waste stream. As part of its pretreatment standards review process, EPA is reviewing industrial sources of mercury, including dental facilities, for potential technology-based options for controlling mercury discharges to wastewater treatment plants. In addition, the Agency is working with wastewater treatment plants to begin implementing best management practices for collecting mercury from other industrial sources, as well as modifying surface water discharge permits to reflect stricter requirements in mercury discharges. See EPA's Effluent Guidelines Program web site (*http://www.epa.gov/guide/)* for more information.

Clean Air Act

Ethylene Oxide (EtO)

Some hospitals use ethylene oxide as a sterilant for certain types of healthcare supplies and devices, primarily due to manufacturers' recommended practice to ensure the sterility of a product. Hospital sterilizers are one of 55 area source categories may be subject to Area Source Category NESHAP regulations. Go to: *http://www.epa.gov/ttn/atw/urban/arearules.html* for more information.

Resource Conservation and Recovery Act

Universal Waste Regulations

In June 2002, EPA proposed to add mercury-containing equipment to the universal waste list. The Universal Waste Rule allows facilities to streamline the waste management of certain widely generated hazardous wastes. The waste management requirements of universal wastes are less strict than those for other RCRA listed hazardous wastes. Visit the web site *www.epa.gov/epaoswer/hazwaste/id/univwast/regs.htm* for more information.

VI.D. Additional Applicable Regulations (Non-EPA Administered)

The following non-EPA administered environmental or wastes related regulations affect the healthcare industry:

Mercury Ordinances/Resolutions

Many states have passed ordinance and resolutions banning the manufacture or sale of mercury-containing items, such as thermometers, thermostats, and switches containing mercury.

"One Plan"/Integrated Contingency Plan

The "One Plan" (EPA HQ), also known as Integrated Contingency Plan (ICP), allows a facility to comply with multiple federal planning requirements by consolidating them into one functional emergency response plan. A number of statutes and regulations, administered by several federal agencies, include requirements for emergency response planning. A particular facility may be subject to one or more of the following federal regulations:

- EPA's Oil Pollution Prevention Regulation (SPCC and Facility Response Plan Requirements) - 40 CFR Part 112.7(d) and 112.20-.21;
- MMS's Facility Response Plan Regulation - 30 CFR Part 254;
- RSPA's Pipeline Response Plan Regulation - 49 CFR Part 194;
- USCG's Facility Response Plan Regulation - 33 CFR Part 154, Subpart F;
- EPA's Risk Management Programs Regulation - 40 CFR Part 68;
- OSHA's Emergency Action Plan Regulation - 29 CFR 1910.38(a);
- OSHA's Process Safety Standard - 29 CFR 1910.119;
- OSHA's HAZWOPER Regulation - 29 CFR 1910.120; and
- EPA's RCRA Contingency Planning Requirements - 40 CFR Part 264, Subpart D, 40 CFR Part 265, Subpart D, and 40 CFR 279.52.

In addition, facilities may also be subject to state emergency response planning requirements that this guidance does not specifically address. Facilities are encouraged to coordinate development of their ICP with relevant state and local agencies to ensure compliance with any additional regulatory requirements.

Visit the National Response Team's Integrated Contingency Plan Guidance (One Plan) web site for more information:
http://yosemite.epa.gov/oswer/ceppoweb.nsf/content/sta-loc.htm

Federal Hazardous Materials Transportation Law (HAZMAT)

The Department of Transportation (DOT), along with other agencies, regulates the transportation of hazardous materials (including certain medical wastes) under 49 CFR Parts 171-180. The regulations cover five areas: (1) hazardous materials definition/classification; (2) hazard communication; (3) packaging requirements; (4) operational rules; and (5) training. Biohazardous wastes are classified as a Class 6 DOT hazard.

The Hazardous Materials Information Center can be contacted at (800) HMR-4922 ((800) 467-4922) or (202) 366-4488, Monday through Friday from 9:00 am to 5:00 pm EST. Visit the HAZMAT web site at http://hazmat.dot.gov/hazhome.htm for additional material.

Nuclear Regulatory Commission (NRC)

The NRC, under authority of the Atomic Energy Act, regulates the use of nuclear by-product material in the fields of nuclear medicine, radiation therapy, and research. The nuclear by-product material is regulated by either the NRC or the state (currently 33 states have agreements with NRC to regulate the by-product material). The NRC issues licenses to authorized users and provides regulations and guidance for the use of nuclear by-product material. Note that radium, a radioactive material that has historically been used in brachytherapy and may be present in healthcare facilities, is not regulated by NRC. It is only regulated by states (although legislation is pending that would bring it under NRC authority).

Visit the NRC web site (http://www.nrc.gov) for more information.

Occupational Safety and Health Administration (OSHA)

OSHA provides regulatory standards to protect workers from injury. OSHA requirements that apply to healthcare facilities include the Bloodborne Pathogens Standard (1910.1030), Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard (1910.120), and Asbestos Standards (1910.1001) for any renovation work.

Visit the OSHA web site (http://www.osha.gov/) for more information. OSHA also has a Hospital eTool (http://www.osha.gov/SLTC/etools/hospital/mainpage.html) that addresses the following areas: administration, central supply, clinical services, dietary, emergency, engineering, heliport, housekeeping, ICU, laboratories, laundry, pharmacy, surgical suite, healthcare wide hazards, and other healthcare wide hazards.

U.S. Postal Service (USPS)

The Domestic Mail Manual, C023, as well as D.O.T. have certain requirements and restrictions for mailing or shipping hazardous pharmaceuticals to patients (i.e. consumer commodities that are hazardous). USPS also has regulations pertaining to mailing sharps, biological specimens, and other healthcare related materials.

Visit the USPS web site and reference the Domestic Mail Manual at (http://pe.usps.gov/) for more information.

National Institutes of Health, Centers for Disease Control (CDC)

The CDC publishes guidelines and recommendations for the healthcare industry on many areas including infection control, sterilization, hand hygiene, and immunizations.

Visit the CDC web site (www.cdc.gov) for more information. The CDC web site also has access to the National Institution of Safety and Health (NIOSH) publication, Preventing Occupational Exposure to Antineoplastic and Other Hazardous Drugs in Health Care Settings (http://www.cdc.gov/niosh/docs/2004-165/)

U.S. Department of Health and Human Services (HHS)

The HHS provides information on laws and regulations pertaining to healthcare from a variety of organizations including the Food and Drug Administration, Centers for Medicare and Medicaid Services, Health Resources and Services Administration, Substance Abuse and Mental Health Services Administration, and Indian Health Services.

Visit the HHS web site (www.hhs.gov) for more information.