3. LOCAL GOVERNMENT OPERATIONS

Local governments, regardless of size, location, or demographic factors, are responsible for providing a variety of services (i.e., operations) to their populations. This chapter identifies and examines some of the services and the specific day-to-day activities that occur within each. The purpose of this chapter is to provide an overview of the operations and activities, present the environmental aspects and impacts of the operations/activities, and identify the environmental requirements to which these operations/activities may be subject. Chapter 4 and Appendix D present additional information on the specific environmental requirements.

It should be noted that the following sections are not exhaustive discussions of every aspect of the specific operations. Instead, the sections attempt to highlight the activities with the greatest potential to impact the environment. Other related activities, while not directly discussed in this chapter, are identified in the regulatory matrix that is included as Appendix D to this profile.

A significant aspect of all of the operations presented in this chapter is pollution prevention. Not only does pollution prevention result in less waste that must undergo treatment and disposal, it also plays an important role in helping local governments achieve compliance. For these reasons, this chapter begins with an overview of pollution prevention and its relationship with compliance. This chapter also includes a section on purchasing and its relationship with pollution prevention and compliance. In addition, each section on a specific operation discusses pollution prevention practices and presents a case study.

3.1 POLLUTION PREVENTION AND COMPLIANCE ASSISTANCE

Pollution prevention, also known as source reduction, is any practice that eliminates or reduces pollution at its source. Pollution prevention is achieved through material substitutions, process changes, and the more efficient use of natural resources (e.g., raw materials, energy, water, and other resources). Through pollution prevention, the use and production of hazardous substances can be minimized, thereby protecting human health, strengthening economic well-being, and preserving the environment.

Pollution knows no boundaries. Pollution originating in the air, on the land, in the water, and even on the other side of the world can eventually impact every living thing. Pollution prevention can be applied across these environmental media (i.e., air, water, and land) and addresses both point source and nonpoint source pollution. Point source pollution includes industrial and

manufacturing wastes; nonpoint source pollution originates from automobiles, construction, agricultural runoff, and so forth.

3.1.1 Benefits of Pollution Prevention

Pollution prevention practices are one of the best ways for localities to meet compliance standards. Information on the waste streams and pollution prevention tips and strategies are included with each local government operation in this chapter.

These strategies can:

- Lead local organizations to meet compliance standards
- Improve practices and procedures to ensure continued compliance
- Move local organizations beyond these environmental compliance thresholds.

Many of the pollution prevention tips contained in this profile are cost effective procedures that not only save precious environmental resources but also money.

Pollution prevention measures often:

- Inherently save money in production and material costs
- Many times lead to increased regulatory compliance and exemption from penalty fees
- Lead to reduction in disposal costs
- Reduce risk of employee exposure to hazardous waste by creating safer working conditions.

3.1.2 Implementation of Pollution Prevention at the Local Government Level

Local governments across the United States have integrated pollution prevention into their different agencies using many methods. Currently, pollution prevention practices are used at the local level in the following areas: wastewater pretreatment and septic tank programs; watershed and groundwater protection programs; educational activities targeted at residents; technical assistance and compliance assistance to local businesses and industries; partnership activities between government agencies; and in-house practices of municipal and county facilities. Appendix C contains four examples of successful pollution prevention programs implemented at the local level.

3.1.2.1 Purchasing and Procurement Opportunities

Local governments can incorporate environmental and health factors into purchasing decisions. Through revised purchasing procedures, local governments and other organizations can avoid potentially harmful chemicals, reduce the risk of accidental injuries, and move toward compliance. More information on purchasing and procurement procedures is located in the next section of the profile.

3.1.2.2 Other Pollution Prevention Practices to Move Beyond Compliance

Aside from practicing pollution prevention to achieve compliance, local government organizations can use pollution prevention to improve workplace productivity and efficiency. Many pollution prevention practices in the office save time, energy, natural resources and money.

There are many ways agencies can practice energy efficiency and reduce air emissions and energy consumption while saving money. The following list presents selected tips that address general office practices:

- **Purchase Energy Efficient Products and Equipment.** By looking for the Energy Star® label on appliances, computers, printers, copiers, light fixtures, and heating and cooling equipment you can reduce your energy bill by 30 percent and your electric lighting charges by 50 percent while cutting pollution.

- **Turn Unused Appliances and Equipment Off.** Turn off equipment (e.g., computers, printers, copiers) and lights at night and on weekends, and unplug appliances when they are not in use.

- **Use Natural Lighting or, When Not Practical, Fluorescent Lighting.** Design buildings and offices to maximize natural lighting, thereby decreasing energy usage. If lighting is needed, consider using fluorescent lighting. By replacing lamps and light fixtures with energy conserving fluorescent bulbs, you will save 75 percent of the energy used with incandescent bulbs. If you currently have fluorescent lighting, consider using a more efficient type that has an electronic ballast that burns cooler. Caution: Remember to properly dispose of fluorescent bulbs.

- **Reduce Paper Usage and Increase Electronic Mail.** By double siding copies, reusing single-sided paper (e.g., for receiving faxes, taking notes), using electronic mail, and

circulating documents with routing slips, an organization can save a significant amount of energy and natural resources. One ton of waste paper saves enough energy to power an average home for 6 months.

- **Reduce Usage of Packaging and Shipping Materials.** By using boxes and envelopes suited to the size of your mailings, you can reduce large quantities of materials - both in the packaging itself as well as the packing materials. When packaging is necessary, reuse old newspaper or purchase packaging materials that do not contain polystyrene or other plastics.

Resources

"Preventing Pollution in our Cities and Counties: A Compendium of Case Studies," NPPR, NACo, NACCHO and U.S. Conference of Mayors, 1995.

U.S. EPA Pollution Prevention Information Clearinghouse, 401 M Street, SW (7409), Washington, DC 20460 (http://www.epa.gov/opptintr/p2home)

Enviroene, U.S. EPA Operations Research Development Division, 401 M Street, SW (MC-8722R), Washington, DC 20460 (http://www.epa.gov/envirosense)

National Pollution Prevention Roundtable, 2000 P Street NW, Suite 708, Washington, DC 20036 (http://www.p2.org)

National Association of Counties, 440 First Street, NW, Washington, DC 20001 (http://www.naco.org)

National Association of City and County Health Departments, 440 First Street NW, Suite 450, Washington, DC 20001

U.S. Conference of Mayors, 1620 I Street, NW, Washington, DC 20006 (http://www.usmayors.org/uscm)

American Council for an Energy Efficient Economy, 1001 Connecticut Avenue, NW, Suite 801, Washington, DC 20036 (http://aceee.org)

3.2 PURCHASING PRACTICES THAT ENCOURAGE REGULATORY COMPLIANCE AND POLLUTION PREVENTION

Local governments use numerous products to perform public services. Product manufacturing (including raw material extraction), transportation, use, and disposal can generate byproducts that stress local and global environmental resources, as well as pose health threats to product users and the public. By incorporating environmental and health criteria into purchasing specifications, local governments can avoid the use of potentially harmful chemicals, reduce the risk of accidents and toxic releases, and more easily achieve regulatory compliance. Localities are also discovering they can save money by reducing the amount of hazardous materials they handle and by purchasing energy efficient equipment.

Presidential Executive Order 13101 (which strengthens Executive Order 12873) "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," has directed federal agencies to increase their demand for recycled content products and other environmentally preferable products and services. Many local and state governments have voluntarily adopted policies that support the Executive Order and have increased their procurement of recycled products and products that are less hazardous, non-toxic, energy efficient, and that generate less waste.

3.2.1 Typical Products Purchased by Local Governments and Environmentally Preferable Product Alternatives

The composition of wastes and the types of emissions generated by local governments is directly affected by the products they purchase. Choosing environmentally-preferable alternatives to products that are considered hazardous, or that contribute to wastes covered under environmental regulations, is a preventative strategy available to any agency involved in product requisition. Please refer to the accompanying local government operations in this profile for specific wastes generated and pollution prevention opportunities.

Exhibit 3-1 presents products that may be purchased by local governments and includes environmentally preferred alternatives to consider. This does not constitute an endorsement of any particular products. All products should be researched and tested.

Exhibit 3-1. Typical Products Purchased by Local Governments and Environmentally-Preferred Alternatives

Department/Operation	Products Purchased	
Construction/Property Management	Construction Site Fill/Base Material (stone, dirt, etc.)	Fill/Base Containing Recycled Materials (recycled concrete, glass, or asphalt)
	Structural Building Materials	Recycled Content Building Materials
	Electrical Equipment	Energy-Efficient Equipment and Building Design (low-mercury fluorescent lights; energy efficient HVAC)
	Adhesives	Vegetable-Based Adhesives
	Petroleum-Based Solvents and Cleaners	Vegetable/Citrus-Based Solvents
	Petroleum-Based Paints	Water-Based Low VOC Paints
Vector/Pest Management	Chemical Pesticides and Herbicides	Integrated Pest Management (mechanical, physical, and biological pest control techniques; least-hazardous chemical options)
Public Safety	Fire Response and Suppression	Ozone-Safe Fire Extinguishers
	Mercury Batteries	Mercury-Free and Rechargeable Batteries
	Mercury Thermometers	Mercury-Free Thermometers
	Lead Bullets	Ceramic Bullets (for firing range use only)
Solid Waste Management	Vehicle Fuel (gasoline, diesel fuel)	Alternative Fuels (natural gas, propane, solar generated electricity)
	Recycling Bins and Residential Trash Cans	Recycled Content Recycling Bins and Trash Cans

Department/Operation	Products Purchased	Environmentally-Preferred Alternatives
Wastewater Management	Chlorine, Hypochlorite	Ultraviolet Osmosis
	Petroleum-Based Lubricants	Vegetable-Based Lubricants
	Petroleum-Based Solvents	Vegetable/Citrus-Based Solvents; Aqueous-Based Parts Washers
Vehicle/Equipment Maintenance	Petroleum-Based and Chlorinated Solvents (parts washers, brake cleaners)	Aqueous-Based Cleaners; Microbial Agents; Vegetable/Citrus-Based Solvents; Aerosol-free Cleaners
	Automotive Fluids	Recycled Automotive Fluids (re-refined motor oil and recycled propylene glycol antifreeze)
	Tires	Retread Tires; Tires with Maximum Durability
Printing	Petroleum-Based Inks	Soy/Vegetable-Based Inks; Water-Washable Ink Systems
	Perchloroethylene; Petroleum Distillates (blanket washes)	Vegetable Ester Solvents; Terpene-Based Solvents
Administrative Activities	Electronic Office Equipment	Energy-Efficient Office Equipment
	Office Furniture	Refurbished Furniture
	Paper Supplies; Paper Use	Post-Consumer Recycled Content, Chlorine-Free Paper; Double-Sided Copying; Reuse of Scrap Paper
	Toner Cartridges	Remanufactured Toner Cartridges

3.2.2 Top Pollution Prevention Opportunities

The following list highlights selected strategies for preventing pollution through purchasing practices:

- Pass a purchasing policy that promotes the integration of environmental and health criteria in all product specifications.

- Form an interdepartmental committee to investigate environmental purchasing opportunities.

- Educate the entire staff about health effects associated with chemicals commonly contained in the products they use, or are exposed to, and provide information on alternatives. Prompt users to choose environmentally preferable products.

- Involve product end-users throughout the decision-making process, request that vendors perform product demonstrations for staff, and compare products.

- Choose one department/operation at a time to incorporate environmentally preferable products. Review final product specifications with product user or operation supervisor to ensure that their needs are satisfied.

- Review all purchases and product Material Safety Data Sheets for potential environmental and health impacts associated with products being purchased.

- Avoid purchasing products that are potentially harmful to the user, public, or environment (e.g., contain known or suspected carcinogens and other toxic ingredients).

- Prevent the generation of hazardous wastes in operations by eliminating products that contain hazardous ingredients.

- Participate in cooperative purchasing ventures with other jurisdictions, your state, and vendors to increase availability of environmentally preferable products and reduce internal costs associated with the formal bid process.

- When researching environmental purchasing, utilize resources and expertise available from vendors, manufacturers, government agencies, non-profit and other organizations.

- Consider environmental and health impacts associated with a product's life cycle prior to drafting bid specifications (“product life cycle” includes raw material extraction or development, product manufacturing, transportation to market, product use, and disposal).

- Implement waste reduction activities (e.g., implement lease agreements that require vendors to take responsibility for products as they become obsolete; require prospective

bidders to avoid excess paper and packaging in their bid and proposal submittals such as avoiding plastic covers and dividers, using both sides of paper, and using post-consumer recycled content paper; specify copiers and printers with double-sided printing capabilities; etc.)

- Begin an energy conservation program and invest in energy-efficient equipment and building design (specify EPA "Energy Star" certified equipment and require equipment installers to activate efficiency features upon product installation).

Appendix C presents information on a local government that significantly reduced pollution by implementing carefully chosen purchasing operations.

Resources

National Association of Counties (NACo) Environmental Purchasing Project, 440 First Street, NW, Washington, DC 20001; phone: (202) 393-6226, *(www.naco.org/programs/environ/purchase.cfm).*

Environmentally Preferable Purchasing Listserve (EPPNET). Established and maintained by the Northeast Recycling Council (802) 254-3636. To subscribe to EPPNET, send an e-mail message to (*lyris@aladdin.webrover.com*) with SUBSCRIBE EPPNET <FIRST NAME> <LAST NAME> on the subject line or in the body of the message.

U.S. EPA Environmentally Preferable Purchasing Program, U.S. EPA (7409), 401 M Street, SW, Washington, DC 20460 *(http://www.epa.gov/opptintr/epp).*

U.S. EPA and DOE Energy Star Program, U.S. EPA (6202J), 401 M Street, SW, Washington, DC 20460 (888) 782-7937, *(http://www.epa.gov/appdstar/buildings.html).*

Office Green Buying Guide and Choose Green Reports: Green Seal, 1400 16th Street, NW, Suite 300, Washington, DC 20036-2215; phone: (202) 588-8400, *(www.greenseal.org).*

Scientific Certification Systems, 1939 Harrison Street, Suite 400, Oakland, CA, 94612; phone: (510) 832-1415, *(www.scs1.com/).*

Toxic Turnaround - A Guide to Reducing Pollution for Local Governments, Environmental Health Coalition, 1717 Kettner Blvd., Suite 100, San Diego, CA; phone: (619) 235-0281, *(www.environmentalhealth.org).*

Sustainable Building Technical Manual - Green Building Design, Construction, and Operations, Public Technology, Inc. (PTI), the U.S. Green Building Council (USGBC), U.S. DOE, and U.S. EPA; printed copies available for purchase from PTI at (301) 490-2188, and from USGBC at USGBC-SF, 90 New Montgomery Street, Suite 1001, San Francisco, CA 94105.

Environmental Purchasing Model Resolutions from Local Governments, National Association of Counties, 440 First Street, NW, Washington, DC, 20001; phone: (202) 393-6226, *(www.naco.org/programs/environ/purchase.cfm).*

"Pollution Prevention Questionnaire for Municipal Departments" and "Procurement Recommendations Applicable to Multiple City Departments and Agencies," Environmental Defense Fund, 1875 Connecticut Ave., NW, Suite 1016, Washington, DC 20009; phone (202) 387-3500; contact Lois Epstein (Lois_Epstein@edf.org).

3.3 CONSTRUCTION/PROPERTY MANAGEMENT

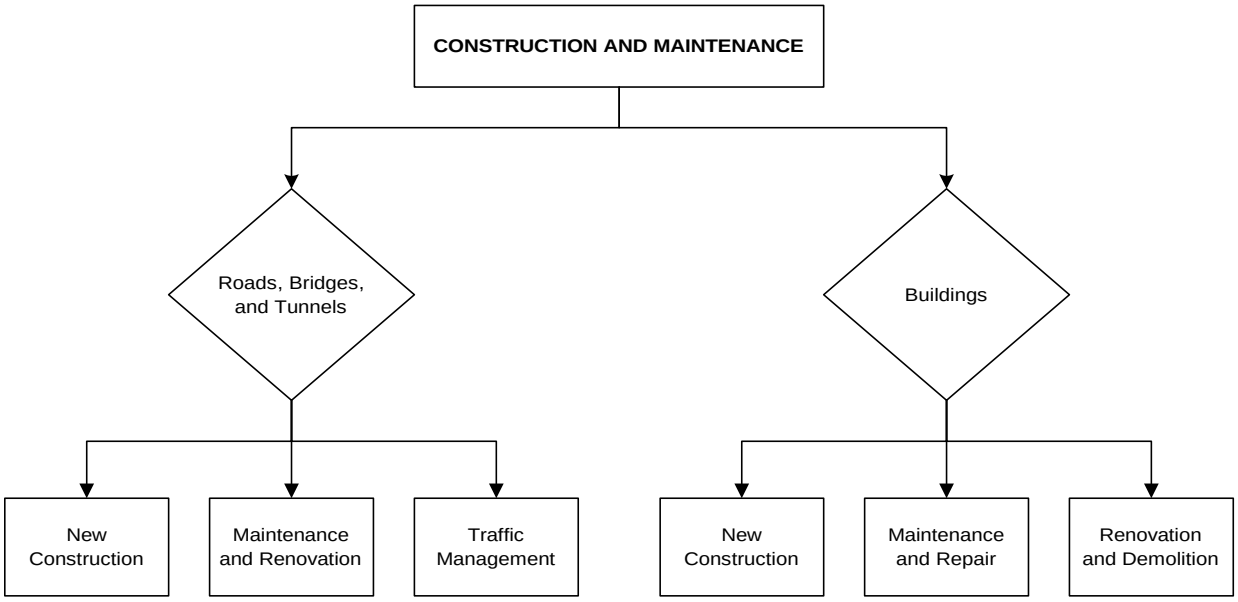
As shown in Exhibit 3-2, local governments may be responsible for constructing and maintaining roads, bridges, tunnels, buildings, treatment plants, and landfills, as well as for renovating and demolishing buildings. Construction and maintenance activities, which typically involve planning, coordination, and oversight by the local government, are essential to the infrastructure for transportation, administration, public services (e.g., wastewater treatment), and, in some cases, housing.

3.3.1 General Activities

Several administrative activities can affect the severity of environmental impacts, as well as relevant regulatory burdens on the construction and maintenance of local government facilities. The following list presents some of these activities:

C ***Zoning***. Zoning decisions that allow an increase in the total impervious area of the local government's jurisdiction lead to increased storm water runoff, often causing increased erosion, degraded water quality, and the need for the local government to install new controls or best management practices (BMPs) to comply with its National Pollutant Discharge and Elimination System (NPDES) storm water permit. By considering the

Exhibit 3-2. Construction and Maintenance



impacts prior to making the zoning decisions, the local government can either prepare for the impact of those decisions (e.g., concurrently construct storm water catch basins while allowing construction of a new commercial parking lot) or decide that the cost of the zoning decision is greater than the benefit.

C ***Coordination***. Many agencies within the local government are often required to directly coordinate their efforts in order to comply with existing permits. BMPs included as part of a publicly owned treatment works (POTW) NPDES permit condition for a combined sewer system often require street sweeping on a regular basis. The POTW may be ultimately responsible for permit compliance, but the local government street maintenance department may be needed to ensure that the permit conditions are met (e.g., the streets get swept every 2 weeks).

- ***Planning and Design***. Whenever a local government is planning and designing a construction project, a local government should apply the concept of an environmental

management system. That is, the local government should evaluate the environmental aspects and impacts of the project and establish procedures to minimize the impacts.

- ***Monitoring Contractors***. In many cases, local governments hire contractors to assist or manage local government operations, such as monitoring or well sampling, solid waste disposal, or vehicle maintenance. Local governments must develop reporting or monitoring methods, therefore, to ensure that contractor operations comply with all regulations that apply to the local government.

3.3.2 Roads/Bridges/Tunnels

Local government activities related to roads, bridges, and tunnels include new construction, maintenance of existing infrastructure, and traffic management. Because these activities could affect the environment, they may be subject to environmental laws and regulations, as indicated in the following list.

C New construction—Clean Water Act (CWA), Endangered Species Act (ESA), Rivers and Harbors Act, Clean Air Act (CAA), National Environmental Policy Act (NEPA), and Resource Conservation and Recovery Act (RCRA)

C Maintenance and renovation—RCRA, CAA, and CWA

C Traffic maintenance—CAA

3.3.2.1 New Construction

Construction of new roads, bridges, or tunnels generally involves clearing land, constructing the new structure, and disposing of construction waste.

Clearing Land for Construction. Clearing land involves the removal of vegetation and existing structures to prepare a site for construction. Clearing land can impact the environment by:

C Reducing the structural safety of land (e.g., making it more susceptible to erosion, landslides, or floods)

C Harming aquatic resources (particularly wetlands) and endangered species

- Increasing soil erosion and sedimentation caused by the removal of vegetation

- Increasing the flow to storm sewer systems leading to increased potential for downstream flooding and increased stream bank erosion in receiving waters.

Additional impacts of construction include dust/odors from construction traffic, air emissions, noise, and vibration from construction equipment.

New construction may directly affect wetlands through the placement of fill for grading purposes. Sediment from construction sites may also affect the hydrologic capacity of wetlands. Wetland losses may increase downstream flooding and may impact a wide variety of aquatic and upland species. If impacting aquatic areas, such as wetlands, and endangered species habitat, local governments must obtain a special permit before beginning a construction project. The U.S. Army Corps of Engineers (Corps) regulates any dredging and general construction in, over, and under navigable waters of the United States under Section 10 of the Rivers and Harbors Act. The Corps also regulates the discharge of dredged and fill material into waters of the United States, which include wetlands. These wetland activities are regulated under Section 404 of the CWA and may require a Section 404 permit. In addition, controlling construction site discharges (particularly storm water runoff) is regulated under the storm water provisions of EPA's NPDES permitting program, as well as local erosion and sediment control programs.

The ESA provides protection for federally listed threatened and endangered species of plants, animals, and their habitats. Local government responsibilities under the ESA depend upon whether the proposed activities occur with federal government involvement. Federal government involvement is triggered when a project seeks to cross public lands, receives public funds, or requires a federal permit (e.g., Section 404 wetland permit).

Endangered species are plants and animals that, without special protection and management, are in danger of becoming extinct. Threatened species are likely to become endangered in the foreseeable future.

Any activities by local governments that involve new construction may be regulated under NEPA (if they involve federal funds) or other state laws that require the preparation of an environmental impact statement. Construction impacts on receiving waters may be regulated under the NPDES storm water section of the CWA and may require the local government to obtain a permit and implement certain controls. Air and noise impacts may be regulated under the CAA and state and local ordinances.

Construction Waste Disposal. Most of the waste generated through construction activities is nonhazardous solid waste. Typical wastes generated at construction sites include concrete, steel, wood, rubber, asphalt, soil, and organic matter, such as stumps.

The disposal of these wastes may be regulated under a variety of federal, state, and local laws. Hazardous construction wastes are regulated under the federal RCRA hazardous waste regulations. Many states and local governments have regulations regarding the disposal of nonhazardous construction and demolition debris at special construction waste landfills. Many states allow debris such as uncontaminated concrete and asphalt to be used as fill material.

3.3.2.2 Maintenance and Renovation

Maintenance and renovation of roads, bridges, or tunnels may include street sweeping, maintenance of storm sewers, snow removal, and removal and disposal of lead-based paint. Street sweeping involves using mechanical sweepers to remove dirt, grit, and solids from road surfaces. Snow removal includes plowing streets and sanding and salting roads. Lead-based paint may be removed and disposed of during bridge and tunnel maintenance. Maintenance and renovation activities may impact the environment by removing materials that can enter storm sewers (sweeping), adding materials that end up in storm sewers and are discharged to water ways (salting, sanding, sandblasting), or emitting contaminated dust to the air (paint removal). Aspects of these activities may be regulated under the CWA, RCRA, and local solid waste disposal requirements.

Street Sweeping. Local governments may be required to sweep streets as a condition of their NPDES storm water or combined sewer overflow (CSO) permit conditions. Street sweeping reduces the concentration of pollutants in storm water runoff and improves street appearance. Considered a BMP and an integral part of a storm water pollution control plan, street sweeping also ensures the continued structural effectiveness of storm sewers.

Maintenance of Storm Sewers. Local governments may be required to maintain storm sewers as part of their NPDES storm water or CSO permit. Maintenance of storm sewers may include catch basin cleaning, litter removal from storm channels, and maintenance of storm water detention facilities. Catch basin cleaning and litter removal from channels protect against street

flooding and remove potential pollutants from storm water. Publicly owned storm water detention facilities and other pollutant removal structures, such as sand filters and oil and grit separators, also require frequent maintenance. Disposal of materials generated during cleaning may be regulated under local solid waste disposal requirements.

Snow Removal. To maintain road safety in the winter, local governments may apply salt and abrasives (e.g., sand) and remove snow . Heavy applications of salts and abrasives may be necessary at busy intersections and steep hills. These activities can negatively affect water quality by increasing sedimentation and salinity in surrounding water bodies. If applied frequently or improperly, salt may leach into the groundwater and contaminate drinking water supplies.

To prevent such contamination, snow removal activities may be regulated under a local government's NPDES storm water permit. The permit may require or recommend that the local government take steps to minimize the impact of snow removal activities. In addition, the permit may require designation of sensitive areas (i.e., near public water supply facilities or high levels of groundwater recharge) where pollution prevention practices must be followed. Some of these practices include prohibiting dumping of heavily treated snow directly into water bodies or in or around drinking water supplies or landfills, proper operation of salt storage facilities to reduce potential salt-contaminated runoff, and use of alternative deicing materials.

Removal and Disposal of Lead-Based Paint. Lead-based paint is typically removed from bridges by sandblasting or abrasive blasting prior to refurbishing and repainting. Sandblasting/abrasive blasting removes the existing paint off a bridge or tunnel with high velocity sand or synthetic particles. This process could contaminate the air with lead dust and soil and water during disposal or spills of lead-contaminated sand/abrasive and paint chips. Where possible, blasting takes place in areas with containment to prevent releases of lead-contaminated materials to the environment. Occupational Safety and Health Administration (OSHA) regulations minimize worker exposure to lead dust, and RCRA regulates the disposal of materials contaminated with lead-based paint. Prevention of lead dust releases may be regulated by the CAA under the State Implementation Plan (SIP).

3.3.2.3 Traffic Management

Traffic management includes designing roads and bridges, access points, and traffic signals. Road designs, location of access points, and installation and scheduling of traffic signals affect the environment by impacting motor vehicle emissions. Increased access points to major roads

generally lead to more traffic, while new traffic signals often lead to increased emissions from engine idling. A local government's traffic management plan must conform to the state's SIP as required under the CAA. In many areas, therefore, a local government's traffic management actions do not result in a net increase of air pollutants in the state.

3.3.3 Buildings

Local government activities related to buildings include constructing new schools, public housing, administrative facilities, and other government buildings; maintaining and repairing those buildings; renovating old buildings; and demolishing unusable buildings. Because these activities could affect the environment, they may be subject to environmental laws and regulations, as indicated in the following list.

- New construction—CWA, ESA, Rivers and Harbors Act, CAA, and NEPA

- Maintenance and repair—CWA, RCRA, CAA, Emergency Planning and Community Right-to-Know Act (EPCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and Toxic Substances Control Act (TSCA)

- Renovation and demolition—RCRA, CAA, and TSCA

3.3.3.1 New Construction

As with the construction of roads, bridges, and tunnels, the construction of new buildings involves clearing land, building the structure, and disposing of construction materials. The impacts and regulations of these activities are similar to those discussed previously in Section 3.3.2.1 for roads, bridges, and tunnels.

Similar to new construction of roads, bridges, and tunnels, storm water runoff (which may contain sediment and construction waste) from new building construction has the potential to contaminate surface waters and must be controlled under the requirements of the NPDES storm water program. As with other construction, most of the waste generated through building construction activities is nonhazardous solid waste. The disposal of these wastes may be regulated under a variety of federal, state, and local laws. Hazardous construction wastes are regulated under the federal RCRA hazardous waste regulations. Many states and local governments have regulations regarding the disposal of nonhazardous construction and

demolition debris at special construction waste landfills. Many states allow debris such as uncontaminated concrete and asphalt to be used as fill material.

3.3.3.2 Maintenance and Repair

Local governments are responsible for activities related to the maintenance and repair of buildings, including operating boilers and cooling systems and applying pesticides. In addition, indoor air quality is a concern, although local governments are not required to comply with any regulations at present.

Indoor Air Quality–Radon. Over the past 40 to 50 years, exposure to indoor air pollutants has increased in part because of construction of more tightly sealed buildings, reduced ventilation rates to save energy, the use of synthetic building materials and furnishings, and the use of chemically formulated personal care products, pesticides, and housekeeping supplies. In recent years, comparative risk studies performed by EPA and its Science Advisory Board have consistently ranked indoor air pollution among the top five environmental risks to public health. Radon is one particular indoor air pollutant of concern associated with this issue. Common effects of indoor air quality problems on occupants include headache; fatigue; shortness of breath; sinus congestion; coughing and sneezing; eye, nose, throat, and skin irritation; dizziness; and nausea.

Radon levels can vary from structure to structure. The average indoor radon level is estimated to be about 1.3 picocuries per liter (pCi/L), and about 0.4 pCi/L of radon is normally detected in the outside air. The U.S. Congress has set a long-term goal for indoor radon levels to be no more than outdoor levels. While this goal is not yet technologically achievable in all cases, levels in most structures today can be reduced to no more than 2 pCi/L. EPA recommends followup radon testing or mitigation in buildings with levels of 4 or more pCi/L.

At this time, local governments are not required to enforce any standards for acceptable radon levels in commercial or residential buildings, including schools. State and local governments may pass legislation recommending radon mitigation to owners of buildings in which the radon level is greater than 4pCi/L; however, this is not a required activity under the CAA or any other major environmental law at present.

The federal government, as well as most state and local governments, do not have regulations or established enforcement capabilities regarding indoor air quality in buildings, including schools.

For some schools, assistance may be available from local or state departments of health or environment. The federal or state OSHA office may also provide some help.

Boiler Operations. Local governments are often required to operate boilers to produce steam or electricity to heat government buildings. Boiler operations include storing fuels and boiler chemicals, operating the boiler, maintaining the boiler, and disposing of residuals from fuel burning. Storing fuels and chemicals can affect the environment through spills that have the potential to reach groundwater or surface waters. Operating boilers may impact the environment through air emissions from fuel burning. Coal ash from fuel burning can contaminate waterways if it contains heavy metals or other toxics and is not disposed of in a manner that prevents it from coming in contact with water ways or rain water.

The storage of liquid boiler fuel (e.g., heating oil) may be regulated under the Spill Prevention, Control, and Countermeasures (SPCC) program of the CWA, which requires a facility to develop spill prevention plans. The storage of chemicals may be regulated under EPCRA or Section 112(r) of the CAA (risk management plans), which requires the development of emergency plans and reporting based on the quantity of chemicals stored.

Disposal of residuals, such as coal ash, may be regulated under RCRA, depending on the metals or other toxics contained in the ash. Air emissions from the boiler may be regulated under the CAA, which requires the local government to obtain a permit and meet emissions standards depending on the heat output of the boiler and date of boiler construction.

Emergency Release Notification (EPCRA Section 304). A facility is required to notify the State Emergency Response Commission (SERC) and Local Emergency Planning Committee (LEPC) of a release equal to or exceeding a predetermined amount of certain hazardous chemicals. The chemicals covered by this requirement include EPCRA extremely hazardous substances (EHSs), and hazardous substances identified in CERCLA. The emergency release notification activates emergency plans and provides information to the LEPCs and SERCs, who coordinate release response activity in order to prevent harmful effects to the public.

Appendices A and B of 40 CFR Part 355 list the EPCRA EHSs and 40 CFR Part 302 lists CERCLA hazardous substances.

Hazardous Chemical Inventory and Reporting (EPCRA Sections 311 and 312). Under EPCRA, any facility that is required by the OSHA Hazardous Communication Standard (HCS) to prepare or have available a material safety data sheet (MSDS) for a hazardous chemical is subject

to EPCRA Sections 311 and 312 requirements if the chemical is present onsite at any one time in excess of threshold levels.

MSDS Reporting. Under Section 311 of EPCRA, a facility must submit a *one-time notification* identifying the hazardous chemicals (including EPCRA EHSs and OSHA hazardous chemicals) present at the facility in amounts equal to or in excess of threshold quantities to the SERC, LEPC, and local fire department (40 CFR 370.21). To meet the notification requirement, a facility must submit either an MSDS (or copies of MSDSs), or a list of the EPCRA EHSs and OSHA hazardous chemicals. After initial reporting, if a facility determines that it has a hazardous chemical that is newly covered in amounts equal to or in excess of the threshold level or there has been significant new information on an already reported chemical, it must update the information reported under Section 311 within 3 months after discovery.

Tier Reporting. Under Section 312 of EPCRA, a facility must meet an annual reporting requirement for OSHA hazardous chemicals and EPCRA EHSs in amounts equal to or in excess of threshold levels. If equaling or exceeding the threshold levels at any time in the preceding year, a facility must submit to the SERC, LEPC, and local fire department an "Emergency and Hazardous Chemical Inventory Form." This form must be submitted by March 1 of each year. EPA publishes two types of inventory forms, **Tier I** and **Tier II**, for reporting this information. While federal regulations require only the submission of a Tier I form, EPA encourages, and some states require, the use of the Tier II form.

LEPCs make this information available to the public, and fire departments and public health officials use the information to plan for and respond to emergencies.

Cooling Systems. Local governments operate cooling systems to maintain temperature in government buildings and to store food in government building cafeterias. Cooling systems contain refrigerants, such as chlorofluorocarbons (CFCs) or ammonia. If released, CFCs have the potential to harm the environment because they are ozone-depleting substances. The CAA requires maintenance of cooling systems to be conducted by certified personnel who are using certified equipment and following specified guidelines for reclaiming CFCs. The storage and use of ammonia may require reporting under EPCRA or CAA Section 112(r).

Pesticide Application. Maintaining buildings includes applying pesticides to eliminate vectors (e.g., insects, rodents) that spread disease, as well as plants and insects that can harm the structural integrity of the building. Frequently used pesticides include herbicides, insecticides,

fungicides, and plant growth regulators. Pesticides are also used on building exteriors for aesthetics. Improper indoor application of pesticides can harm human health, causing respiratory and skin infections, and even death. Improper outdoor application can cause health problems in humans, while also destroying flora and fauna and contaminating groundwater and surface water supplies through infiltration and runoff. Section 3.4 of this profile describes pesticide management activities.

3.3.3.3 Renovation and Demolition

Renovation and demolition of buildings can impact the environment as materials trapped within the building structure become exposed to the environment. The removal and disposal of asbestos and the removal and disposal of lead paint can significantly affect both human health and the environment.

Asbestos. Buildings owned by local governments may very well contain asbestos or asbestos-containing materials (ACM). Used for insulation and as a fire retardant, asbestos and ACMs can be found in a variety of building construction materials, including pipe and furnace insulation materials, asbestos shingles, millboard, textured painted and other coating materials, and floor tiles. When encapsulated, asbestos fibers do not impact human health or the environment. During renovation or demolition, however, asbestos fibers may be released. If inhaled or ingested, these fibers can cause respiratory damage. Renovation and demolition activities are regulated under the CAA, which requires local governments to contact EPA prior to renovation or demolition, use only accredited trained personnel and appropriate equipment for asbestos removal, and follow specified procedures for asbestos disposal.

Asbestos is recognized as the greatest environmental concern to schools. If a local government owns or operates a school building constructed or insulated with asbestos, particularly if renovations or demolitions occur that release fibers, then indoor air quality can be impaired and people might suffer severe respiratory and other health problems. Local governments operating schools could face enforcement actions pertaining to asbestos-related violations.

In October 1986, Congress passed the Asbestos Hazard Emergency Response Act (AHERA), which required EPA to establish a comprehensive regulatory framework within which local governments would inspect, manage, plan, and conduct operations and maintenance (O&M)

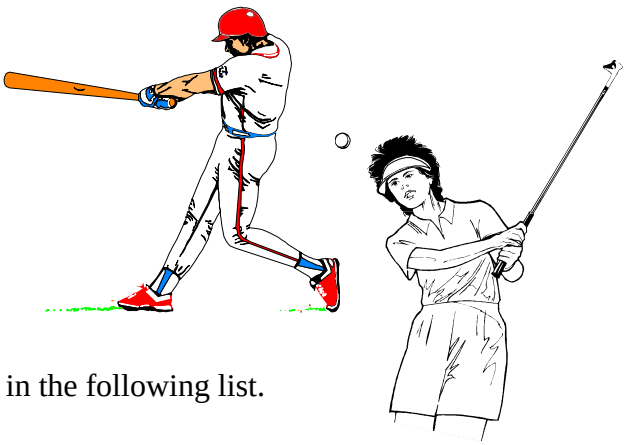
activities and appropriate abatement responses to control ACM in schools. To this end, EPA promulgated the asbestos-containing materials in schools rule in October 1987.[1]

Many states and local governments have since developed comprehensive asbestos management/ control programs and/or abatement contractor certification programs. In addition, EPA's National Emission Standard for Hazardous Air Pollutants (NESHAP) for asbestos regulates asbestos emissions during building demolition or renovation and the transport and disposal of asbestos waste. Also, according to federal regulations, school building owners are supposed to inspect school buildings for friable and nonfriable asbestos materials. Inspection activities include reviewing building records, inspecting and sampling materials, and mapping the locations of confirmed or suspected asbestos locations.

Buildings built in the sixties are more likely to have asbestos-containing sprayed- or troweled-on friable materials than other buildings. EPA banned the use of asbestos-containing materials in the 1970s.

Lead-Based Paint. Lead-based paint is typically found on building interiors and exteriors of buildings constructed prior to 1978. During renovation and demolition, paint removal has the potential to impact human health and the environment as fibers, dust, and paint chips are released. Paint chips and dust can cause indoor air contamination during renovation, and soil contamination from demolition or improper disposal. Assessment of lead-based paint hazards and removal of lead-based paint is regulated under TSCA. Disposal of any building materials contaminated by lead-based paint is regulated under RCRA.

3.3.4 Outdoor Recreation Facilities (including stadiums and golf courses)



Local governments construct and maintain outdoor recreation facilities, including swimming pools, playing fields, and stadiums. Because these activities could affect the environment, they may be subject to environmental laws and regulations, as indicated in the following list.

[1] U.S. EPA, *EPA Study of Asbestos-Containing Materials in Public Buildings*, A Report to Congress, Washington, DC, February 1988, p. 1.

- New construction—CWA, RCRA, ESA, Rivers and Harbors Act, CAA, and NEPA
- Maintenance and renovation—CWA, RCRA, EPCRA, CERCLA, CAA, TSCA, and FIFRA

3.3.4.1 New Construction

New construction of swimming pools, playing fields, golf courses, and stadiums has many of the same impacts of constructing buildings, roads, bridges, and tunnels. New construction involves clearing and grading land, landscaping, and building the structure. Section 3.3.2.1 describes these impacts and the associated regulations.

3.3.4.2 Facility Maintenance and Renovation

Facility maintenance and renovation are performed on playing fields and golf courses, stadium buildings (including wastewater treatment plants), and swimming pools.

Playing Field and Golf Course Maintenance. Playing field and golf course maintenance may involve numerous activities, including mowing, irrigating (watering), fertilizing, resodding, applying pesticides, spreading lime, and maintaining vehicles. Local governments may conduct each of these activities to keep their playing fields in the desired condition for their designated use. Mowing is typically done by gasoline powered mowers that can pollute the air with particulates, volatile organic compounds (VOCs), and noise. While mowing activities are generally exempt from EPA regulations, the mowers themselves are required to meet specifications described in the mobile sources section of the CAA.

Activities such as irrigating, fertilizing, and applying pesticides may impact the environment through irrigation or storm water runoff that may contaminate local waterways or cause soil erosion. If playing field irrigation leads to a direct discharge (i.e., water is drained to a pipe that leads to a surface water or a storm water system), the discharge may be regulated under the NPDES program in the CWA. If the discharge drains to a municipal sewer system, the discharge may be regulated under the pretreatment program in the CWA. Local governments that fertilize their playing fields and golf courses with biosolids from a municipal wastewater treatment plant must comply with the biosolids management section of the CWA. Pesticide application may be regulated under FIFRA. Section 3.4 provides additional information on regulations concerning the application of pesticides and fertilizers.

Maintaining vehicles and equipment used for playing field and golf course maintenance may be regulated under several environmental laws. Section 3.10 describes in detail these activities and the applicable laws and regulations. Appendix D identifies numerous activities associated with playing fields and golf courses that may have environmental aspects.

Maintaining Stadium Buildings. Maintenance of stadium buildings includes many of the activities related to maintenance of other buildings that are described in this section. In addition to operating boilers and cooling systems, maintenance of stadium buildings may include operating a wastewater treatment plant during stadium events; operating a large electrical system that includes capacitors and transformers; storing and using cleaning chemicals; sanding and salting, as well as removing snow from stadium parking lots; and managing nonhazardous waste streams, including food wastes.

Large stadiums may have their own wastewater treatment plants to accommodate a relatively large number of users during stadium events. Operation of a stadium wastewater treatment plant has the potential to impact the environment in the same manner as a larger municipal wastewater treatment plant, which is described in Section 3.7. Wastewater treatment plants may impact surface waters through treatment plant discharges and contaminate the air through treatment plant emissions, including odors. In addition, treatment plant chemicals can affect the air or waterways if they are improperly stored or applied. Discharges from wastewater treatment plants are regulated under the CWA, which may require an NPDES permit or compliance with local pretreatment regulations. The storage of treatment plant chemicals may be regulated under EPCRA, while disposal of spilled chemicals may be regulated under RCRA.

Stadiums that hold evening events often have extensive lighting and public address systems that require capacitors and transformers to assure the necessary electrical current. Stadiums may also have diesel fuel-fired generators for auxiliary power. Capacitors and transformers that contain PCB oils are regulated under TSCA, which requires labeling of PCB-containing equipment. The storage of oils, as well as spills of PCB oils and oils without PCBs, including diesel fuel, may be regulated under the SPCC provisions of the CWA, depending on the total volume of oil stored at the stadium.

Maintaining stadium parking lots may involve applying salt or sand to lots or removing snow. Each of these activities may be regulated under the CWA if the facility has an NPDES storm water permit or under local ordinance if the facility does not have a permit. Stadiums use chemicals for cleaning all aspects of the stadium, including restrooms, food service areas, and seating areas. The storage and use of these chemicals may be regulated under the CAA, EPCRA

and CERCLA. Appendix D identifies numerous activities associated with maintaining stadiums and other recreational facilities that may have environmental aspects.

Maintaining Swimming Pools. Many local governments operate outdoor recreation facilities that include swimming pools. Swimming pool maintenance involves treating pool water through filtration and the addition of chemicals. The use and storage of pool chemicals may be regulated under EPCRA, and the disposal of unused or spilled pool chemicals may be regulated under RCRA. Filtered materials are generally nonhazardous and may be disposed of according to state and local nonhazardous solid waste regulations. Appendix D identifies numerous activities associated with maintaining a swimming facility that may have environmental aspects.

3.3.5 Vehicle/Equipment Maintenance

Local governments are responsible for maintaining all vehicles associated with construction and property management activities according to the operations described in Section 3.10

3.3.6 Pollution Prevention in Construction and Maintenance

Local governments are responsible for construction and maintenance activities. Included in this category are constructing and maintaining roads, bridges and tunnels, and building, maintaining, renovating and demolishing structures. In some cases, these activities are conducted through contractual arrangements. A simple building/construction cycle includes the following activities:

- Pre-construction
- Construction
- Maintenance and repair.

3.3.6.1 Typical Wastes Generated

Pre-construction activities involve the preparation of a site for future development. During this phase existing vegetation and structures may be removed, creating demolition waste including asbestos, mercury, PCB, lead based paints, and dust. Other pre-construction impacts include increased potential for storm water runoff and possible negative impacts on aquatic resources and habitat.

Construction activities may involve grading, drilling, and filling. These activities generally do not generate substantial hazardous waste but may result in habitat loss through erosion,

sedimentation, and disruption of the natural environment. Building construction and maintenance activities generate wastes from paints, thinners, grease, resins and sealers, glues, cleaners, hydraulic oils, paint remover/stripper, soiled rags, and solder, as well as a host of solid wastes including paper, plastic, scrap lumber, insulation, metals, gypsum, and roofing materials.

Maintenance and repair activities involve the removal and replacement of worn or damaged surfaces, structural members and lubricating or cooling fluids. This could result in the generation of hazardous wastes such as lead based paint or asbestos, cleaning fluids, used lubricating oil, and cooling system fluids.

Pollution prevention begins long before the first nail is driven. Local governments can conduct a baseline analysis of institutional issues that affect pollution prevention /green building construction and maintenance policy implementation. Areas to examine include procurement policies, zoning, building codes and standards, operations and maintenance policies, and recycling policies. Throughout the construction and maintenance process, opportunities exist for implementing pollution prevention.

Construction and Demolition (C&D). A major opportunity in the construction and demolition (C&D) industry is the expansion of the recovery and reuse of materials. Areas to examine include the type of demolition process selected, labor costs, contracting constraints, project schedules, material storage space, and marketability of materials.

Local governments should collaborate with the local stakeholders to understand local conditions and issues. The key is to make material recovery a part of the planning and contracting process and make waste management and recovery plans part of the contractual scope-of-work. Recovery levels could be made an explicit factor in awarding contracts. Prevailing labor rates and local market conditions will need to be considered since labor costs are viewed as the single most important barrier to increasing C&D materials recovery.

Local planning and permit departments could consider the impacts of connecting permit authorization with material recovery efforts. Educational outreach programs including workshops, websites and informational packets are a critical source of encouraging greater participation in C&D material recovery programs.

3.3.6.2 Top Pollution Prevention Opportunities

- Adopt a resolution or policy to direct future building toward green practices.
- Use "first-in, first-out" materials management.
- Segregate waste streams.
- Reduce risks of spills by controlling access to storage areas and routinely inspecting containers.
- Recycle used cleaning, lubricating or cooling fluid.
- Use water-based paints and coatings to minimize the use of petroleum-based solvents and the hazardous air emissions associated with such solvents.
- Avoid unnecessary grading and removal of vegetative cover to minimize road run-off into surface water.
- Use waterborne or thermoplastic traffic paint.
- Consider deconstruction and reuse of existing buildings rather than demolition.
- Use high efficiency lighting and electronic ballasts to illuminate roadways and tunnels, and install occupancy sensors to control lighting fixtures.

3.3.7 Success Stories

3.3.7.1 The Riverdale Deconstruction Case Study

This study fully documents the manual disassembly and salvage of a 2,000-square-foot, 4-unit, residential building in an urban area of Baltimore County, Maryland. It addresses issues such as the salvage of common building materials (i.e., brick, framing lumber, hardwood flooring, windows, doors, and assorted fixtures), labor requirements and activities, total cost comparison, and environmental benefits, among others. In addition this study also proposes recommendations for the improvement of the deconstruction industry. For more information on this case study,

contact Peter Yost at (301) 249-4000, or read about this case study on the Internet at http://www.smartgrowth.org/casestudies/casestudy_index.html.

3.3.7.2 Fort ORD Deconstruction Pilot Project Summary

The closure of Fort Ord, U.S. Army Military Reservation in 1994 left more than 28,000 acres and over 7,000 buildings to be reused in the local community. Working collaboratively with the University of California Santa Cruz Extension and the Presidio of Monterey Base Realignment and Closure Office, the Fort Ord Reuse Authority established a specialized program for testing the feasibility of a more environmentally effective approach to remove the substandard facilities, abate the remnant hazards, and reuse the materials in new construction. Implementation began in April of 1998, with four buildings selected for deconstruction, three for relocation, and one concrete building for disassembly. Non-contaminated materials were offered at a public sale and contaminated materials were stockpiled for future research. For more details on this project and to receive a copy of the complete final report, call Standen Cook at (408) 883-3687, or read about them on the Internet at http://www.fora.org.

3.3.7.3 City of Austin Smart Growth Initiative Summary

Early in 1998, the City of Austin, TX announced its kick-off of the Smart Growth Initiative. The ultimate goals of the initiative are to manage growth, protect the City's quality of life and assure the creation of a healthy economy. The Austin City Council created a special subcommittee to overhaul the City's Land Development Code to provide a foundation for the Smart Growth initiative by:

- Establishing general planning principles, including land use and traffic planning guidelines
- Developing a City of Austin-supported neighborhood-based planning framework
- Providing incentives and a viable mechanism for infill development and redevelopment
- Analyzing the provision, management and regulation of wastewater service
- Outlining a plan for the purchase of water conservation easements in the most environmentally sensitive areas

- Creating a plain English version of the Land Development Code

- Simplifying the development process, providing project-based development guidelines, clear expectations, and definitive expiration dates.

For more information on this initiative, contact Michele Middlebrook-Gonzalez at (512) 499-2410, or read about it on the Internet at http://www.ci.austin.tx.us/smartgrowth/smart_growth.htm.

Resources

"Hazardous Waste Minimization Checklist and Assessment Manual for the Building Construction Industry," CA EPA, Dept. of Toxic Substances Control, Office of Pollution Prevention and Technology Development, May 1993, Sacramento, CA.

"Hazardous Waste Minimization for the Building Construction Industry," Fact Sheet, op. Cit.

"Building Construction Industry," Waste Audit Study, op. cit.

"Cooling Water Systems, Management Guidelines for Water Quality Protection," Palo Alto Regional Quality Control Plant, Palo Alto, CA.

"Blueprint for a Clean Bay, Construction-related Industries," Santa Clara Valley Non-point Source Pollution Control Program, 1992, San Jose, CA.

"Residential Construction Waste: From Disposal to Management," interim document, NAHB Research Center, Inc., Upper Marlboro, MD.

"Environmental Handbook For Oregon Construction Contractors: Best Pollution Prevention Practices," River City Resources Group, Inc., May 1994. (located in California EPA, Office of Pollution Prevention and Technology Development Reference Library, (800) 700-5854).

"Environmental Handbook For Oregon General Construction Contractors: Regulatory Guidance," Oregon Waste Reduction Assistance Program, Palermini And Associates, April 1994 (located in California EPA, Office of Pollution Prevention and Technology Development Reference Library, (800) 700-5854).

"Construction And Demolition Waste Recycling Guide: Recycling Construction and Demolition Waste In The Los Angeles Area," LA Network, August 1992 (located in California EPA, Office of Pollution Prevention and Technology Development Reference Library, (800)700-5854).

"Blueprint For A Clean Bay: Best Management Practices To Prevent Stormwater Pollution From Construction-Related Activities," Bay Area Stormwater Management Agencies Association (BASMAA), 1995 (located in California EPA, Office of Pollution Prevention and Technology Development Reference Library, (800) 700-5854).

"Pollution Prevention Training Instructors' Guide," Science Applications International Corporation (SAIC), March 1996 (located in California EPA, Office of Pollution Prevention and Technology Development Reference Library, (800) 700-5854).

"Start at the Source: Residential Site Planning & Design Guidance Manual For Stormwater Quality Protection," Tim Richman & Associates, January 1997 (located in California EPA, Office of Pollution Prevention and Technology Development Reference Library, (800) 700-5854).

Barron, Thomas S., "Pollution Prevention In The Construction Industry: A Workbook Covering The Chemicals Used And Wastes Generated By Construction Trades," Construction industry workshop, 1997 (located in California EPA, Office of Pollution Prevention and Technology Development Reference Library, (800) 700-5854).

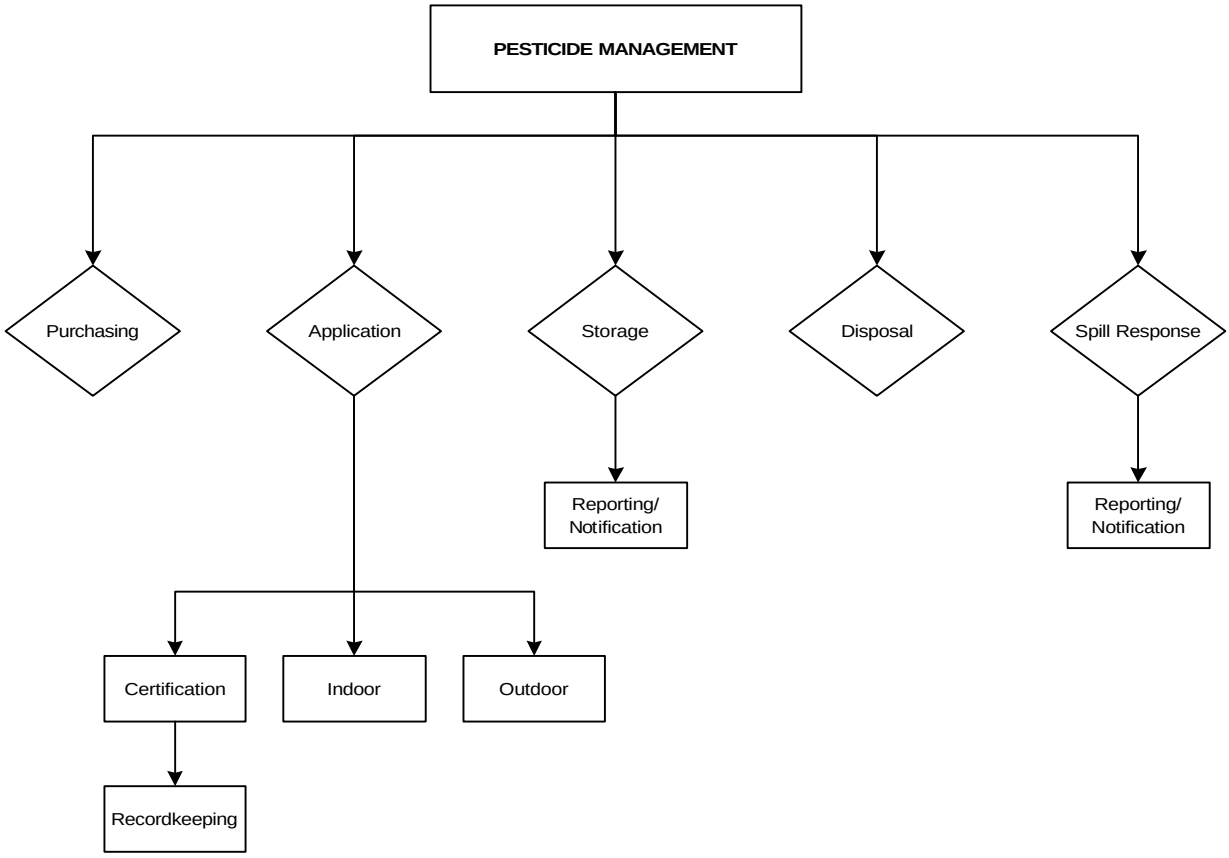
Gruder, Sherrie, "Construction Resources: A Waste Reduction And Recycling Guide for Wisconsin Builders and Contractors," University of Wisconsin-Extension, Solid and Hazardous Waste Education Center, 528 Lowell Hall, Madison, WI, Nov. 1997.

For more information, contact Isao Kobashi, Santa Clara County Pollution Prevention Program, Phone: (408) 441-1195, Fax: (408) 441-0365, E-mail: isao_kobashi@qmgate.pln.co.scl.ca.us.

3.4 PESTICIDE/VECTOR MANAGEMENT

Local governments are responsible for pesticide/vector management, which includes applying, storing, and disposing of pesticides to improve the health and appearance of their outdoor and indoor properties. Exhibit 3-3 presents activities associated with pesticide management.

Exhibit 3-3. Pesticide Management



Because these activities could affect the environment, they may be subject to environmental laws and regulations, as indicated in the following list.

- Application—FIFRA, CWA and ESA
- Storage—FIFRA, EPCRA, CERCLA, and CAA
- Disposal—FIFRA, CWA, and RCRA
- Spill/Release Response—EPCRA, CERCLA, and CAA

In addition, although purchasing is not regulated, local governments can minimize environmental impacts through their purchasing decisions.

3.4.1 Purchasing Pesticides

Purchasing includes the acquisition of pesticides and pesticide application equipment. Although these purchases are not regulated directly by environmental laws, purchasing decisions could

impact the environment. The purchase of pesticides sold in recyclable containers that can be returned to the dealer will, for example, prevent the local government from having to dispose of the containers, which could be a regulated waste under RCRA. In addition, a local government can purchase certain types of equipment that apply pesticides more efficiently, thereby conserving resources, and reducing the environmental impacts of application.

3.4.2 Applying Pesticides

Pesticide application methods and practices depend largely upon the nature of the application. Pesticides may be applied indoors (e.g., housing units, schools, other publicly owned buildings) or outdoors (e.g., solid waste management units, parks and other recreational areas, other publicly owned land). Pesticide application ranges from household products, such as cockroach sprays and insect repellents (which can be applied without training as long as the label requirements are followed), to restricted use pesticides (which can only be applied by certified individuals).

The hundreds of application methods available can be categorized into three major types:

- Sub-surface application methods, including injecting the pesticide into the ground to control subterranean insects, such as termites, grubs, and nematodes, and other sub-surface methods, such as incorporating the pesticide into the soil

- Surface applications, which include applying pesticides, repellants, disinfectants, or mildewcides directly to the surface of something (e.g., applications to floorboards, structures, animals or insects, crack/crevices)

- Aerial application, including aircraft applications, spray booms to apply pesticides to trees, or fumigants to control mosquitoes and wood-boring insects, such as termites.

Pesticides can be applied in many forms, including gases, sprays, dusts, granulars, baits, and dips. Pesticide application can impact the environment in several ways and is regulated under federal and state environmental laws and regulations. Pesticide-related activities conducted by local governments are primarily regulated under FIFRA, which specifies application in a manner consistent with the label. All pesticide management operations must comply with pesticide use requirements unless an emergency exemption has been granted by EPA (40 CFR 166). (It should be noted that FIFRA implementation has been delegated by the federal government to the states.)

Excessive applications may also be regulated under the CWA if the local government develops best management practices that are included in its storm water or wastewater discharge permit.

3.4.2.1 Applying Pesticides Indoors

Indoor applications occur in non-agricultural areas or any type of structural or industrial areas requiring pest management. Applicators must follow label requirements for both general and restricted use pesticides. Applicators applying pesticides indoors must follow guidelines listed under 40 CFR 171, regulating the use of pesticides in, on, or around the following structures:

- Food-handling establishments
- Human dwellings
- Institutions (e.g., schools and hospitals)
- Industrial establishments (e.g., warehouses and grain elevators, and any other structures and adjacent areas, public or private).

The potential environmental impacts from indoor pesticide application are air pollution and contamination of personal items. Misuse of a pesticide could cause damage to non-target species, such as humans, pets, or other animals and plants that come into contact with the pesticide. Pesticide labels should be followed strictly to prevent indoor pollution and potential hazards to humans and animals. The label controls when and under what conditions pesticides can be applied, mixed, stored, loaded, or used. Labeling requirements establish worker protection standards imposed under FIFRA, which include information on restricted entry intervals after pesticide usage and personal protective equipment requirements.

3.4.2.2 Applying Pesticides Outdoors

The outdoor use of pesticides refers to the application of any pesticide outside enclosed manmade structures. Local governments may be responsible for supervising the use of restricted pesticides to control pests in the following areas:

- Public forests, nurseries, and forest seed producing areas

- Ornamental trees, shrubs, flowers, and turf producing areas

- Maintenance of public roads, electric power lines, pipelines, railway rights-of-way, or other similar areas

- Recreation or other outdoor areas requiring pest management.

One of the most common methods of applying pesticides to outdoor areas is liquid spraying. Liquid spraying may be conducted by aerial spraying, tractor spraying, spray rigs, blasters, hand spraying, or other liquid spray devices. The potential environmental impacts from outdoor pesticide application are human exposure and air, soil, and water contamination. The application of certain pesticides may destroy or have adverse effects on endangered or threatened species of fish, wildlife, or plants and their habitats. Local governments must ensure that the use of pesticides does not jeopardize the existence of these species or their habitats, as stated under 50 CFR 402.

Outdoor pesticide activities are regulated under the label requirements and application provisions of FIFRA. FIFRA establishes worker protection standards designed to protect agricultural workers and pesticide handlers. This includes posting warning signs in areas where pesticides have been applied. FIFRA also requires the certified applicator to maintain records regarding the product name, amount, approximate date of application, and location of application of each pesticide used for a 2-year period.

3.4.2.3 Cleaning Application Equipment

There is no satisfactory way to completely remove all traces of any pesticide from application equipment. At the end of each application, however, several steps can be followed to clean as much pesticide as possible off of the equipment:

C Rinse the inside and outside of the tank three times with clean water.

C Put in a moderate amount of clean water and spray it out. A small amount of liquid detergent added to the water will help clean the inside of the sprayer system.

C Clean the nozzles, nozzle screens, and suction screens with compressed air or a soft brush.

3.4.2.4 Certifying Applicators

Pesticides can be classified into two categories--general use and restricted use pesticides. General use pesticides are those that when applied properly will not cause adverse effects on the environment and can be applied by anyone. Restricted use pesticides are those that when applied may cause adverse effects on the environment, including injury to the applicator. Applicators and supervisors of restricted use pesticides must be certified under Section 11 of FIFRA, which outlines federal and state certification procedures for applicators. Applicators who use restricted use pesticides must be certified to use pesticides by demonstrating competency in specified areas:

- Label and labeling comprehension
- Safety techniques
- Environmental awareness
- Pest identification
- Pesticide application
- Equipment use
- Application techniques
- Laws and regulations.

3.4.2.5 Keeping Records

Local governments who have staff or use certified pesticide applicators must keep and maintain various restricted use pesticide records for 2 years. The records must include the types, amounts, uses, dates, and places of application of all restricted use pesticides.

3.4.3 Storing Pesticides

Local governments are responsible for storing any unused or excess pesticides. The recommended procedures and criteria for proper storage apply to areas where pesticides are classified as highly toxic or moderately toxic and have written on their labels DANGER, POISON, WARNING, or the "Mr. Yuk" symbol. FIFRA defines adequate storage as placing pesticides in proper containers and in safe areas to minimize the possibility of accidental release that could result in adverse effects on the environment. Storage sites should be in a dry, well ventilated, separate area where fire protection is provided. Identification signs should be posted to advise of the contents and hazardous nature of the pesticide. The potential environmental impacts from pesticide storage are air, soil, and water contamination from accidental releases.

Because pesticides are typically stored in large quantities for future use, accidental releases may be large, causing immediate detrimental effects on the surrounding environment.

Pesticides that cause adverse effects on the environment should be stored only in facilities where special attention has been given to the hazardous nature of the pesticide. Temporary storage of highly toxic or moderately toxic pesticides may occur at isolated sites and facilities where there is unlikely contact with external conditions that may cause a release. Each container should be stored with the label plainly visible, and the container should be inspected for corrosion and leaks. The storage of pesticides must follow FIFRA guidelines under which all pesticides stored by the local government must be registered or ruled exempt from the registration requirements (40 CFR 152.15 through 152.30). FIFRA covers worker protection standards that must be followed when personnel handle pesticides. In addition, FIFRA lists safety measures that must be followed by personnel who are around pesticides and containers.

If a local government stores or uses specified amounts of certain pesticides, it may be subject to planning and reporting requirements of EPCRA and Section 112(r) of the CAA. These requirements are described below.

3.4.3.1 Risk Management Planning (CAA Section 112(r))

Under Section 112(r) of the amended CAA, facilities that have more than a threshold quantity of any of the 140 regulated substances in a single process are required to develop risk management programs and to summarize these programs in risk management plans by June 21, 1999 (40 CFR Part 68). Risk management plans, which are intended to prevent accidental releases of regulated substances and to reduce the severity of those releases that do occur, will be made available to state and local government agencies and the public. EPA has been working with industry groups to develop model risk management programs. To review the model program, refer to EPA's Chemical Accident Prevention and Risk Management Planning website at http://www.epa.gov/swercepp/acc-pre.htm#Model Plans/.

> At present, EPA has established a list of 140 regulated substances that fall under the Risk Management Planning Regulations of the CAA. These substances were published in the *Federal Register* on January 31, 1994; EPA amended the list by rule, published on December 18, 1997. EPA may further amend the list in the future as needed.

3.4.3.2 Notification of a Canceled or Suspended Pesticide

Under FIFRA, EPA or a registrar can cancel or suspend the registration of a pesticide or of a specific use of a pesticide. In such situations, EPA or the state regulatory agency would request that all entities having supplies of that pesticide notify the state. If a local government has any amounts of canceled or suspended pesticides, it must notify the state of the amount. The state will respond with specific directions concerning the pesticide.

3.4.4 Disposing of Pesticides

Pesticide management includes the disposal of excess pesticides that are not capable of being stored for later use. Pesticide disposal can involve dilution with water, incineration, chemical degradation, burial in a specially designated landfill, and well and soil injection. The potential environmental impacts from pesticide disposal are air, soil, and water contamination from releases. The environmental implications are the same as for the application process, except that the concentration of the pesticide is typically stronger because of the quantity and mass of the disposed pesticide. The disposal of pesticides is a critical process and if not properly conducted can have immediate detrimental effects on the environment.

General and restricted use pesticide labels outline proper disposal guidelines. FIFRA, RCRA, and the CWA regulate these practices. Disposal activities may require notifying EPA, the state, or a local solid waste disposal facility (landfill or incinerator) that is complying with permit provisions. Before disposing of excess pesticide, the local government should try two options:

- Store and reuse any leftover portion at the prescribed dosage rates

- Return any excess to the manufacturer or distributor for relabeling or reprocessing into other materials.

3.4.5 Vehicle/Equipment Maintenance

Local governments are responsible for maintaining vehicles and equipment associated with pesticide management activities according to the operations described in Section 3.10.

3.4.6 Pollution Prevention in Pesticide Management

Reduction in the use of pesticides in local government operations can be achieved by using Integrated Pest Management (IPM). IPM utilizes regular monitoring to determine if and when treatments are needed. It employs physical, mechanical, cultural, biological, and educational tactics to keep pest numbers low. Least-toxic pest control methods are used as a last resort. Using these alternatives will result in decreased use of pesticides. Many of the tips listed in Section 3.4.6.2 may not initially appear to be related to pesticide pollution prevention. The tips will result in lowered reliance on pesticide use by making the plants healthier. Healthy plants are able to withstand pest invasions much like healthy humans. Although IPM reduces reliance on pesticides, some pesticide use may still be necessary. In these cases, use pesticides properly and safely.

3.4.6.1 Typical Wastes Generated

The following lists presents typical waste generated during pesticide management and ways to handle them:

- Empty containers including bags, drums, bottles, and cans. Containers should be triple rinsed or "jet rinsed" prior to disposal. Tripled rinsed containers should be crushed or punctured to prevent reuse. Containers can be reduced in quantity by buying in bulk; however, never buy more than the amount needed. When possible, purchase in recyclable containers that can be returned to dealers.

- Excess mixture (i.e., the diluted pesticide left over in the spray tank). The best disposal method is to use it on a site.

- Excess product (i.e., the unused pesticide no longer needed due to a change in procedures or because the pest problems are solved). The best disposal method is to find someone who can use it.

- Rinse water from containers and application equipment. This rinse water can be added to a tank and used.

- Expired pesticides resulting from poor inventory management or from improper storage. Contact the vendor to inquire if the manufacturer will take back the product.

3.4.6.2 Top Pollution Prevention Opportunities

The following recommendations can help local governments achieve reductions in pesticide and herbicide applications and maintain regulatory compliance associated with chemical use, storage, and disposal.

- Design for water conservation. Group plants with similar water needs together so they can be irrigated together and water will not be wasted on plants that do not need it. Proper watering will reduce stress on plants and allow their natural resistance to withstand pest attacks without the need for pesticides.

- Employ Environmental Landscape Management (ELM). ELM is a common-sense approach that starts with healthy growing space. Select pest resistant plants, use sound planting techniques, and correctly manage the established landscape. Place the right plants in the right place; choose plants according to soil characteristics (pH level, moisture retention), rainfall, and sunlight conditions. Use more native plant species and reduce the use of exotics.

- Avoid monocultures. Monocultures (single-species planting, such as large areas of grass) are very susceptible to infestation since most pests are host-specific. Growing different species together prevents pests from readily spreading.

- Reduce water runoff by building retaining walls, which direct water to a dry well or other areas to collect and percolate through soil. If pesticides are used, this will reduce the likelihood of nearby water body contamination.

- Use proper mowing practices. Mow grass with sharp blades. A dull blade rips grass making larger wounds and increasing susceptibility to disease pathogens. Sharp blades also increase equipment efficiency and reduce wear on equipment. Never cut more than one-third the height of the grass at any time.

- Scout the landscape regularly to learn which plants have problems. Most plants (except grass) seldom have more than one major pest problem. By scouting, you will find problems early and be able to solve them with IPM without resorting to pesticides.

- Use pesticides only when needed, not on a prescribed schedule. Use spot treatment instead of treating the entire area.

- Correctly identify insects prior to treatment. Less than 1 percent of all insects are harmful to plants. Take care not to harm beneficial insects.

- Use least toxic pest control methods:

  – Horticultural oils

  – Insecticidal soaps

  – Natural enemies such as:

    < Pathogens, such as *Bacillus thuringiensis*, which infects and controls caterpillars

    < Predators, such as purple martins, praying mantis, lady beetles, beneficial nematodes, and spiders

    < Parasites, such as parasitic wasps

  – Diatomaceous earth

  – Boric acid

  – Pyrethrins

  – Insect growth regulators, which halt or interfere with the development of an insect before it matures

  – Pheromones, which disrupt normal mating behavior by stimulating breeding pests and luring them into traps

  – Insect traps

  – Mechanical treatments, such as cultivating to control weeds; hand picking of pests off plants, and sticky traps.

- Buy pesticides only in small quantities and store carefully in labeled, airtight containers. Plan your purchases so pesticides do not expire.

- Understand that pest eradication is generally an unrealistic management objective. An attempt to totally eliminate a pest is likely to result in excessive pesticide application.

- Outsource pest control services and write IPM requirements into the specifications.

- Keep clutter, excess water sources (e.g., drips or standing water in plants), and food waste minimized to discourage pests from entering buildings.

3.4.7 Success Stories

3.4.7.1 The City and County of San Francisco, California

In October 1996, the San Francisco Board of Supervisors passed Chapter 39 of the Administrative Code, mandating that City departments adopt IPM. Chapter 39 states, "The City, in carrying out its operations, shall assume pesticides are potentially hazardous to human and environmental health." IPM coordinators were assigned in each department to act as the primary contacts for staff and the public on IPM. The IPM coordinators also file the department's IPM Implementation Plan, keep records on pesticide application, and review and keep on file the Inspection and Quality Assurance forms submitted by the IPM service providers. The IPM Implementation Plan outlines pest management strategies that the City department uses to control pests. The strategies emphasize preventive tactics and least-toxic approaches. For additional information, contact Alan Hom, IPM Project Coordinator, at (415) 554-6399.

3.4.7.2 Westchester County, New York

Westchester County passed a local law (Chapter 690) to create a Pest Management Committee to develop and implement pest management policies using the principles of integrated pest management. They also created a requirement to use chemical pesticides only where feasible alternatives are not available. For additional information, contact Katherine S. Carsky, Chair, Board of Legislators Committee on the Environment, (914) 285-2846.

3.4.7.3 Cape May County, New Jersey

In September 1992, the Cape May County Board of Chosen Freeholders unanimously passed resolution 8199-92, formally adopting an IPM plan. The plan defined IPM and established procedures to identify pest problems and control strategies. Routine applications of pesticides were permanently discontinued. When chemicals are deemed necessary, an entomologist determines the least toxic option. Cumulative savings to date amount to $44,551, and the use of pesticides and herbicides has been reduced drastically. For additional information, contact Harry E. Kehr, Director, Department of Facilities and Services, (609) 465-1296.

3.4.7.4 The City of Santa Monica, California

Because most pest control was performed by contractors, the City of Santa Monica changed its pest control activities by changing their purchasing practices. The City drafted a request for qualifications, request for proposals (RFP), and specifications for IPM contractors which required contractors to provide detailed information on their IPM experience. The RFP required vendors to rank pest management options in categories of “low,” “medium” and “high” risk to human health and the environment. Santa Monica's specifications for IPM contractors included utilization of non-pesticide methods whenever possible and mandated approval from the City prior to applying or storing pesticides. For additional information, contact Debbie Raphael, Environmental Programs Analyst, at (310) 458-2255.

Resources

Common Sense Pest Control, by William Olkowski, Sheila Daar, and Helga Olkowski, The Tauton Press, 1991, Newtown, CT, pp. 715.

"Biological Control of Insect and Mite Pests of Woody Landscape Plants: concepts, agents and methods" by Michael J. Raupp, Roy G. Van Driesche, and John a. Davidson. Maryland Cooperative Extension Service, 1993, pp. 39.

"Suppliers of Beneficial Organisms in North America" by Charles D. Hunter, California Environmental Protection Agency, Department of Pesticide Regulation, Environmental Monitoring and Pest Management Branch.

Cornell University World Wide Web site *(http://www.nysaes.cornell.edu/ent/biocontrol/).*

Handbook of Integrated Pest Management for Turf and Ornamentals, edited by Anne R. Leslie, Lewis Publishers, 1989, Boca Raton, Florida, pp. 660.

National Farm*A*Syst, B142 Steenbock Library, 550 Babcock Drive, Madison, WI 52706-1293, Phone: (608) 262-0024, Email: farmasyst@macc.wisc.edu.

Integrated Pest Management/Cooperative State Research Service. Contact Dr. Robert C. Riley, Dr. James R. Cate, or Dr. John M. Barnes. USDA Cooperative State Research Service, Plant and Animal Sciences, Aerospace Building, Washington, D.C. 20250-2220. Telephone: (202) 401-4781, Fax: (202) 401-4888.

Integrated Pest Management/Cooperative Extension Service. Contact Michael S. Fitzner, USDA Extension Service, Ag Box 0909, Washington, D.C. 20250-0909. Telephone: (202) 720-2471, Fax: (202) 720-4395. E-mail: mfitzner@esuda.gov. 401- 4939.

Integrated Pest Management Information, National IPM Network - Colorado State University, *http://www.colostate.edu/Depts/IPM/csuipm.html.*

National IPM Network. *http://ipmwww.ncsu.edu/main.html*

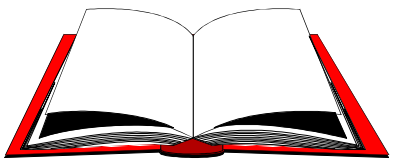
For more information, contact Kay Gervasi, Pollution Prevention Manager, Broward County Department of Natural Resource Protection, Phone: (954) 519-1257, Fax: (954) 765-4894, Email: kgervasi@co.broward.fl.us.

3.5 PUBLIC SAFETY

As shown in Exhibit 3-4, local governments help ensure public safety by providing emergency planning and response to releases of hazardous substances, fire protection, and police protection. Emergency planning and response activities include analyzing community hazards and developing a local emergency response plan to prepare for and respond to chemical emergencies. While also involved in emergency planning, fire department activities include fire suppression and hazardous materials response.

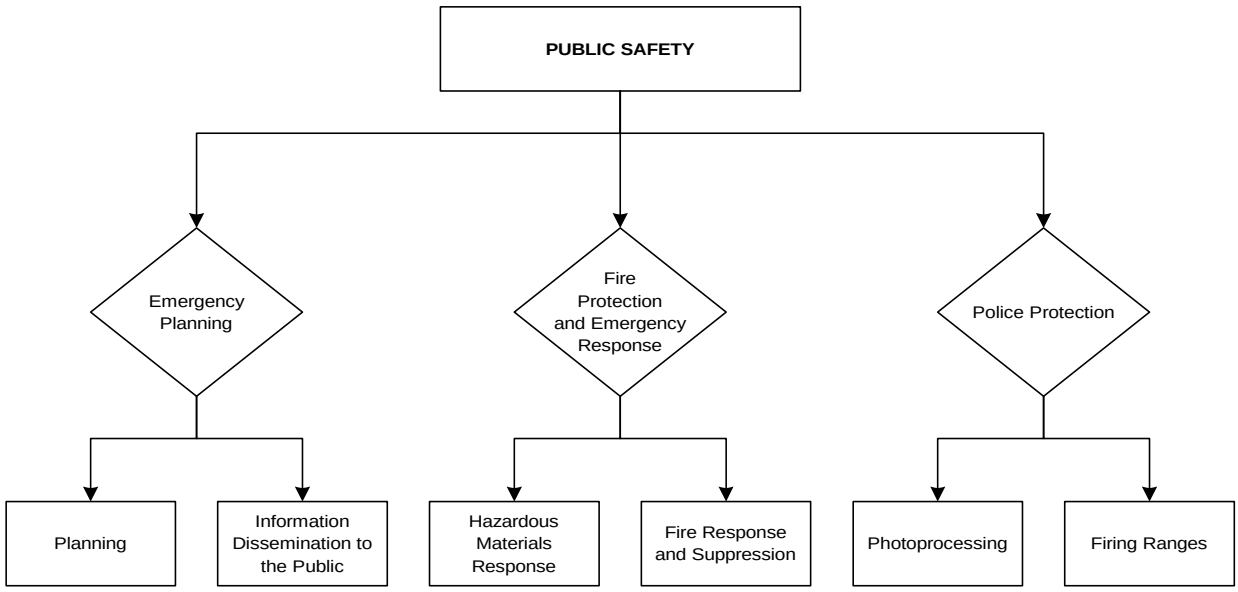
3.5.1 Emergency Planning

Local governments have the basic responsibility for understanding risks posed by chemicals at the local level,



managing and reducing those risks, and dealing with emergencies. Local governments must meet requirements both as regulated entities and as regulators under EPCRA. EPCRA regulates both emergency planning and the dissemination of information on certain chemicals to the public.

Exhibit 3-4. Public Safety



3.5.1.1 Planning

Under the emergency planning section of EPCRA, local governments must prepare for and respond to emergencies involving hazardous substances. Local governments and fire departments are expected to participate in the local emergency planning efforts under EPCRA. LEPCs, appointed by SERCs for every local emergency planning district, are broadly representative of their communities and generally include representatives of elected local officials; law enforcement officials, civil defense workers, and firefighters; first aid, health, environment, and transportation workers; owners/operators of facilities; and community group representatives.

LEPCs must analyze community hazards and develop local emergency response plans to prepare for and respond to chemical emergencies. The focus for emergency planning for LEPCs is the list of 366 "extremely hazardous substances" identified by EPA as having immediate health effects and hazardous properties, but plans also address all hazardous materials in the community

that present risks to public health and safety. These substances are found in some widely used insecticides, herbicides, fertilizers, photographic chemicals, and solvents, as well as in wastewater treatment and drinking water treatment processes.

Local emergency response plans delineate potential local hazards, response capabilities, and procedures to follow in an emergency. An emergency plan must include the identity and location of hazardous materials, procedures for immediate response to a chemical accident, ways to notify the public about actions it must take, names of coordinators at industrial plants, and schedules and plans for testing the plan. Initial plans were required by October 1988. The LEPC publicizes the plan through public meetings or newspaper announcements. In addition, the LEPC updates the plan at least annually based on chemical information reported by local industries and the public.

In addition to requirements imposed by federal law, local governments must comply with all applicable state and local right-to-know laws. State and local emergency response committees are permitted to impose requirements in addition to those imposed by EPCRA.

3.5.1.2 Providing Chemical Information Dissemination to the Public

Under EPCRA, LEPCs receive hazardous chemical inventory and emergency release information submitted by facilities and have access to toxic chemical release information supplied by facilities to EPA. LEPCs can provide this information to local officials, community leaders, and the public to aid in preparing for emergencies and managing chemical risks. The following describes the EPCRA reporting requirements for chemicals:

- ***Hazardous Chemical Reporting***. Under EPCRA, LEPCs receive hazardous chemical inventory information submitted by facilities and make it available to the public upon request. Facilities with chemicals that are present in excess of certain amounts are required to submit either actual copies of MSDSs or lists of MSDS chemicals to the LEPC, the SERC, and the local fire department. This reporting requirement has been in effect since October 1987. In addition, these facilities must submit annual inventories on the same hazardous chemicals to the LEPC, the SERC, and the local fire department. These inventory forms are due on March 1 of each year. LEPCs make this information available to the public, and fire departments and public health officials use the information to plan for and respond to emergencies. Local governments also are subject to the reporting requirements if they have or use any of the specific chemicals in excess of the threshold amounts.

- ***Emergency Release Notification***. Under EPCRA, LEPCs receive emergency release information submitted by facilities and make it available to the public upon request. A facility is required to immediately notify the community and the state (i.e., the LEPC and the SERC) of the release of more than a predetermined amount of certain hazardous chemicals. Chemicals covered by this requirement include not only the 366 "extremely hazardous substances," but also more than 700 hazardous substances subject to the emergency notification requirements of the Superfund hazardous waste cleanup law. The emergency release notification activates emergency plans, and the information on emergency releases is considered in the LEPC planning process. Local governments are also subject to this notification requirement.

- ***Toxic Chemical Release Reporting***. LEPCs, as well as the public, have access to an EPA database called the Toxic Release Inventory (TRI), which contains information on annual toxic chemical releases submitted by certain facilities. Under EPCRA, specific facilities must estimate and report each year the total amount of toxic chemicals that they release into the environment, either accidentally or as a result of routine plant operations, or transport as waste to another location. EPA compiles this information into the database. The annual release data are used, along with the other information the LEPC receives, to put together a more complete picture of the hazardous substances in each district.

3.5.2 Fire Protection and Emergency Response

Local governments may be responsible for providing fire protection services to their communities. Fire protection services and responsibilities include fire response and suppression (i.e., firefighting), salvage (e.g., pumping water out of basements), investigation of fires, repair and maintenance of equipment, and fire prevention.

To provide appropriate fire protection, a city is usually divided into a number of fire districts with at least one fire station in each district, depending upon various factors (e.g., population density, topography, and the nature of buildings and building materials). Each station has teams or companies for one or more fire trucks (ladder, hose, engine company). Smaller communities are likely to have only one firefighting company. Many states allow counties and towns or

townships to carry out fire protection functions. Fire departments receive financial assistance through local governments, fund raising, and state loans, although these funds may not be enough to fully staff and equip a district. Thus, many areas use volunteer firefighters. In small towns and villages, which often depend entirely on volunteers, local governments usually contribute part of the money for trucks and other equipment (except in the smallest communities). A volunteer fire department may fall under the jurisdiction of a local government (which is sometimes required by state law), or it may be incorporated as an independent fire company, which is self-governing and owns its own station and equipment.

3.5.2.1 Fire Protection

As discussed above, fire departments are typically responsible for emergency planning and emergency mitigation, including fire response and suppression (i.e., firefighting) and hazardous materials response. In this role, fire departments attempt to safeguard lives and property against the injurious effects of accidents or uncontrolled hazards, fire, explosion, or hazardous materials. Because fire protection activities can affect the environment, they may be subject to environmental laws and regulations, as indicated in the following list.

- Emergency planning—EPCRA
- Fire response and suppression—CAA and EPCRA
- Hazardous materials response—RCRA and CWA

3.5.2.2 Emergency Planning

As discussed, firefighters may be appointed to LEPCs under the emergency planning provisions of EPCRA. Section 3.5.1 presents more information on this topic.

3.5.2.3 Fire Response and Suppression

Agents used for fire suppression vary based on the location and type of fire. Halons, which are low toxicity, chemically stable compounds, have been used for fire and explosion protection throughout this century. Halons are now known to contribute to the depletion of the ozone layer and have been phased out of production. Effective January 1, 1994, the production and importation of new halons (1211, 1301, or 2402) were banned in the United States. Recycled halon is now the only source of supply. The environmental impacts of halon use in firefighting are primarily damaging to the ozone layer.

Firefighters use a number of traditional fire extinguishing agents, including water, carbon dioxide, dry chemicals, and foam, that are good alternatives to halons for many fire protection applications. Recent research has led to the commercialization of new agents and technologies: halocarbon compounds, inert gas mixtures, water-mist or fogging systems, and powdered aerosols. The potential environmental impacts from firefighting activities using water are soil and water contamination from runoff. Many conventional synthetic foams contain solvents regulated under EPCRA.

3.5.2.4 Hazardous Materials Response

Hazardous materials can be located anywhere at any time. In the event of a spill, the public safety agency (e.g., fire department, local hazardous materials response team) having jurisdiction where the discharge occurred is responsible for taking the actions necessary to protect public health and safety and the environment. Based on the nature of the hazard presented by this discharge, public safety personnel may be obliged to stand by until the hazard is controlled.

The public safety agency may bill the responsible party (i.e., the property owner or whoever caused the spill) for the expenses incurred to protect the public and the environment. In addition, safety personnel may use materials to control a spill, protect the environment, and mitigate the hazard. These materials and personnel costs may be charged to the responsible party.

Response techniques:
- Mechanical containment and recovery
- Chemical and biological methods
- Physical methods.

Depending on the type of hazardous material released, various response techniques may be used to control the spill and minimize the impacts on human health and the environment. The key to effectively combating spills is careful selection and proper use of the equipment and materials most suited to the type of spill and the conditions at the spill site. The types of response techniques include:

- Mechanical containment or recovery, such as booms, barriers, and skimmers, as well as sorbent materials, that are used to capture and store the spilled material until it can be disposed of properly.

- Chemical and biological methods (e.g., dispersants and gelling agents for oil spills).

- Physical methods, such as natural processes (e.g., evaporation, oxidation, and biodegradation). Depending on the type of material spilled, this may not be the best response technique available.

Sorbents contaminated with hazardous materials must be disposed of according to the hazardous waste provisions of RCRA.

3.5.3 Police Protection

Police protection involves law enforcement, traffic safety, and other activities related to law enforcement and preservation of order. Local governments, rather than states or the national government, have primary policing responsibilities:

- ***Patrol.*** A patrol officer is responsible for investigating complaints, reporting accidents, making arrests, and maintaining peace and order.

- ***Investigative/detective force***. The investigative/detective force concentrates on specialized work involved in the detection and apprehension of criminals (e.g., vice, intelligence, narcotics, homicides, bomb threats).

- ***Traffic regulation*****.** Traffic regulation involves traffic control, engineering, and enforcement.

- ***Crime prevention*****.** A crime prevention unit often works with an investigative unit and focuses on youth investigation, safety education, and other evidence collection and identification activities.

To support these units, police departments may participate in various activities including the development of photographs (i.e., photoprocessing) from arrests and shooting range practice at either police department or publicly owned facilities. Because these activities could affect the environment, they may be subject to various environmental laws and regulations, as indicated in the following list.

- Photoprocessing—RCRA, CAA, and CWA
- Firing ranges—RCRA, CERCLA, and EPCRA
- Laboratory operations—RCRA, EPCRA, CERCLA, and CWA

3.5.3.1 Photoprocessing

Police departments may have their own photoprocessing laboratories or contract out this activity to commercial photoprocessing laboratories. Processing photographic film requires the use of various chemicals to develop and produce finished goods. The photosensitive medium used for black and white processing is an emulsion of fine silver halide crystals in a matrix of gelatin, which is applied in a thin layer on either paper or clear plastic film. The film used for color photography consists of three separate layers of photosensitive emulsion with intermediate layers which are coated on a clear film base. Each emulsion is sensitive to either red, green, or blue light due to the presence of selective dyes in the emulsion.

The wastes generated from photoprocessing vary widely according to the type and volume of processing. Exhibit 3-5 presents examples of typical photoprocessing wastes. Wastes generated during photoprocessing are primarily aqueous effluents. The disposal of wastewater from photoprocessing may be regulated under the pretreatment or NPDES program of the CWA.

Exhibit 3-5. Examples of Typical Photoprocessing Wastes

Wastewater	Hazardous Waste	Air Emissions	Solid Wastes
Used, treated fixers Used developers Used activators/ stabilizers Rinse water	Chrome-based system cleaners Non-empty aerosol cans Discarded, unused, or outdated chemicals Used, untreated fixers Used shop towels contaminated with hazardous waste	Volatile organic compounds or toxics emitted from: – Film cleaners – Solvents	Empty containers Developed or out-dated film Out-dated materials Used, empty aerosol cans Used shop towels

Photoprocessing solutions may be too acidic or alkaline to meet local wastewater discharge limits. Fluids disposed of or spilled in floor drains or otherwise released from the facility property are regulated under the NPDES, pretreatment, or storm water provisions of the CWA. These provisions require notifying EPA, the state, or a local treatment plant; complying with permit provisions; and preventing untreated fluids from reaching surface waters. The storage

and disposal of hazardous wastes (e.g., non-empty aerosol cans; discarded, unused, or outdated chemicals; solvent-contaminated rags) are regulated under the hazardous waste provisions of RCRA. Air emissions from the various chemicals used in photoprocessing (e.g., volatile organic compounds or toxics emitted from film cleaners, solvents) may be regulated under the CAA.

3.5.3.2 Firing Ranges

Most police departments require their police officers to practice firing accuracy at local indoor or outdoor firing ranges. If conducted at outdoor firing ranges, this activity may contaminate the soil (and possibly the groundwater) with lead from the birdshot, bullets, and bullet fragments, as well as produce airborne lead dust.

Despite the likely contamination, EPA's current position is that the deposition of lead from lead shot, bullets, and bullet fragments at firing ranges is considered to be within the normal and expected use pattern of the manufactured product, and the resultant contamination is not subject to the RCRA regulations. The bullets and bullet fragments are not characterized as "hazardous wastes" because they have not been discarded. Where an imminent and substantial endangerment to health or the environment may have been created by expended shot or debris, however, remedial requirements may apply under RCRA. In addition, the remediation of lead-contaminated soil at a firing range, either for maintenance or site closure, is regulated under the hazardous waste provisions of RCRA and/or CERCLA. Under the provisions of EPCRA, fire ranges must report releases of lead dust transported by the wind. A release is reportable when more than 1 pound of lead particles smaller than 0.004 inches in diameter is released beyond the boundaries of the site or facility.

Notwithstanding the above, EPA encourages the use of alternative approaches that ranges can take to reduce the possibility of lead contamination. These include installing devices that can intercept and collect the shot and bullets for recycling and substituting less hazardous materials (e.g., plastic and steel shot) for the lead shot. To reduce and/or eliminate lead pollution, many indoor and outdoor firing ranges use bullet "traps." Bullet traps have a rubber media that capture bullets and contain them, as well as a filter system that eliminates airborne lead dust. These traps prevent the lead pollution of air and soil, which would normally occur from bullet impact with metal, sand, or the ground. Most local firing ranges hire salvage companies to recover, clean, and recycle the bullet traps and filter systems. The disposal of bullets and bullet fragments recovered from a bullet trap may be regulated under the hazardous waste provisions of RCRA.

3.5.3.3 Laboratory Operations

Chemicals used in the laboratory include acids (e.g., sulfuric, hydrochloric, nitric), bases (e.g., sodium hydroxide, potassium hydroxide, sodium azide solution), and others (e.g., chlorine, ferric salts, carbon disulfide, and benzene). The quantity of wastes generated depends on the number and types of tests performed. Disposal of lab wastes down the sink or drain may be regulated under the pretreatment or NPDES program of the CWA. The storage and disposal of some wastes generated from laboratory activities may be regulated under the hazardous waste provisions of RCRA.

3.5.4 Vehicle/Equipment Maintenance

Local governments are responsible for maintaining all vehicles associated with public safety activities according to the operations described in Section 3.10.

3.5.5 Pollution Prevention and Public Safety

Public safety operations, especially emergency planning and response activities, can involve a variety of different local government agencies, local industry and other community representatives. Within the public safety arena, local governments have responsibilities as a regulated entity, an enforcement agent, a generator of various waste streams, and a provider of quality services to the constituents they serve. Pollution prevention strategies can help local governments efficiently and effectively meet the regulatory requirements associated with public safety operations, provide value added services, and implement a proactive approach to protecting their community from chemical emergencies. The three primary functions associated with public safety are emergency planning, fire protection and emergency response, and police protection. The opportunities for pollution prevention within these three primary functions can best be realized by examining both a list of the wastes generated and the specific services provided through each of these functions.

3.5.5.1 Emergency Planning

Services

- Understand and manage risks associated with specific chemicals and facilities in their community.

C Prepare for and respond to emergencies involving hazardous substances.

C Provide chemical information to the public.

***Waste Streams*.** There are no significant wastes associated with emergency planning other than any wastes created by the clean up of a specific release. Usually these types of clean ups involve state and often federal oversight.

***Pollution Prevention Opportunities*.** LEPCs, and Local Emergency Coordinators and Planners, are in an excellent position to promote pollution prevention through their relationships with both the facilities that store and release chemicals in their community and the general public they serve and protect. With guidance and assistance from state and regional pollution prevention programs, local agencies involved in emergency planning and response can use pollution prevention as a tool to better manage the risks in their communities by working with facilities to reduce and eliminate the chemicals posing the risk. Through EPCRA, communities are provided valuable information regarding the presence, quantities, and release of chemicals in their environment. This information can be used to identify local prevention priorities and establish a basis for local officials, citizen groups, and state pollution prevention officials to target and approach specific facilities.

Top Pollution Prevention Opportunities

- Encourage facilities which are required to develop risk management plans to consider pollution prevention strategies to meet or avoid this regulation.

- Establish a pollution prevention task force or subcommittee through the LEPC to investigate ways to access state and regional pollution prevention resources to address chemical concerns and priorities.

- Incorporate pollution prevention requirements into Right-to-Know and other local enforcement actions.

- Sponsor and/or co-sponsor pollution prevention workshops and other educational events for industrial facilities.

3.5.5.2 Fire Protection and Emergency Response

Services

- Fire response and suppression
- Hazardous materials response
- Fire code inspections
- Employee training
- Vehicle and equipment maintenance

Waste streams. A majority of the waste associated with fire response and suppression and hazardous materials response operations is a product of the specific nature of the release or the fire that takes place. Fire protection services usually involve vehicle and equipment maintenance activities similar to those associated with public works and other local government operations. For specific guidance regarding pollution prevention opportunities for vehicle maintenance operations, please refer to Section 3.10.

Top Pollution Prevention Opportunities

- Safeguarding lives and property, the primary objective of this service can not be jeopardized. There are pollution prevention strategies which can be incorporated through training and response protocols that will minimize the waste generated and long-term environmental impacts associated with the response incident without compromising human health and property.

- Incorporate strategies within emergency and fire response protocols and responder training courses to maximize the containment of spilled materials and contaminated fire suppression run-off and to prevent migration to waterways, sewers, and permeable surfaces.

- Incorporate the use of reusable absorbent booms and pads for materials containment to replace clay and other absorbent materials that can only be used once. Reusable booms and pads can provide the opportunity to recover a percentage of the material released and significantly reduce the amount of waste generated.

- Consider the use of halon free suppression materials where appropriate and develop a specific protocol for using halon suppressants only for situations where a suitable alternative is not available.

- Review training exercises and other drill activities for opportunities to substitute less hazardous and non-hazardous materials, and incorporate water reuse and conservation measures where and when the effectiveness of the training is not compromised.

- Promote site specific pollution prevention strategies through fire code inspections and enforcement activities.

3.5.5.3 Police Protection

Services

- Patrol/surveillance to maintain peace and order
- Investigation of crimes, and detection and apprehension of criminals
- Traffic regulation enforcement and traffic control
- Crime prevention, safety outreach, and education

Waste Streams

- Photoprocessing wastes (fixers, developers, film cleaners, etc.)
- Vehicle maintenance wastes
- Gun cleaning wastes (solvents, rags)
- Shooting range wastes (spent casings, lead slugs, lead dust emissions)
- Batteries
- Office paper and other solid wastes

Top Pollution Prevention Opportunities

- Consider the use of digital cameras to eliminate and/or reduce the need for photoprocessing.

- Consider the use of contracted photoprocessing services through a vendor that recycles photo wastes to eliminate the generation of photo wastes in house.

- Most liquid photoprocessing wastes can be recycled through a large commercial photoprocessing company or metals reclaimer.

- Consider the use of ceramic or other non-lead bullets for training where the effectiveness of the training is not compromised. Where alternatives to lead bullets are not suitable, the use of traps and other devices should be employed at both indoor and outdoor shooting ranges to capture bullets and bullet fragments for recycling.

- Consult Section 3.10 for pollution prevention opportunities associated with vehicle and fleet maintenance.

- Implement a recycling program for office paper, cardboard and other significant solid waste streams.

Resources

"Preventing Industrial Toxic Hazards: A Guide for Communities," M. Wise and L. Kenworthy, INFORM.

"Risk Management Planning: Will It Lead to Inherently Safer Operations?" by Carol J. Forrest; Pollution Prevention Review/ Summer 1997.

"Accidents Do Happen: Toxic Chemical Accidents in the United States," December 1996, National Environmental Law Center. "Too Close to Home," National Environmental Law Center.

For more information, contact Tom Hersey, Coordinator - Pollution Prevention Programs, Erie County Department of Environment and Planning, Phone: (716) 858-7674, Fax: (716) 858-7713, Email: hersey@cdbg.co.erie.ny.us.

3.6 SOLID WASTE MANAGEMENT

Local governments may be responsible for managing solid waste created by households and businesses within the community. Proper management of solid waste is critical to public health, as well as to the aesthetics of a community. Exhibit 3-6 presents activities associated with solid waste management. Because these activities could affect the environment, they may be subject to environmental regulations as indicated in the following list.

- Collection and storage—CWA
- Composting—EPCRA, CERCLA, and CAA
- Disposal—RCRA, CWA, and CAA

Household hazardous waste collection and storage programs are not regulated by federal statutes.

RCRA defines solid waste as any garbage or refuse; sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility; and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. The main constituent of the latter group is municipal solid waste (MSW), which includes paper and paperboard, yard waste, wood, metal, glass, food waste, plastics, rubber, leather, textiles, household hazardous waste, and miscellaneous inorganic waste.

3.6.1 Collecting and Storing Municipal Solid Waste

Solid waste management begins with the collection and storage of solid waste. Collection involves either picking up the waste at curbside or backdoors or gathering it from drop-off locations. Storage is basically maintaining the waste at an interim site prior to recycling or final disposal.

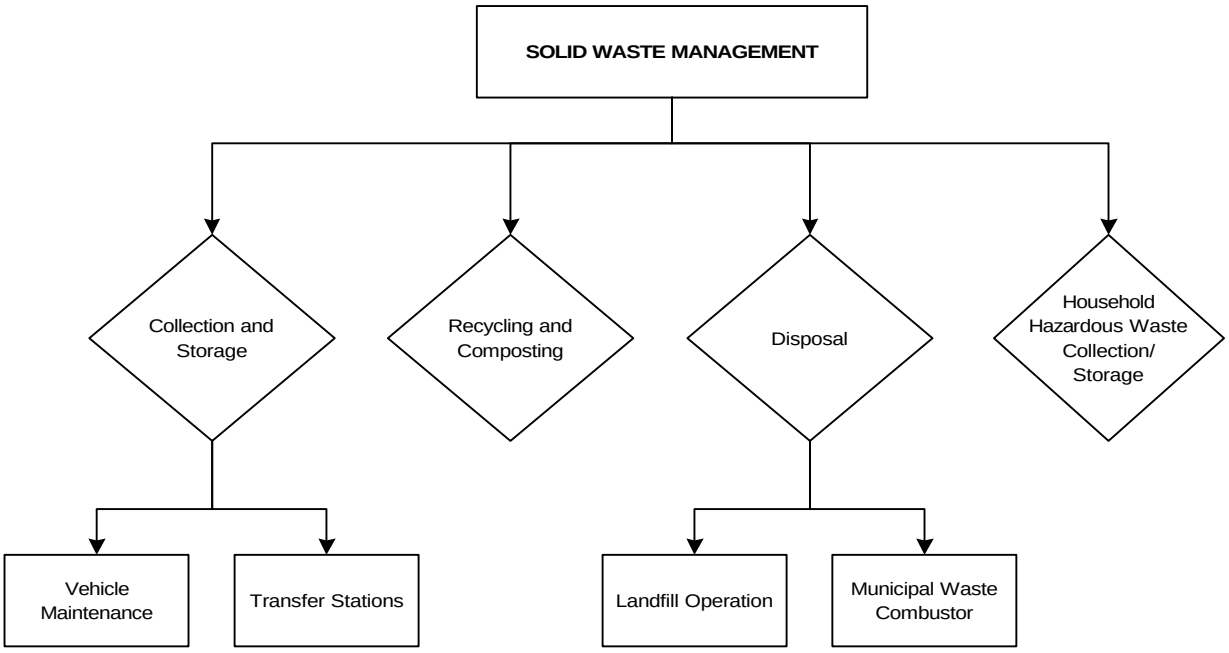
3.6.1.1 Collection

Depending on the demographics, geographic environment, and/or state law, every local government has some type of service in which solid waste is collected from residents. A local government can use its own employees and equipment, a private firm(s) through an established contract(s) with the local government, or a private service that has contracted directly with residents.

Local governments use an array of methods for collecting solid waste, including the following:

- Curbside or alley collection
- "Backyard set out-set back" or "backyard carry," in which containers are carried from backyards by collection crews to the curbs for collection
- Drop-off stations, where residents deliver solid waste to a specified site, such as a transfer station, local dumpster, or the disposal site itself.

Exhibit 3-6. Solid Waste Management



Most activities undertaken during collection are not regulated by any particular environmental statute. Federal guidelines for the collection and storage of residential, commercial, and institutional solid waste are given at 40 CFR Part 243, but are not binding on state and local governments. There may be local ordinances or state health laws that pertain to the frequency of collection, depending on the community.

3.6.1.2 Storage/Operation of Transfer Stations

Once a local government has collected the solid waste, it may have to store the waste at an interim location prior to recycling or final disposal. If necessary, such storage usually occurs at a transfer station. A transfer station is a facility where wastes are transferred from smaller collection vehicles to larger transport vehicles, such as tractor trailers, railroad gondola cars, or barges. These vehicles then transport the waste to its final destination.

Not all local governments have transfer stations. In small communities in which the nearest landfill is within 10 to 15 miles, compactor trucks take solid waste directly to the landfill. If stations are used, collection crews take waste to the transfer stations where it is weighed and either temporarily stored or moved directly into a larger vehicle.

These activities may impact the environment if waste is not contained and kept from leaving the transfer station by wind or storm water runoff. In addition to basic local building and health codes, the operation of transfer stations may be regulated under the local government's NPDES storm water or CSO permit conditions. Storage should be on a short-term basis only and should prevent the waste from being released to the environment. In some conditions, improper storage could be deemed disposal and could trigger more stringent regulation of the waste.

3.6.2 Recycling and Composting

3.6.2.1 Recycling

Many local governments have established recycling programs as part of their integrated waste management strategy. Recycling reduces the amount of waste ultimately being disposed of, conserves natural resources, and, in some situations, generates revenue for the local government. A local government recycling program usually includes the following activities:

- Collecting recyclables
- Separating recyclable from nonrecyclable materials
- Processing the recyclable materials
- Marketing the "final" product.

Collection of recyclables is extremely similar to collection of municipal solid waste. Specially designed vehicles collect recyclables either at curbside or from designated drop-off locations.

Separating recyclables from nonrecyclable materials depends on the collection method. Basically, three categories of collection drive separation activities:

- Source separation by type of recyclable (e.g., glass, paper, aluminum) either by the generator (i.e., the resident) or by the collector at curbside

- Commingled collection (i.e., generator separates recyclables from nonrecyclables)

- Mixed collection, in which there is no separation.

In source separation, segregated recyclables are usually stored by the local government until the amount is sufficient to send to a processor or market. Private recyclers or dealers usually further process (e.g., can flattening, glass pulverizing) the recyclables in small communities. During

commingled collection, the local government transports the recyclables to a materials recycling facility where the recyclables are segregated. Most segregation occurs by hand, but some automated systems are being used. In mixed collection, all waste is collected together and taken to a central processing facility. The mixed waste is shredded and magnets and air separators segregate out the recyclable materials in a process known as front-end processing.

Processing recyclables generally includes activities that prepare the material for final shipment to the recycler or dealer. Once segregated, recyclables may need further processing to make them more dense or package them in a way that is appropriate for final shipment. For example, bottles may be crushed, metals flattened, and paper baled. Such activities reduce storage area, facilitate handling, and reduce transportation costs.

By definition, recycling does not occur until someone uses the recycled product to make new products. If there is no market for the recycled materials, there is no recycling. The local government is responsible for locating markets for its recycled materials. This process is similar to marketing any product or commodity and involves four distinct steps: 1) determining the possible uses of the end product, 2) identifing potential markets, 3) marketing the product, and 4) developing a distribution system. Failure to effectively market the product may ultimately result in more waste being landfilled.

The major environmental impact associated with recycling is the volume of waste diverted from landfills or incineration. This diversion extends the life of landfills and limits the volume of wastes being combusted, thus reducing environmental impact.

Federal environmental statutes do not directly regulate the recycling of typical solid wastes (e.g., paper, plastic, glass, aluminum). However, the recycling of used oil is regulated under 40 CFR Part 279, which establishes standards for used oil generators, collection centers, transporters and transfer facilities, processors and re-refiners, burners of off-specification used oil, used oil fuel marketers, the use of used oil as a dust suppressant, and used oil disposal. Used oil generated by households is exempt from these requirements. Like federal environmental law, most state laws that address solid waste recycling typically do not focus on the recycling process itself, but may specify source separation requirements or recycling/recovery goals.

3.6.2.2 Composting

Composting is a process of aerobic biological decomposition of organic materials to produce a stable and usable organic topsoil that does not require disposal. Resources used to create the

final compost product originate from the roughly 70 percent of the municipal solid waste stream that is organic material (i.e., food waste/scraps, yard and lawn clippings).

Three primary activities are associated with composting:

- Collecting/receiving wastes for composting
- Processing the wastes (e.g., decomposition)
- Marketing.

A local government can collect or receive wastes for composting from a variety of sources. The local government may have active yard waste collection programs, complete with trucks that vacuum up leaves. Many communities have separate yard waste pickup as a part of recycling programs or drop-off stations for yard wastes. Significant composting wastes also result from recyclable material separation and processing. Once recyclable materials are removed from the solid waste stream, the remaining wastes may be suitable for composting.

During the processing or decomposition stage of composting, the local government may need to adjust the physical and chemical properties of the waste to make it more amenable to composting. For example, it may shred or grind the waste into a smaller particle size, alter the carbon-to-nitrogen ratio, or add water to the waste. All of these activities are designed to facilitate decomposition. Depending on the types and amounts used, chemicals added to alter the properties of the composted waste may be regulated under EPCRA or Section 112(r) of the CAA (risk management plans). Composting that occurs outside may create nuisance odors. Local ordinances may address odor problems.

A key aspect of composting programs is the concept of biosolids recycling. Sewage sludge biosolids are solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a wastewater treatment plant. Composting of household organic materials is not regulated by any major federal statutes, although many states do establish composting standards. However, the requirements for land application of biosolids at 40 CFR Part 503 pertain to materials **derived** from biosolids (e.g., biosolids that have undergone a change in quality through treatment, such as composting, or by mixing with other materials, such as wood chips, municipal solid waste, or yard waste). These regulations specify pollutant limits, management practices, operating standards, monitoring requirements, and recordkeeping and reporting requirements. As with recycling, the local government is responsible for locating a market for its compost.

3.6.3 Source Reduction

Local governments often encourage programs that are directed at conserving resources and reducing the amount of solid waste generated in the first place, thereby helping to mitigate the burden of collection, processing, and disposal practices. In many states, source reduction is the topic of legislation directed at government procurement and purchasing requirements (e.g., local governments can model their own policies after state directives to use recycled paper, double-sided copies), labeling guidelines, and product reuse (e.g., "bottle bills"). Many states have waste reduction goals that require 25 to 50 percent reduction in the solid waste stream before a particular year.

Local governments can perform waste audits to assess the flow of materials through their systems. In doing so, disposal costs are quantified, unnecessarily disposed materials are identified and quantified, cost savings are estimated, and new programs are initiated and monitored. These audits can help managers to determine the most appropriate and effective source reduction programs for their community.

3.6.4 Disposal

Local governments must dispose of solid waste that is not recyclable, compostable, or considered household hazardous waste. The two primary types of disposal practices are landfilling and municipal waste combustion, or incineration, which may employ conventional techniques or a "waste-to-energy" approach.

3.6.4.1 Landfill Operation

Local governments often own and operate solid waste landfills for final disposal of the majority of solid waste generated within their jurisdictions. Solid waste landfills provide an engineered facility for the long-term containment of solid waste and involve the following activities:

- Receiving and depositing solid waste into the landfill
- Controlling disease vector populations
- Managing/monitoring landfill gas production, leachate, and storm water
- Recordkeeping.

Most landfills include a large disposal area that contains numerous smaller cells. Solid waste is deposited in these cells daily, compacted using specially designed bulldozers, and then generally

covered with either a thin layer of soil or some alternative cover. The local governments control the flow of solid waste into the facility to exclude materials such as hazardous waste or other materials that should be managed elsewhere or could be recycled to make the landfill safer and preserve capacity. Once a cell is full, it is covered with a final cover designed to limit infiltration and vector populations, as well as to provide a base for cover vegetation.

Local governments must monitor groundwater in close proximity to the landfill and employ a system of pipes that collect methane gas generated as a byproduct of decomposition. Methane gas has been identified as a significant greenhouse gas. Facilities that generate sufficient quantities of methane can recover the landfill gas for use as an energy source. Storm water runoff associated with landfills may be regulated under the CWA storm water provisions.

Landfill operations are subject to the minimum criteria for municipal solid waste landfills given at 40 CFR Part 258. These criteria address location restrictions, operating criteria, design criteria, groundwater monitoring and corrective action requirements, closure and post-closure care requirements, and financial assurance criteria. If a municipal solid waste landfill subject to this rule does not meet these requirements, it is considered an open dump, which is prohibited under Section 4005 of RCRA.

A local government could be subject to state permit provisions if it has developed its own solid waste permit program under delegated authority from EPA. Under the CAA, landfills are subject to air emission guidelines (40 CFR Section 60.30c), and EPA is developing NESHAPs for emissions from landfills as a long-term action. In addition, landfills may be regulated under prevention of significant deterioration (PSD), nonattainment area (NAA) provisions, and new source performance standards (NSPS) programs.

3.6.4.2 Municipal Waste Combustion

An alternative method of managing solid waste is through combustion. Solid waste combustion involves the incineration of all or a portion of the solid waste stream in specially designed solid waste combustion facilities and the disposal of the residual ash in landfills.

When choosing to employ municipal combustion, local governments can either retrofit existing facilities, build new facilities, or enter into regional partnerships. If they are building new facilities, they must site, design (incorporating elaborate air pollution controls), permit, and construct the combustion facility. Once a combustion facility is in place, the local government must ensure its proper operation, provide a relatively constant flow of waste as a feed stream, and

manage and dispose of the residual ash. Most new incinerators have the capacity to recover and reuse the energy released during combustion (the "waste-to-energy" process).

Municipal waste combustion is regulated primarily under the CAA (40 CFR Part 60), which establishes guidelines and standards of performance for municipal waste combustors, as well as standards of performance for incinerators. Regulations under RCRA would only apply if the facility receives and burns hazardous waste. Other CAA regulatory programs to which combustion may be subject are PSD, NAA provisions, NESHAPs, and NSPS.

The disposal of residual ash from the combustion of municipal waste, including fly ash and bottom ash, is regulated under RCRA and state law. Generally, these two types of ash are combined and then disposed of either at a municipal landfill or a special ash landfill. Under RCRA, each facility must determine whether the combined ash constitutes a hazardous waste and, if so, the ash must be managed as a hazardous waste. If the ash is not a hazardous waste, it can be managed under state law, which may allow disposal in a solid waste landfill or provide for disposal in an ash monofill (or impose other special requirements).

3.6.5 Household Hazardous Waste Collection and Storage

Local governments may sponsor basic household hazardous waste collection programs. These programs may be single-day or continuous events that provide for the safe collection, identification, sorting, storage, and disposal or reuse of household hazardous waste. Such programs may be operated by the local government or administered under a contract with a waste management firm. The materials collected during a household hazardous waste collection program may be recycled (e.g., used oil), used as a waste fuel (e.g., solvents), or disposed of properly at hazardous waste facilities.

Common Household Hazardous Wastes

Oil-based paint and varnish, paint and varnish remover, pesticides, insecticides, herbicides, motor oil, brake fluid, fuels, antifreeze, oven cleaners, drain cleaners, bleach, solvents, pool chemicals, mothballs, dye, nail polish, photo chemicals, toilet cleaners, fertilizer, metal polish, floor cleaners, wood strippers, muriatic acid, creosote, sealants, and both household and automotive batteries

Under the regulations that implement RCRA, hazardous waste generated by households is exempt from federal hazardous waste regulations. Nevertheless, these wastes can and do pose an environmental and health risk when they are managed improperly. These products may contain toxic substances that can be released when they are poured down the sink, sewer, onto the

ground, or when they are landfilled or incinerated. Thus, many state and local governments have established household hazardous waste collection, storage, and disposal programs.

Under federal regulation, the collection, transportation, storage, treatment, and disposal of household hazardous waste are exempt from the regulations applicable to commercial hazardous waste. In addition, resource recovery facilities that manage municipal solid waste are not subject to hazardous waste regulations (with the exception of ash that exhibits a hazardous characteristic, such as toxicity) if they meet specified conditions.

3.6.6 Vehicle/Equipment Maintenance

Local governments are responsible for maintaining all vehicles associated with solid waste activities according to the operations described in Section 3.10.

3.6.7 Other Operations That May Be Regulated

Another operation associated with solid waste management is pesticide application. Pesticides may be used in solid waste management activities to control weed growth and control vectors. Activities related to pesticide use and storage may be regulated under the provisions of FIFRA, EPCRA, or CAA Section 112(r). Section 3.4 provides more information on pesticide management.

3.6.8 Pollution Prevention in Solid Waste Management Operations

Numerous opportunities exist for pollution prevention in solid waste management operations. As the lead municipal department with responsibility of "putting waste in its place," solid waste operators have a responsibility to demonstrate their commitment to waste reduction by ensuring that their operations prevent pollution and are in compliance with existing environmental regulations. With a diverse range of activities, solid waste managers provide a range of services with polluting possibilities. These can generally be categorized as follows:

- Source reduction
- Collection and storage
- Processing—recycling and composting
- Disposal
- Household hazardous waste (HHW).

With the exception of source reduction, each of these categories generates wastes as described below.

3.6.8.1 Typical Wastes Generated

Curbside *collection* is provided for solid waste and recyclables, with drop off facilities for other materials and special wastes. Key wastes generated by collection operations include used motor oil and filters, antifreeze, parts washer solvent, used hydraulic oil, tires, used vehicles and vehicle parts, and air emissions.

The *processing* of recyclables at material recovery facilities, solid waste at transfer stations, and yard waste at compost sites often generates waste. Key wastes include dust from compost sites, hydraulic oil, site runoff, recycling residues, electrical transformers, and spilled fuels.

Waste *disposal* includes landfill and waste-to-energy facility operations. Key landfill wastes include leachate and air emissions. Key waste-to-energy facility wastes include bottom ash, fly ash, bulky materials, air pollution control residues, air emissions, and wastewater.

Household hazardous waste collection programs are frequently operated by a local government as a service to the citizens, where the local government typically assumes generator status for household materials upon acceptance at the collection point. Problematic wastes generated internally by solid waste management operations include PCBs and mercury from fluorescent ballasts, paints, and CRTs (cathode ray tubes) from computer monitors.

3.6.8.2 Top Pollution Prevention Opportunities

Overall

Perform a waste audit - understand your waste stream in order to identify high priority items for source reduction and reuse (e.g., textiles, yard waste, construction and demolition material).

Collection

- Establish "take back" program with motor oil suppliers to provide re-refined oil.

- Use in-line oil filters to reduce frequency of oil filter disposal.

- Capture and recycle on site spent antifreeze.
- Convert parts washer to aqueous-based systems.
- Convert fleet to natural gas as feasible.
- Maximize collection efficiency (minimize trips) by using route management software and multi-purpose vehicles.
- Recycle tires and utilize retread tires where appropriate.
- Specify tires for maximum durability.

Processing

- Establish a preventative maintenance program for all major pieces of equipment to minimize potential fluid discharges.
- Capture and recycle spilled hydraulic oil using oil absorbent material.
- Minimize recycling residues through on-going education of customers, limits on compaction equipment, and employee training.
- Maximize acceptability of compost products by minimizing heavy metal content of source materials, including pretreatment requirements for industrial contributors and increased frequency of street sweepings.

Disposal

- Minimize landfill site runoff by capturing and recirculating leachate and development of effective storm water management plans.
- Capture and reuse methane gas generated at landfill sites.
- Minimize hazardous nature of incinerator ash by implementing battery recycling and household hazardous waste collection programs.

Household Hazardous Waste

Educate HHW participants to "use it up," provide a waste exchange for unopened materials, and bulk containerize latex paint for reuse or resale.

Other

- Establish preventative maintenance program for electrical equipment and require equipment vendors to take back all devices with mercury switches or PCB transformers.

- Replace underground storage tanks with above ground tanks with proper containment systems.

- Minimize pesticide usage through litter prevention and site management programs.

3.6.8.3 Success Story

The City of Milwaukee Department of Public Works provides solid waste and recycling collection and processing services for more than 600,000 people. In 1990, the department began a review of its operations to determine what types of pollution prevention efforts could be implemented.

As a result of waste audits at numerous facilities, the city has implemented the following:

C Encouraged residents to leave grass clippings on their lawns by launching the "Just Say Mow" campaign.

C Designed, tested, and added 45 split body packers for multi-purpose collection.

C Developed and implemented a GIS-based routing program to minimize trip times.

C Replaced fuel stations with state-of-the art fueling facilities, including pump emission controls and containment.

C Implemented storm water management plans for each of its facilities.

C Improved fleet maintenance by use of re-refined motor oil and paint booth improvements.

C Discouraged drop off of latex paints and educated public to reduce and reuse materials.

Resources

EPA Office of Solid Waste Management - *www.epa.gov/osw.*

Azimi and Saphire, Rethinking Resources: New Ideas for Community Waste Reduction - *http://www.informinc.org/rethinking.html.*

Comprehensive Municipal Pollution Prevention Project: Inventory Phase, Regional Municipality of Hamilton-Wentworth, April, 1995.

For more information, contact Steve Brachman, Waste Reduction and Management Specialist, UW-Extension, Phone: (414) 227-3165, Fax: (414) 227-3165, E-mail: brachman@uwm.edu.

3.7 WASTEWATER MANAGEMENT

Local governments are responsible for designing, planning, constructing, financing, operating, and maintaining wastewater treatment plants. They are also responsible for the conveyance systems that transport wastewater to the treatment plant and discharge storm water runoff to nearby water bodies. A publicly owned treatment works (POTW) consists of the wastewater treatment plant and a collection system that transports sanitary sewage to it. A collection system can be either of two types (or some combination of the two):

- Separate sanitary sewer systems are designed to convey only municipal sanitary sewage and industrial wastewater.

- Combined sewer systems are designed to convey storm water runoff in addition to municipal sanitary sewage and industrial wastewater.

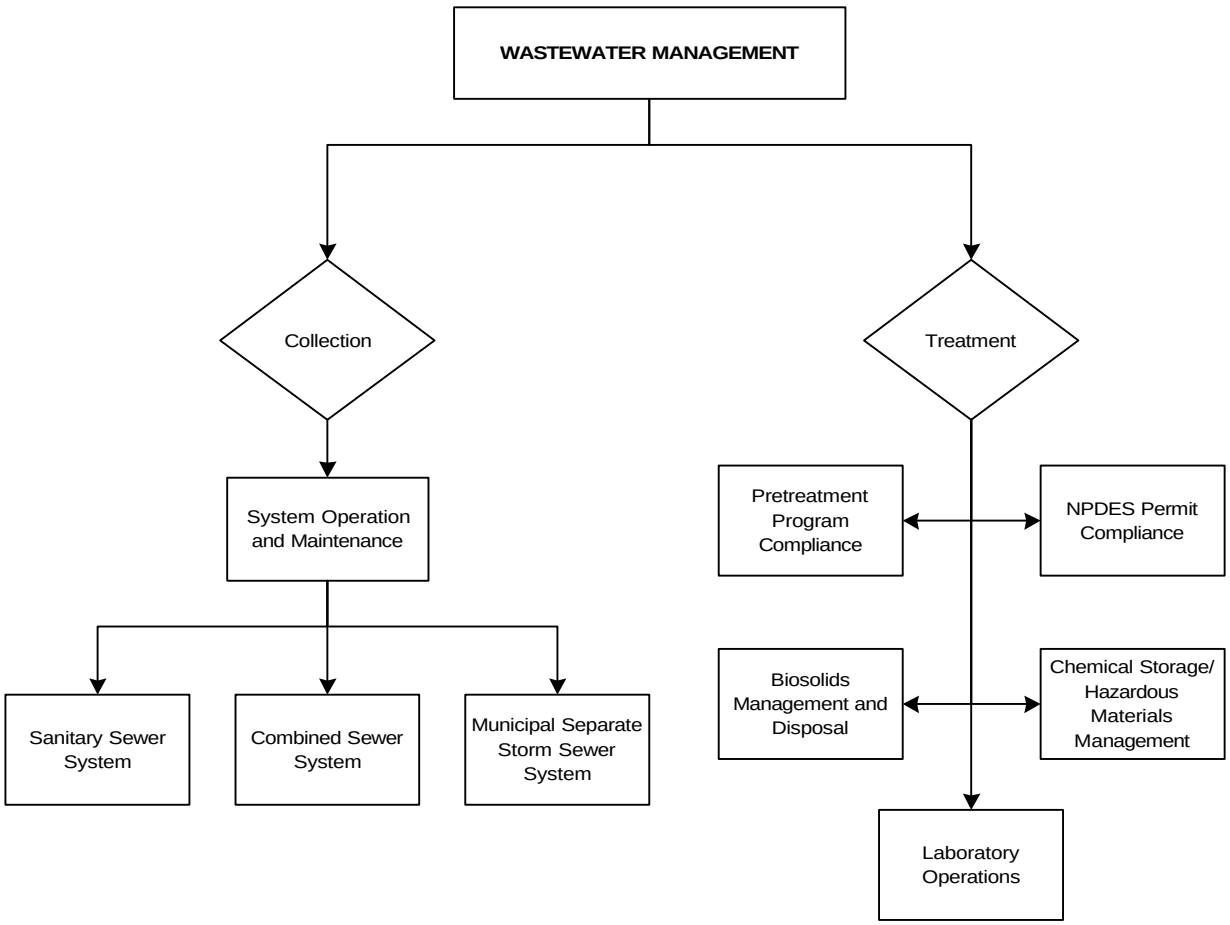
Defining "Municipal" Sewer Systems

EPA uses a broad definition of "municipal" in defining municipal sewer systems. Municipal systems are defined as conveyances that are owned or operated by a state, city, town, borough, county, parish, district, association, or other public body having jurisdiction of disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or other similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the CWA.

A third type of conveyance system—a municipal separate storm sewer system (MS4)—conveys storm water runoff directly to nearby waters rather than to a POTW.

Overall, POTWs are responsible for collecting, treating, analyzing, and discharging wastewater received from separate sanitary or combined sewer systems, as well as for disposing of sewage sludge, or "biosolids," generated during the treatment process. A POTW must comply with its NPDES permit, including requirements for industrial pretreatment, compliance monitoring, and proper use or disposal of biosolids. A POTW is also responsible for laboratory operations, chemical storage and hazardous materials management, and vehicle and equipment maintenance. Exhibit 3.7 presents common operations for wastewater management.

Exhibit 3-7. Wastewater Management



3.7.1 OPERATION AND MAINTENANCE OF SEWER SYSTEMS

What part of the sanitary sewer system is most likely to leak?

Sanitary sewer capacity is reduced by ground water seepage through leaky pipes and storm water flow through leaky and missing manhole covers and domestic and industrial roof drains. While much of the leakage occurs in main trunk sewers, more than 50 percent of groundwater seepage in certain areas may come from holes in pipes on private property.

The system through which water is conveyed can be one or more of three types, any or all of which a local government may be responsible for operating and maintaining. The three types are separate sanitary sewer systems, combined sewer systems, and municipal separate storm water systems. These systems may be regulated under the NPDES, pretreatment, or storm water provisions of the CWA.

3.7.1.1 Sanitary Sewer Systems

Local governments design, construct, operate, and maintain sanitary sewer systems to convey wastewater from homes and businesses to wastewater treatment plants. Local governments install new sewer lines, clean blocked lines, repair leaky lines, maintain root control, repair manholes, operate and maintain pump stations, and conduct all maintenance activities necessary to prevent overflows and ensure that wastewater is conveyed to the treatment plant.

Maintaining sanitary sewer systems is a significant responsibility for local governments. Leaks or the infiltration of wastewater into the sewer system can occur through cracks and improperly sealed pipe joints.

Overall, this "infiltration and inflow" (I/I) raises the volume of wastewater in sewers and lowers their capacity. During excess rainfall events, the sewer system cannot carry the excess wastewater, and flooding can occur. Diluted and untreated sewage can back up through manholes and into basements, spill into storm drains and creeks, and wash up onto public beaches. To ensure maximum system capacity and to prevent these "sanitary sewer overflows" (SSOs), local governments must undertake active monitoring and preventive maintenance programs to identify and repair leaky sewer lines, as well as conduct any major upgrades or restorations.

Local governments that operate POTWs are required to report all overflows and flooding from either sanitary or combined sewage systems so that repairs and preventive action can be taken to minimize the extent of environmental and human health impacts.

SSOs, whether caused by excessive I/I, inadequate capacity, blockages, or equipment failure, impact the environment through the discharge of raw sanitary sewage. These discharges often result in direct human exposure to raw sewage, as well as discharge of sewage to surface and ground waters. SSOs are unpermitted, illegal discharges under the CWA and may subject the local government to enforcement action by the regulatory authority.

3.7.1.2 Combined Sewer Systems

Approximately 950 communities, mostly in the Northeast and Great Lakes regions, have combined sewer systems (CSSs) that are designed to carry both sanitary sewage and storm water runoff to the POTW for treatment. In periods of heavy rainfall or snowmelt, the wastewater volume in a CSS can exceed the capacity of the system. CSSs, therefore, are designed to overflow occasionally and discharge excess wastewater directly to nearby water bodies. These discharges are called combined sewer overflows (CSOs).

Communities with CSSs have operation and maintenance responsibilities similar to those for separate sanitary sewer systems, such a installing new sewer lines, cleaning blocked lines, and inspecting for and fixing leaks and infiltration. Their most important activity, however, is controlling CSOs, which contain not only storm water but also untreated human and industrial waste, toxic materials, and debris.

EPA's CSO Control Policy describes numerous options available to communities with CSOs, recognizing that completely eliminating these discharges is neither necessary nor affordable in many cases. All CSO communities are expected to implement nine minimum controls, such as maximizing the use of the collection system for storage, controlling the discharge of solid and floatable materials, and eliminating CSOs during dry weather periods. CSO communities are also expected to develop long-term CSO control plans that identify which additional controls, including capital projects, will be developed to help meet water quality standards.

CSO control requirements are included as conditions in NPDES permits and enforcement orders. Due to the site-specific nature of CSO problems and the flexibility in the CSO Control Policy, local communities should coordinate actively with their permitting and water quality standards authorities to develop long-term control plans and permit requirements that will provide meaningful environmental benefits within the community's financial capability.

3.7.1.3 Municipal Separate Storm Sewer Systems

Local governments also are responsible for operating and maintaining separate storm sewers. MS4s are designed to convey storm water from impermeable areas to bodies of water. In conveying storm water directly to streams, rivers, and lakes, MS4s also transport oil, grease, pesticides, herbicides, dirt and grit, all of which have the potential to reduce water quality. Local government operations related to operating and maintaining storm sewer systems include clearing blocked sewer lines, preventing contaminants from entering the storm sewer system, constructing storm water controls, and sampling and analyzing storm water discharges. In addition, local governments reduce the volume of silt and solids being transported to the sewer systems and reduce water contamination by cleaning streets, removing wastes, and cleaning screens.

EPA's NPDES storm water regulations require local governments to apply for an NPDES storm water permit, characterize storm water discharges, implement management procedures to prevent contaminated storm water from discharging to waterways, and monitor storm water discharges.

3.7.1.4 Water Line Repair/Replacement

Separate, combined, and storm sewer systems require repair to eliminate conditions that interfere with their ability to convey sewage and storm water flows. Sewers and other collection system components, such as manholes, pump stations, and siphons, must be repaired or replaced to address structural failure, infiltration (leakage of groundwater into pipes), exfiltration (leakage of sewage out of pipes), and blockages. In combined sewers, regulators must be repaired when they fail to divert combined wastewater flows at the intended flow rates. Portions of a sewer system may need to be replaced to address inadequate capacity, which can result in separate sewer system overflows during periods of high flow. Repairs may involve replacing individual pipe sections, replacing entire sewer segments, or repairing existing sewers. Grouting leaking joints, lining existing sewers, and rebuilding or lining manholes and other structures all may be necessary.

Separate and combined sewer system repairs can impact the environment through the discharge of raw sewage that may occur as a result of the need to bypass sewage around the line or system component being repaired. Repairs of separate, combined, and storm sewers also can affect the environment through erosion and sedimentation, which take place as a result of excavation, stockpiling, and backfilling, or through the discharge of sediment-laden water from the repair

excavation. Guidance on sewer maintenance activities is often included in a local government POTW's NPDES permit.

3.7.2 Wastewater Treatment

Local governments may be responsible for the final system through which water is conveyed and treated. WWTPs are responsible for the treatment, analysis, and discharge of wastewater received from sanitary or combined sewer systems, and the disposal of sludge generated from the treatment process.

Activities at a WWTP may include:

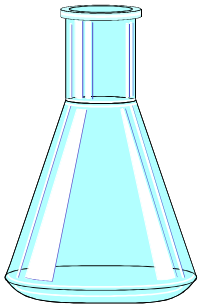
- Operating and maintaining the plant to ensure that discharges meet the facility's NPDES permit requirements and limitations
- Overseeing a pretreatment program to prevent industrial discharges from causing interference or pass through, sludge contamination, or the plant to violate its permit
- Sampling and analyzing wastewater and sludge prior to discharge or disposal to meet NPDES monitoring requirements
- Managing biosolids from the treatment processes by landfilling, land application, surface disposal, incineration, or composting
- Maintaining records and submitting discharge monitoring reports (DMRs).

Because these activities could affect the environment, they may be subject to environmental regulations as indicated in the following list.

- Wastewater treatment process—CAA
- NPDES permit compliance—CWA
- Laboratory operations—CWA and RCRA
- Pretreatment program—CWA

- Biosolids management and disposal—CWA, RCRA, and CAA
- Chemical storage/hazardous materials management—EPCRA, CERCLA, and CAA

3.7.2.1 Wastewater Treatment Process



Municipal wastewater (sewage) treatment is defined by the extent of pollutant removal and the mechanisms (physical, biological, or chemical) used for removal. Wastewater treatment is classified as primary, secondary, and tertiary treatment. Primary treatment consists primarily of physical processes (settling or skimming) that remove a significant percentage of the organic and inorganic solids from wastewater. Secondary treatment depends on biological action to remove fine suspended solids, dispersed solids, and dissolved organics by volatilization, biodegradation, and incorporation into sludge. In addition, secondary treatment satisfies much of the oxygen demand of the pollutant(s). Advanced wastewater treatment uses a variety of biological, physical, and chemical treatment approaches to reduce nutrients, organics, and pathogens.

Local governments can use "biogas," a product of anaerobic digestion, either offsite or within the plant to improve energy efficiency of wastewater treatment processes. Biogas, a gas composed of methane, carbon dioxide, hydrogen sulfide, and other minor gaseous compounds, has about 60 percent of the heat value of natural gas. If the gas is not reused, it can be flared, which may be regulated under the CAA.

3.7.2.2 NPDES Permit Compliance

Local governments are responsible for complying with federal regulations, for both wastewater plant operation and the collection system (sanitary or combined) that conveys wastewater to the WWTP. Proper operation and maintenance are critical for sewage collection and treatment because the environmental impacts from these processes can severely degrade water resources and, ultimately, human health. For these reasons, POTWs receive NPDES permits to ensure compliance with federal regulations.

NPDES permits, issued by either EPA or a delegated state (EPA has authorized 42 states to administer the NPDES program), establish effluent limits on the kinds and quantities of pollutants that POTWs can discharge and the pollutant monitoring, recordkeeping, and reporting requirements. Each POTW that intends to discharge into the nation's waters must obtain an NPDES permit prior to initiating its discharge.

To comply with the NPDES permit, local governments are responsible for implementing an NPDES monitoring program at their POTWs. To comply with the program, POTWs must collect samples of effluent discharges at the required frequencies and locations as specified in their permits and submit monitoring reports to the state or EPA. Sampling and analysis are conducted to verify that the amounts and types of pollutants discharged from wastewater treatment systems meet the NPDES permit limits. The NPDES permit specifies the parameters that must be monitored. These parameters vary by plant. The primary parameters in NPDES permits for POTWs include biochemical oxygen demand (BOD), pH, fecal coliform, residual chlorine, and suspended solids. An NPDES permit may include other parameters, such as bioassay toxicity tests and metals.

If a POTW meets the NPDES permit limits, the systems usually are operating properly. Failure to comply with these requirements can result in permit suspension, increased monitoring requirements, and/or issuance of fines or other penalties by EPA or the relevant state regulatory agency.

3.7.2.3 Laboratory Operations

Some POTWs analyze wastewater samples and sludge at onsite laboratories. Laboratory procedures must comply with approved methods and meet NPDES monitoring requirements. Chemicals used in the laboratory include acids (e.g., sulfuric, hydrochloric, nitric), bases (e.g., sodium hydroxide, potassium hydroxide, sodium azide solution), and others (e.g., chlorine, ferric salts, carbon disulfide, and benzene). The quantity of wastes generated depends on the number and types of tests performed. The storage and disposal of some wastes generated from laboratory activities may be regulated under the hazardous waste provisions of RCRA.

POTWs are responsible for operating the wastewater laboratory safely. To prevent laboratory accidents, chemicals should be stored in a properly ventilated and well lit room. All bottles and reagents should be clearly labeled and dated. Volatile liquids that can escape as a gas, such as ether, must be kept away from heat sources, sunlight, and electrical switches. Cylinders of gas being stored should also be capped and secured to prevent rolling or tipping.

3.7.2.4 Pretreatment Program

Under the pretreatment regulations (40 CFR 403), POTWs are required to develop and implement local pretreatment programs. Through this program, the POTW is directly

responsible for the regulation of certain industrial users discharging to the wastewater treatment system. See Section 3.11 for more information.

3.7.2.5 Biosolids Management and Disposal

Local governments are responsible for managing and disposing of sewage sludge (i.e., biosolids). Biosolids are a primary organic solid product produced by wastewater treatment processes that can be beneficially recycled. (The fact that biosolids can be recycled does not preclude their disposal.) Local governments must follow the federal sludge management program (40 CFR Part 503), which establishes requirements for the final use or disposal of biosolids when biosolids are:

> ***What are biosolids?***
> Biosolids (or sewage sludge) are defined as solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works.

- Applied to land to condition the soil or fertilize crops or other vegetation grown in the soil
- Placed on a surface disposal site for final disposal
- Fired in a biosolids incinerator.

A fourth disposal option is landfilling. If biosolids are placed in a municipal solid waste landfill, the local government is responsible for ensuring that the biosolids meet the provisions of 40 CFR Part 258.

For the most part, the requirements of 40 CFR Part 503 are self-implementing and must be followed even without issuance of a permit. In most cases, Part 503 requirements will be incorporated over time into NPDES permits issued to POTWs. The sludge program includes other facilities (e.g., sewage sludge incinerators, composting facilities, sewage sludge surface disposal sites) that have not been part of the NPDES program because they were not point sources of discharge to U.S. waters.

The following provides more information on final use and disposal options for biosolids:

- ***Land Application***. Land application, defined as the spreading of biosolids on or just below the surface of the land, is the most widely employed use of biosolids. Part 503 specifies the biosolids quality, pollution limits (metals), pathogen reduction and vector

attraction requirements, application rates, and environmental conditions under which land application is permitted. Representative samples of biosolids must be collected and analyzed for inorganic pollutants and pathogens according to methods specified in the Part 503 rule. In addition, the regulations specify recordkeeping requirements for land application facilities.

C ***Surface Disposal***. Surface disposal is defined in the Part 503 regulations as an area of land that contains one or more active biosolids units. A unit is an area of land on which only biosolids are placed for final disposal. Under the provisions of Part 503, facilities using surface disposal must comply with pollutant limits, management practices, and operational standard(s), as well as other requirements related to the frequency of monitoring, recordkeeping, and reporting. The regulation established limits for three inorganic pollutants (i.e., arsenic, chromium, and nickel) for active biosolids units that do not contain a liner and leachate collection system. In addition, site-specific limits can apply in certain situations.

When placing biosolids on a surface disposal site, local governments must follow management practices, some of which are given below:

- ***Threatened or Endangered Species***. Biosolids cannot be placed in a surface disposal site if it is likely to adversely affect a threatened or endangered species (under Section 4 of the ESA) or its designated critical habitat.

- ***Wetlands***. An active biosolids unit cannot be located in a wetland unless a permit is issued under Section 402 (NPDES permit) or Section 404 (dredge and fill permit) of the CWA. If the owner/operator of a surface disposal site suspects that all or some portion of an active biosolids unit is in a wetland, he or she should contact the local Corps of Engineers district office to request a wetland delineation.

- ***Methane Gas Concentrations***. Methane, an odorless and highly combustible gas, is generated at surface disposal sites. When biosolids are *covered by soil or other material either daily or at closure,* established limits on methane gas concentrations in air must be met because of the gas's explosive potential. The gas can migrate and be released into the environment. To protect site personnel and the public from risks of

explosions, air must be monitored for methane gas continuously within any structure on the site and at the property line of the surface disposal site.

- ***Incineration***. Incineration of municipal biosolids is regulated under the CAA. National ambient air quality standards apply to six pollutants, including total suspended particulates. Biosolids incinerators contribute primarily to ambient particulate loadings. Pathogens and toxic organic chemicals are destroyed during biosolids incineration. However, metals, such as cadmium and lead, are not destroyed during incineration and are associated with the ash and fine particulates in the stack emissions. The emission of mercury and beryllium from sludge incinerators and drying equipment is regulated under 40 CFR 61. This regulation rarely causes concern, however, since most biosolids have low concentrations of these elements.

  Incinerators constructed or significantly modified since June 11, 1973, are subject to additional regulation under the NSPS, which limit particulate discharges. These standards apply to any incinerator that burns more than 10 percent wastewater sludge at a rate of more than 1,000 kg per day (40 CFR 60). Usually, incinerators will have to use high-pressure scrubbers to meet these requirements, but some incinerators have been able to meet the standard solely through strict operating practices. SIPs may require a facility to demonstrate that air quality impacts will be within acceptable limits.

- ***Landfilling***. Landfilling is a biosolids disposal method in which sludge is deposited in a dedicated area alone or with solid waste and buried beneath a soil cover. Landfilling is primarily a disposal method, with no attempt to recover nutrients and only occasional attempts to recover energy from the biosolids. If biosolids are placed in a municipal solid waste landfill, the local government is responsible for ensuring that the biosolids meet the provisions of 40 CFR Part 258.

- ***Impact of Biosolids Composition on Disposal/Use Options***. The composition of biosolids can limit a local government's choice of biosolids use/disposal options or make certain options more appealing.

The most important constituents are the organic content, nutrients, pathogens, toxic organic chemicals, and metals. Biosolids may contain varying amounts of heavy metals and inorganic ions (e.g., cadmium, copper, lead, mercury, silver) that at high concentrations may be toxic to humans, animals, and plants. The metals concentrations in biosolids are among the foremost considerations in land application because of their potential to damage crops and, in the case of cadmium, to enter the human food chain. Metals may also be a concern in landfilling, if conditions are acidic and promote leaching of metals, and in incineration, if improper design or operating procedures result in the release of metals into the atmosphere.

Under the hazardous waste provisions of RCRA, biosolids from municipal wastewater treatment plants are neither excluded nor specifically listed as hazardous waste. Biosolids from POTWs with highly industrialized areas, however, may need to be evaluated for characteristics that would result in designation as hazardous waste. The test most appropriate for these biosolids is the toxicity characteristic leaching procedure (TCLP). If the biosolids fail the TCLP test, they must be handled as a hazardous waste according to the RCRA requirements.

3.7.2.6 Chemical Storage/Hazardous Materials Management

If storing or using *specified amounts* of certain hazardous chemicals, a local government may be subject to planning and reporting requirements of EPCRA and Section 112(r) of the CAA. Hazardous chemicals may be used in various wastewater collection and treatment operations, such as disinfection as part of the treatment process or cleaning and other maintenance activities. Specifically, chlorine and sulfur dioxide are commonly used in the disinfection (chlorination/dechlorination) process. Additional chemicals may be used in laboratory procedures to analyze wastewater samples. Facilities must submit hazardous chemical inventory and emergency release information as follows:

- **Emergency Release Notification (EPCRA Section 304).** A facility is required to notify the SERCs and LEPCs of a release equal to or exceeding a predetermined amount of certain hazardous chemicals. The chemicals covered by

Appendices A and B of 40 CFR Part 355 list EPCRA EHSs and 40 CFR Part 302 lists CERCLA hazardous substances.

this requirement include EPCRA extremely hazardous substances (EHSs), as well as hazardous substances identified in the CERCLA. The emergency release notification activates emergency plans and provides information to the SERCs and LEPCs, who will coordinate release response activity in order to prevent harmful effects to the public.

C **Hazardous Chemical Inventory and Reporting (EPCRA Sections 311 and 312)**. Under EPCRA, any facility that is required by OSHA's Hazardous Communication Standard to prepare or have available an MSDS for a hazardous chemical is subject to EPCRA Sections 311 and 312 requirements if the chemical is present onsite at any one time in excess of threshold levels.

MSDS Reporting. Under Section 311 of EPCRA, a facility must submit a *one-time notification* identifying the hazardous chemicals (including EPCRA EHSs and OSHA hazardous chemicals) present at the facility in amounts equal to or in excess of threshold quantities to the SERC, LEPC, and local fire department (40 CFR 370.21). To meet the notification requirement, a facility must submit either an MSDS (or copies of MSDSs) or a list of the EPCRA EHSs and OSHA hazardous chemicals. After initial reporting, if a facility finds that it has a hazardous chemical that is newly covered in amounts equal to or in excess of the threshold level or there has been significant new information on an already reported chemical, it must update the information reported under Section 311 within 3 months after discovery.

Tier Reporting. Under Section 312 of EPCRA, a facility must meet an annual reporting requirement for OSHA hazardous chemicals and EPCRA EHSs in amounts equal to or in excess of threshold levels. If equaling or exceeding the threshold levels at any time in the preceding year, a facility must submit to the SERC, LEPC, and local fire department an Emergency and Hazardous Chemical Inventory Form. This form must be submitted by March 1 of each year. EPA publishes two types of inventory forms, **Tier I** and **Tier II**, for reporting this information. While federal regulations require only the submission of a Tier I form, EPA encourages, and some states require, the use of the Tier II form.

LEPCs make this information available to the public, and fire departments and public health officials use the information to plan for and respond to emergencies.

- **Risk Management Planning (CAA Section 112(r))**. Under Section 112(r) of the amended CAA, facilities that have more than a threshold quantity of any of the 140 regulated substances in a single process are required to develop risk management programs and to summarize these programs in risk management plans by June 21, 1999 (40 CFR Part 68). Risk management plans, which are intended to prevent accidental releases of regulated substances and to reduce the severity of any releases that do occur, will be made available to state and local government agencies and the public. EPA has been working with industry groups to develop model risk management programs. To review the model program, refer to EPA's Chemical Accident Prevention and Risk Management Planning website at http://www.epa.gov/swercepp/acc-pre.htm#Model Plans/.

> At present, EPA has established a list of 140 substances that are regulated under the CAA. These substances were published in the *Federal Register* on January 31, 1994; EPA amended the list by rule, published on December 18, 1997. EPA may further amend the list in the future as needed.

3.7.3 Vehicle/Equipment Maintenance

Local governments are responsible for maintaining plant vehicles according to the operations described in Section 3.10, as well as for maintaining equipment (e.g., pumps, standby generators) at the POTWs. Equipment maintenance is necessary for optimal equipment operation, which helps ensure high performance at a plant. Most POTWs maintain an onsite spare parts inventory. Many large plants have fully equipped machine shops staffed by competent mechanics. Smaller plants often have to rely on machine shop facilities in the community. In addition, most pump manufacturers maintain pump repair departments where pumps can be fully reconditioned.

3.7.4 Other Operations That May Be Regulated

In addition, POTWs may be regulated for pesticide management. POTWs may use pesticides, particularly herbicides, onsite to control weed growth and maintain the plant site. Activities related to pesticide use and storage may be regulated under the provisions of FIFRA, EPCRA, or Section 112(r) of the CAA. See Section 3.4 for more information on pesticide management.

3.7.5 Pollution Prevention in Wastewater Management

A substantial amount of the pollution generated by the practices and processes used to collect and treat wastewater can be prevented. In preventing pollution, wastewater treatment plants can

serve as role models for their residential, commercial, and industrial customers and to help or require dischargers to reduce their own toxic discharges to sewers through education, on site assistance, and regulatory programs.

3.7.5.1 Typical Wastes Generated

Sewer line and wastewater treatment *operations and maintenance* is key to ensuring proper treatment of wastewater and protection of the environment. Losses include leaks from pipes, unintended discharges to water ways, and others.

The *wastewater treatment* process involves treating both the liquid and solid factions of waste water. In doing so, various chemicals may be added to either the solids or the liquids to produce an appropriate product meeting discharge requirements. Sample of losses include lab waste, methane flare, bar screen waste, and grit chamber material.

Other elements of a wastewater collection and treatment system may include such things as wetlands, storage tanks, pesticide and herbicide use, use of well water, and purchasing practices. Spills and leaks from containers or purchasing a hazardous chemical over an alternative non-toxic chemical, etc. contribute to losses that increase pollution in the environment.

The proper *maintenance of vehicles and equipment* is key to wastewater treatment. Potential wastes found in this area are emissions from vehicle use and spill/leaks/drips from equipment.

3.7.5.2 Top Pollution Prevention Opportunities

- Keep harmful chemicals out of the sewer lines and protect line workers, the plant, and the public's investment. Work closely with assistance programs at the local and state level, such as pollution prevention programs, economic development commissions and pretreatment programs.

- Institutionalize a preventative maintenance program to predict problems before they occur instead of reacting to them after their occurrence.

- Design, implement, and evaluate sewage acceptance procedures including provisions for spill prevention, discharge limitations, hauler performance guarantee, and enforcement or permit revocation.

- Explore, evaluate and implement alternatives to existing wastewater treatment processes, such as ultraviolet radiation or osmosis, to avoid toxic chemicals, such as chlorine and hypochlorite.

- Reuse or recycle solids (e.g., primary scum) and secondary screenings in areas such as landscaping. Check local and state regulations for any special requirements.

- Post and track statistical control tools to inform all employees of the plants target operating level and the actual operating level.

- Establish a screening mechanism for procuring chemicals that evaluates non-toxic alternatives, and reduces chemical dependence thereby lowering hazardous waste and the hazardous waste generator status.

- Be innovative in use and reuse of energy, such as fuel cells operating from methane, participating in DOE's Green Lights Program, using variable speed pumps, and using heating/air conditioning controls and room sensors in buildings.

- Create a gain share program whereby employees benefit from reduced pollution and for sharing ideas. (Labor unions embrace pollution prevention as a health and safety issue for their members.)

- Use alternative transportation, such as bicycles, at the facility. Offer transit subsidies, telework, and flex-schedules for employees.

3.7.6 Success Story

The City of Portland, Oregon's, Environmental Services operates and maintains the collection and treatment systems of two wastewater treatment facilities for 550,000 people in the greater Portland area. Columbia Boulevard Wastewater Treatment Plant's average annual day flow is 80 MGD, whereas Tryon Creek Wastewater Treatment Plant's average flow ranges from 5 to 17 MGD. Each facility provides primary and secondary treatment. Using self-directed work teams and participating in a Pollution Prevention Program field project, each facility has accomplished great results in prevention. These include:

C Implementing a chemical pre-screening program

- Participating in the Green Lights Program, thereby saving $28,465 per year in energy costs

- Testing a new fuel cell that converts methane and produces power for use by the treatment plant

- Reducing hazardous waste generator status from large quantity generator to conditionally exempt small quantity generator

- Reusing treated effluent to water facility grounds.

Resources

"Promoting Pollution Prevention Among Dischargers to POTWs," Lois N. Epstein and Steven A. Skavroneck, WEF conference, Miami, FL, October 25, 1995. Available from the Environmental Defense Fund, 1875 Connecticut Avenue NW, #1016, Washington, D.C. 20009.

For more information, contact Margaret Nover, Pollution Prevention Program, City of Portland, Oregon, Phone: 503-823-7623 Fax: 503-823-5565, E-mail: margaret@bes.ci.portland.or.us

3.8 WATER RESOURCES MANAGEMENT

Water resources include surface waters (i.e., coastal bays, lakes, rivers, and streams) and groundwater. These water resources may be used to supply drinking water, industrial process water, or water for recreational opportunities. For each of these uses, local governments are primarily responsible for ensuring that the water is safe and available in sufficient quantities to be used for its intended purpose. Activities related to water resources management include protecting and managing surface waters (including reservoirs), and protecting groundwater drinking supplies. Water resources management programs protect these waters from storm water runoff, direct wastewater discharges, and direct discharge of materials that can cause contamination. In contrast to the previously described local government operations, the implementation of water resources management activities has a minimal negative impact on the environment. Rather, the activities themselves are designed to reduce the environmental impact on water resources. For this reason, considering water resources management through land use planning is an important component of protecting the water supplies. Section 3.11 of this profile provides more information on land use planning.

Local governments may be responsible for managing the water resources within their borders as part of their efforts to meet requirements in their NPDES storm water or CSO control program permit conditions. While many water resource management activities will overlap these permit requirements, local governments may elect to develop water resources management programs whether or not they are required by regulations.

3.8.1 Surface Water Protection

Local governments may be responsible for protecting surface waters for designated uses including drinking water, habitat preservation, or recreation. Surface waters are generally protected through implementation of storm water management plans that include BMPs, effluent or watershed monitoring, and in some cases, reservoir management. These activities can reduce contamination of water sources and increase opportunities to use those sources for their intended purposes.

3.8.1.1 Best Management Practices

BMPs may be structural (e.g., storm water detention/retention ponds) or nonstructural (e.g., street sweeping) and may include managing existing sources or conduits of contamination such as roads, bridges, and storm water systems. These activities help a local government protect its water supply and comply with its storm water permit.

Structural BMPs are designed to prevent, inhibit, or slow the rate at which storm water runoff or spilled contaminants reach a body of water. BMP structures, including extended retention ponds, wet ponds, and constructed wetlands, prevent contaminants from reaching surface waters by capturing runoff and allowing it to filter through the soil or evaporate, rather than directly flowing to a water body. Additional filtering structures include sand filters, oil and grit separators, and infiltration basins. Containment structures may require periodic maintenance to remove accumulated sediment, while filtering structures may require maintenance to remove debris and ensure the filters are working efficiently. Each of these structures helps remove contaminants (sediment, oils and greases, pesticides, fertilizers, debris) from rain water to protect the surface water for its intended use.

3.8.1.2 Nonstructural BMPs

Nonstructural BMPs include various operational activities such as sweeping streets, and maintaining or preserving grassed swales, vegetative buffer areas, and wetlands.

While many local governments may sweep the streets to improve community aesthetics or as part of their NPDES combined sewer or storm water permits, street sweeping is also an effective tool in protecting water resources. Contaminants typically found on streets include the following:

- Particulates from local soil erosion
- Nitrogen and phosphorus from local plants and soils
- Phenolic compounds from wear of asphalt street surfaces
- Grease, petroleum, n-paraffin, and lead from vehicle leaks and spills
- Lead, zinc, and asbestos from tire wear
- Asbestos, lead, chromium, copper, and nickel from clutch and brake lining wear
- Chlorides from deicing compounds.

Street sweeping protects surface waters by removing such solids as sand, debris, and litter that would otherwise be transported to the surface water during a rain event. Street sweeping also prevents contaminants that may be absorbed by sand and debris from reaching surface water.

Vegetative buffer areas are physical active controls designed and maintained to filter and infiltrate pollutants thereby preventing them from reaching surface waters, and are essential in maintaining surface water quality. These areas complement passive control, such as land use or zoning laws, that prevent activities (e.g., paving, pesticide use) that could increase surface water contamination.

Wetlands are used to help break down contaminants before they reach open bodies of water. Local governments may actively manage marsh areas by adding new plants and removing accumulated sediment.

Watershed Monitoring. Watershed monitoring programs complement implementation of BMPs by providing the local government with a comprehensive tool to measure the effectiveness of the BMPs. Watershed monitoring programs include collection and observation of water, insects, aquatic plants, and fish from locations throughout the watershed. Chemical analysis is performed to determine whether specific contaminants have infiltrated a water body, and biological analysis is conducted to evaluate the impact of contaminants on various plant, animal, and insect species. Samples taken for chemical analysis (e.g., phosphorus, metals) are generally analyzed in a laboratory, while physical attributes (e.g., turbidity, temperature, color) are analyzed in the field. Biological monitoring evaluates the health of a water body by determining the number and type of plant, fish, and insect species found in the water body. Samples for biological analysis may be analyzed in the field or in a laboratory. By allowing local governments to measure the

effectiveness of various BMPs, and the relative health of a water body over time, watershed monitoring programs can promote the use of effective activities to protect surface waters. For communities that are unable to undertake comprehensive watershed monitoring programs, periodic monitoring of storm water discharges can provide useful information for developing controls for storm water and nonpoint pollution.

The following highlights some other types of monitoring that may be included in a watershed monitoring program:

Identification of Major Outfalls. Surveying and mapping all major storm water outfalls is vital for developing monitoring regimes for characterizing runoff and ambient water body conditions. Treatment or diversion of these outfalls may be necessary.

Detection of Illicit Discharges. Outfall identification is also imperative for determining if wastes or wastewater from non-storm water sources are being improperly discharged from a separate storm sewer system. Many of these discharges occur during dry weather and are often the result of improper connections into the storm system or via spills or infiltration at drains. A plan to detect and address these illicit discharges is vital to a storm water management program.

Public Outreach and Education. A concerted effort to inform the public of the hazards of improper waste disposal and illegal connections is also vital to a storm water management program. This effort could include storm drain stenciling, encouragement of citizen reporting of illicit discharges and improper waste disposal, and outreach programs covering potential contaminants like motor oil, antifreeze, fertilizers and pesticides/herbicides.

Reservoir Management. Protecting reservoirs is a key component to a local government's surface water protection program. Keeping reservoirs clean and free from contamination helps ensure a safe supply of drinking water. In addition, preventing debris, sedimentation, litter, chemicals or other pollutants from entering a reservoir reduces the amount of treatment necessary for the water to meet drinking water standards. While managing reservoirs includes many of the BMPs described previously, it also includes establishing security around the reservoir and creating buffer zones.

Reservoir security involves controls to prevent direct litter, dumping, or inappropriate use. Security measures may include fencing at the water line or fencing of a larger surrounding area. Dumping, litter, or inappropriate use of reservoirs can also be limited through indirect means, such as providing limited access roads or trails in the reservoir vicinity. While not preventing

contamination, limiting access roads and trails can prevent large-scale dumping, limiting pollution to litter or human waste, while allowing hiking or cycling opportunities for community residents.

Managing reservoirs also includes creation of buffer zones to prevent off site contamination from reaching the reservoir. While these buffer zones are similar to those used for protecting other surface waters, local governments may pay special attention to the zones of vegetation that filter or prevent off site spills and runoff from reaching the reservoir. These zones may be created by direct purchase and planting of vegetation on adjacent land, or through zoning laws that prohibit or limit development (thus using the land's natural existing vegetative filters). Buffer zones may also include structural controls such as storm water retention basins, which are discussed above.

***Pollution Prevention*.** In addition to the activities described previously, local governments may be responsible for implementing or overseeing pollution prevention activities designed to prevent surface water contamination. These activities include limits or prohibitions of certain activities in protected areas, requirements for new construction, and public education. These activities are useful for both surface water and groundwater protection, and are described in more detail below.

3.8.2 Groundwater (Wellhead) Protection

Local governments that provide or maintain underground drinking water supplies within their boundaries may be responsible for developing wellhead protection programs to prevent contamination of the supplies. Similar to surface water protection programs, wellhead protection programs generally involve implementation of management practices on government and private land. In contrast to surface water protection programs, wellhead protection programs often focus more on management practices and oversight by the local government, rather than building new structures. A local government may conduct some of the necessary activities for wellhead protection. Private landowners, however, participate in many of the protection activities, as well, under the direction of and in accordance with ordinances established by the local government. The following list highlights selected wellhead protection activities:

- Zoning and subdivision ordinances
- Site plan reviews
- Design standards for new construction and operating standards for ongoing land use activities
- Source prohibitions within protected areas
- Property or easement purchases
- Public education

- Groundwater monitoring
- Household hazardous waste collection.

Zoning and subdivision ordinances. Zoning and subdivision ordinances are designed to direct or limit development in a wellhead protection area. Zoning ordinances may also restrict or regulate land uses within the protected area. Subdivision ordinances are designed to limit the division of land for sale or development. By limiting the creation of new subdivisions, local governments can limit the number of potential sources of contamination.

Site plan reviews. Site plan reviews require developers to submit for approval plans for development occurring within a given area. Site plan reviews help minimize the impact on a protected area by requiring compliance with protection ordinances and giving the local government an opportunity to review and approve development activities prior to implementation.

Design and Operating Standards. Local governments can establish design standards for new construction and operating standards for ongoing land use activities. Design standards can ensure that new buildings or structures placed within a wellhead protection area do not pose a threat to the water supply. Operating standards minimize threats from ongoing activities, such as application of fertilizers and pesticides or storage and use of hazardous materials. These standards may also include prohibition of potential pollutant sources within protected areas.

Property or Easement Purchases. Local governments can purchase property or property easements on land within the protected areas. These purchases can prevent future development and give the local government land on which to maintain vegetative buffers to help prevent contaminants from reaching the protected area.

Public Education. Public education for wellhead protection programs is similar to educational programs that a local government may implement as part of a storm water pollution prevention plan or the combined sewer system nine minimum controls. Public education includes distributing press releases, newsletters, or brochures about wellhead protection activities; posting signs around protected areas; and establishing wellhead protection committees.

Household Hazardous Waste Collection. As part of their wellhead protection programs, local governments may establish household hazardous waste (HHW) collection programs. HHW collection programs provide an opportunity for safe disposal of oils, fertilizers, gasoline, or other household chemicals that residents might otherwise dispose of on the ground or in a landfill designed to accept only nonhazardous solid waste. By collecting and safely disposing of these

materials, local governments prevent them from potentially reaching underground drinking water supplies. Section 3.6 presents more information on operating HHW collection centers.

Groundwater Monitoring. As part of wellhead protection programs, local governments may monitor the groundwater within and leading to a drinking water aquifer. In addition, owners of businesses that have the potential to contaminate groundwater may be required to monitor groundwater as it leaves their property. EPA regulations may require monitoring in particular circumstances (e.g., underground storage tank monitoring), and local governments may request property owners who participate in particular activities (e.g., agricultural fertilizer application) to periodically monitor groundwater to determine whether it is becoming contaminated.

Activities associated with groundwater monitoring that could affect the environment include collecting samples, preserving samples, and analyzing samples. Collecting samples generally has a minimal impact on the environment; however, spilled sample preservation chemicals can contaminate an aquifer. In addition, if wells are improperly drilled and a contaminated aquifer is located above an uncontaminated aquifer, groundwater from the contaminated aquifer can seep into the uncontaminated aquifer.

3.8.3 Pollution Prevention and Water Resources Management

The best way to protect water quality is to avoid polluting the water in the first place. When pollution reaches surface or underground waterways, it can have many adverse effects, including impacts on drinking water sources. Water resource management approaches vary from community to community depending on various factors such as the source of water, size and population of the community, needs of the population, and the water supply system integrity. For example, water conservation may be a very high priority in some locales, while other areas may enjoy an abundance of source water. But in all cases, there is a need to protect and manage water resources wisely. Some water resource management entities have an opportunity to act as pollution prevention role models for others.

As with other local government activities, by incorporating pollution prevention criteria into the decision making processes, public policy makers and water resource managers can:

- Help prevent and reduce waste and pollution
- Prevent and reduce potentially harmful chemical exposures to employees and citizens
- Reduce risks of accidents and releases
- Prevent or reduce potential liabilities and regulatory compliance burdens while providing service delivery and cost savings to their organizations, customers and communities.

Programs that focus on municipal and industrial pollution prevention help prevent or reduce water pollution. Development of local source water management programs can help achieve CWA and SDWA goals.

3.8.3.1 Typical Wastes Generated or Losses Contributing to Pollution

Overall (affecting surface and ground water)

- Releases into storm water sewer systems of hazardous substances such as used oil or household or yard chemicals.
- Industrial site releases.
- Runoff of excessive pesticides, fertilizers, and herbicides.
- Lack of education, awareness, and participation (public and private sector) in local collection, recycling and disposal of household hazardous waste materials.
- Lack of education, awareness, and participation (public and private sector) in local water protection and conservation activities.

A***dditional Surface Water***

- Lack of residential and commercial development storm water management controls.
- Flood control projects that impair water quality.
- Soil runoff from construction and other sites.

3.8.4 Top Pollution Prevention Opportunities

3.8.4.1 Pollution Prevention Outreach and Promotion

Overall (surface and ground water)

- Develop local storm water management NPDES and pollution prevention programs.
- Develop local groundwater (wellhead) protection programs.

- Develop household hazardous waste collection initiatives.

- Require pollution prevention BMPs as a permit condition under the CWA. Agencies could design BMPs on a case-by-case basis or develop generic BMPs that would be applied to all facilities in a given industrial category.

- Set protective limits for reduction of discharges to wastewater treatment plants.

- Set protective limits for discharges of hazardous substances and petroleum storage.

- Adopt landscaping codes (e.g., institute irrigation restrictions, implement increasing block pricing or time of day pricing.)

- Investigate reduced water use projects (i.e., ultra-low flush "toilet voucher programs," low flow shower heads, sprinkler systems that are sensitive to rainfall, etc.)

- Establish low-income resident programs to conduct in-home water audits, leak repairs, and subsidized retrofits with water conserving fixtures.

Additional Surface Water

- Develop local surface water protection programs.
- Develop erosion and sediment control programs.
- Set protective discharge limits for storm water controls.

Additional Ground Water

- Develop groundwater monitoring programs.
- Limit or exclude industrial discharges to septic systems through design review.

3.8.4.2 Internal Local Government Operations

Overall (surface and ground water)

- Conduct leak detection programs.

- Perform plumbing fixture retrofits.

- Upgrade water meters to ensure accurate readings (use water inventory meter and retrofit programs).

- Develop BMPs for local government internal operations, in order to lead by example.

- Integrate water conservation into new facility design

- Set protective limits for reduction of internal discharges to wastewater treatment plants.

- Set protective limits for internal discharges of hazardous substances and petroleum storage.

- Limit or exclude internal discharges to septic systems.

- Investigate a new source water potential: water recycling for golf courses, parks, roadway landscaping, schools, firefighting, fountains, street sweeping, vehicle washing, and irrigation projects.

- Investigate U.S. EPA's Water Alliances for Voluntary Efficiency (WAVE) program which will soon be expanded to schools, hospitals, and other public facilities. EPA also encourages municipalities, local, and regional water resource boards; water districts; and water utilities to join the WAVE program as supporters.

Additional Surface Water

- Reconstruct or upgrade wastewater treatment plants.
- Investigate wetland mitigation banking opportunities.
- Set protective internal discharge limits for storm water controls.

Additional Ground Water

- Plug free-flowing Artesian wells.

3.8.5 Success Stories

*3.8.5.1 The City of New York/Multi-County Partnership, New York**

New York City, which operates as a city/county consolidated government, and the counties of Delaware, Greene, Schoharie, Sullivan, Ulster, Putnam, and Westchester in New York State, have signed a watershed protection agreement that will protect the source of these communities' drinking water supply. The partnership also includes the agricultural community, watershed municipalities, and the state and federal governments. Benefits to the City include a filtration waiver from the U.S. Environmental Protection Agency, saving billions of dollars in capital costs. Upstate communities benefit from higher property values resulting from environmentally sound agricultural practices and planned sustainable development.

Components of the Watershed Protection Agreement That Are Currently Under Way:

- Upgrading the nine City-owned upstate sewage treatment plants
- Rehabilitating and upgrading City-owned dams and water supply facilities in the watershed
- Implementing the Watershed Agricultural Program
- Constructing or upgrading public and privately owned wastewater infrastructure, including failing septic systems
- Acquiring hydrologically sensitive lands in high priority areas near reservoirs, streams and wetlands
- Establishing the Catskill Fund for the Future, an economic development bank to support responsible, environmentally sensitive projects in the watershed
- Extensively reviewing proposed developments and other projects to ensure compliance with watershed regulations and standards and the protection of water quality
- Monitoring water quality in streams, reservoirs, and the distribution system
- Forming the Watershed Protection and Partnership Council

- Establishing the Sportsmen's Advisory Councils to review and recommend possible public recreational uses of City-owned lands in the watershed.

* This case study contains excerpts from "Innovative City/County Partnership - A Report from the Joint Center for Sustainable Communities." For further information, contact Joel A. Miele, Sr., P.E., Commissioner, New York City Department of Environmental Protection, Phone: 718/595-6565.

3.8.5.2 Cincinnati Water Works Wellhead Protection

In April 1998, Judy Suzurikawa, a member of the Cincinnati Water Works Wellhead Protection Team, presented a paper at the "Source Water Assessment and Protection '98" conference in Dallas, Texas. Ms. Suzurikawa's paper, "Data base and Geographic Information System (GIS) for Management of a Multi-Jurisdictional Wellhead Protection Area," discussed various management tools, a geographic information system, and computer data bases used by the Hamilton to New Baltimore Groundwater Consortium to track water quality issues in the Great Miami Buried Valley aquifer. The Hamilton to New Baltimore Groundwater Consortium consists of Cincinnati Water Works and five other public and industrial water suppliers. The purpose of the Consortium is to monitor the quantity and quality of groundwater and to implement a comprehensive groundwater protection program. The Consortium's multi-jurisdictional Wellhead Protection Plan was fully endorsed by the Ohio EPA in January 1998. The Consortium has cost-effectively avoided duplication of effort by its members while promoting a unified, consistent groundwater management program for the region. The Consortium's web site, listed in the references below, describes the Consortium's purpose and programs. The web site also describes and illustrates examples of groundwater contamination and many preventive measures. The City of Cincinnati was designated a Groundwater Guardian Community at the end of 1997 by the Groundwater Foundation of Lincoln, Nebraska. Cincinnati Water Works has been actively involved since 1990 in the joint development of a Groundwater Protection Program for the Charles M. Bolton wellfield and adjacent wellfields in the Greater Hamilton/Fairfield area in Ohio.

Resources

"$mart Investments for City and County Managers: Energy, Environment and Community Development," U.S. Environmental Protection Agency, Office of Policy, Planning and Evaluation, EPA 231-R-98-004, April 1998.

"Preventing Pollution in Our Cities and Counties: A Compendium of Case Studies," NPPR, NACo, NACCHO and U.S. Conference of Mayors, 1995.

"Database and Geographic Information System (GIS) for Management of a Multi-Jurisdictional Wellhead Protection Area," Cincinnati Water Works, 1998, Proceedings, NWRI Source Water Assessment and Protection 98 Conference, Dallas, TX.

"When it Rains, It Drains-What Everyone Should Know About Storm Water," Michigan Department of Environmental Quality, Surface Water Quality Division.

"Innovative City/County Partnerships - A Report from the Joint Center for Sustainable Communities," The United States Conference of Mayors and National Association of Counties, 1998.

U.S. EPA Pollution Prevention Information Clearinghouse, 401 M Street, SW, Washington, D.C. 20460 (http:www.epa.gov/opptintr/p2home).

International City/County Management Association, Smart Growth Network (SGN): *http://www.smartgrowth.org*; 202/962-3591; email Noah A. Simon *nsimon@icma.org.*

"Drinking Water - The Safe Drinking Water Act vs. the Small Systems 'How Safe is Safe,'" EMGT 850, 1996.

"Building State and Local Pollution Prevention Programs," U.S. Environmental Protection Agency, Office of the Administrator, EPA-130-R-93-001, December 1992.

Local Government Environmental Assistance Network (LGEAN), contact: David George at International City and County Management Association (ICMA) at 202/962-3531; email *dgeorge@icma.org.*

Water Efficiency Program; San Jose/Santa Clara Valley Water District and Water Pollution Control Plant, 3025 Tuers Road, San Jose, CA 95121.

South Bay Water Recycling, 2540 North First Street, Suite 316, San Jose, CA 95131; 408/232-0832.

The U.S. EPA's WAVE Program: EPA Office of Water, Contact: John Flowers, WAVE Program Director, Phone: 202/260-7288; EPA's WAVE Technical Support Hotline: 800/993-WAVE.

The Hamilton to New Baltimore Groundwater Consortium's web site: *www.gwconsortium.org.*

"Beyond Delineation and Assessment: Community Action to Protect Source Water Using Farm*A*Syst\Home*A*Syst": *http://www.ctic.purdue.edu/Abstracts/Castelnuovo.html.*

"Cryptosporidium and Water" by the CDC Working Group on Waterborne Crypto, provides guidance on setting-up a local task force to deal with the threat to drinking water: *http://www.cdc.gov/ncidod/diseases/crypto/crypto.htm.*

The Lincoln-Lancaster Health Department (NE) developed a guide and checklist for septic and wells that was implemented through citizen volunteers. For information, contact the Lincoln Lancaster Health Department at 402/441-8000.

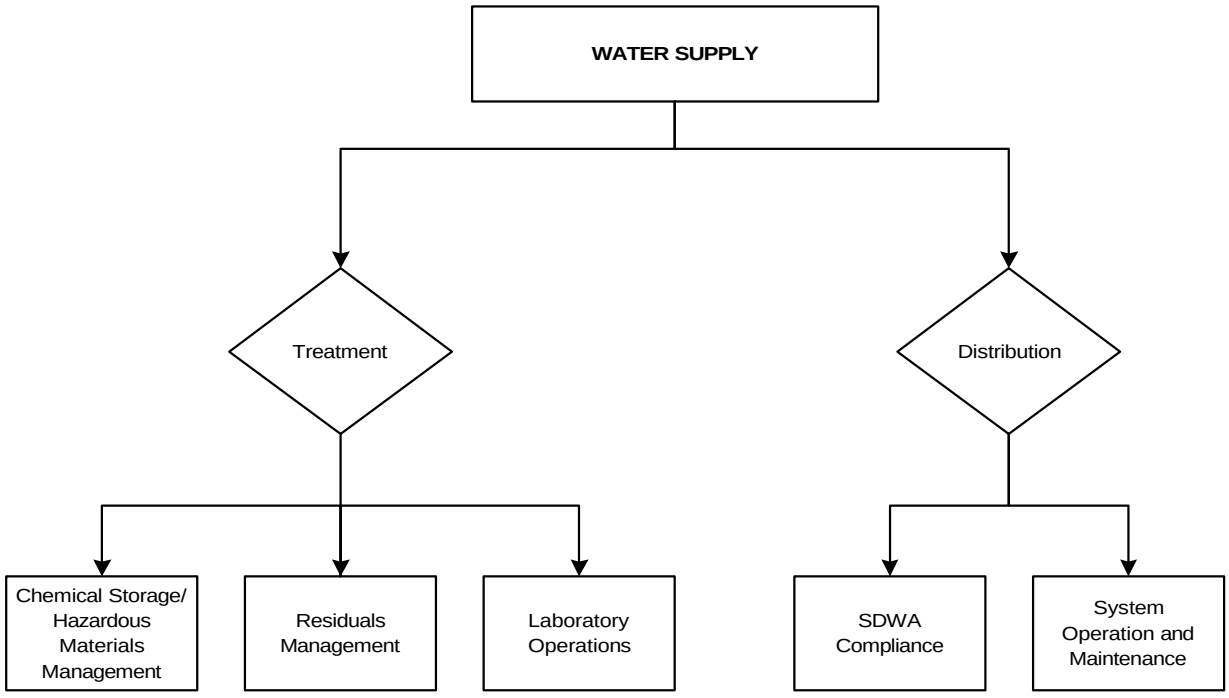
"Tools for Drinking Water Protection" Video Workshop - The League of Women Voters developed this excellent video on local government and citizen action on water quality issues. Their resources are listed on the web at *http://www.lwv.org/pubweb/resources.html*

For more information, contact: J. Bruce Suits, City of Cincinnati, Office of Environmental Management. Phone: 513/352-6270; Fax: 513/352-4970; E-mail: bruce.suits@cinems.rcc.org

3.9 WATER SUPPLY

Local governments may be responsible for operating public water systems. Public water systems are defined as the central systems or networks of facilities that supply drinking water to the public. Public water systems are designed to provide and maintain a reliable, high-quality water source (e.g., groundwater or surface water). The operations necessary to provide and maintain reliable drinking water include water treatment, residuals management, and water distribution. (See Exhibit 3-8)

Exhibit 3-8. Water Supply



Under the Safe Drinking Water Act (SDWA), EPA regulates chemical, physical, radiological, and bacteriological substances in drinking water that pose a health risk to the public. EPA develops drinking water regulations to protect public health and welfare, and individual states enforce the regulations for public water systems. Public water systems, therefore, must provide water treatment, as required; ensure drinking water quality through monitoring; and provide public notice of violations or possible contamination.

3.9.1 Water Treatment

Because water treatment operations include several activities that could affect the environment, they are regulated under U.S. environmental laws and regulations. These activities include the treatment process itself, laboratory operations, management of residuals, and storage of chemicals and hazardous materials management. Typical steps in the treatment process include:

- ***Screening and Presedimentation***. Screening captures large debris, such as leaves, logs, plastic bottles, sticks, and fish, at the intake where water is drawn into the treatment plant. Presedimentation allows removal of settleable solids in the water by gravity prior to additional treatment.

- ***Coagulation/Flocculation/Sedimentation***. These three processes commonly are used together to remove suspended solids, dissolved chemical substances, and impurities from raw water supplies. The removal of suspended solids and other substances improves the appearance and taste of drinking water and helps remove some of the chemical and microbiological contaminants that might be harmful to humans.

- ***Filtration***. Filtration is another commonly used step in removing solids and fine particles. In slow-sand filtration, source water passes through granular materials, such as sand, where particles are trapped and removed. In rapid-sand filtration, solids remaining after the coagulation/flocculation/sedimentation processes are removed.

- ***Disinfection***. Disinfection is the process by which pathogens in the water are inactivated or rendered harmless by the use of chemicals, such as chlorine and ozone.

- ***Softening***. Water softening is a process used to remove minerals (primarily calcium and magnesium) that cause hardness of water.

The SDWA regulates the treatment of drinking water. Specifically, SDWA regulations (40 CFR 141) require filtration and disinfection for water systems that use surface water as their source of water. In addition, other treatment activities, may be regulated under environmental laws and regulations, as indicated in the following list.

- Chemical storage/hazardous materials management—EPCRA, CERCLA, CAA, and CWA

- Laboratory operations—RCRA and CWA

- Residuals management—RCRA and CWA

More detail on the specific activities related to water treatment are provided below.

3.9.1.1 Chemical Storage/Hazardous Materials Management

If a local government stores or uses *specified amounts* of certain hazardous chemicals, it may be subject to planning and reporting requirements of EPCRA and Section 112(r) of the CAA. Hazardous chemicals may be used in various water treatment operations, such as disinfection, or other maintenance activities. Specifically, chlorine is commonly used in the disinfection process.

Additional chemicals are used for laboratory procedures used to analyze water samples. Facilities must submit hazardous chemical inventory and emergency release information as follows:

Emergency Release Notification (EPCRA Section 304). A facility is required to notify the SERCs and LEPCs of a release equal to or exceeding a predetermined amount of certain hazardous chemicals. The chemicals covered by this requirement include EPCRA EHSs, as well as hazardous substances identified in CERCLA. The emergency release notification activates emergency plans and provides information to the LEPCs and SERCs, who will coordinate release response activity in order to prevent harmful effects to the public.

The list of EPCRA EHSs can be found at 40 CFR Part 355, Appendices A and B; the list of CERCLA hazardous substances can be found at 40 CFR Part 302.

Hazardous Chemical Inventory And Reporting (EPCRA Sections 311 and 312). Under EPCRA, any facility that is required by the OSHA Hazardous Communication Standard (HCS) to prepare or have available an MSDS for a hazardous chemical is subject to EPCRA Sections 311 and 312 requirements if the chemical is present onsite at any one time in excess of threshold levels.

- ***MSDS Reporting***. Under Section 311 of EPCRA, a facility must submit a *one-time notification* identifying the hazardous chemicals (including EPCRA EHSs and OSHA hazardous chemicals) present at the facility in amounts equal to or in excess of threshold quantities to the SERC, LEPC, and local fire department (40 CFR 370.21). To meet the notification requirement, a facility must submit either an MSDS (or copies of MSDSs) or a list of the EPCRA EHSs and OSHA hazardous chemicals. After initial reporting, if a facility determines that it has a hazardous chemical that is newly covered in amounts equal to or in excess of the threshold level or there has been significant new information on an already reported chemical, it must update the information reported under Section 311 within 3 months after discovery.

- ***Tier Reporting***. Under Section 312 of EPCRA, a facility must meet an annual reporting requirement for OSHA hazardous chemicals and EPCRA EHSs in amounts equal to or in excess of threshold levels. If equaling or exceeding the threshold levels at any time in the preceding year, a facility must submit to the SERC, LEPC, and local fire department an "Emergency and Hazardous Chemical Inventory Form." This form must be submitted by March 1 of each year. EPA publishes two types of inventory forms, **Tier I** and **Tier II**,

for reporting this information. While federal regulations require only the submission on a Tier I form, EPA encourages, and some states require, the use of the Tier II form.

LEPCs make this information available to the public, and fire departments and public health officials use the information to plan for and respond to emergencies.

Risk Management Planning (CAA Section 112(r)). Under Section 112(r) of the amended CAA, facilities that have more than a threshold quantity of any of the 140 regulated substances in a single process are required to develop risk management programs and to summarize these programs in risk management plans by June 21, 1999 (40 CFR Part 68). Risk management plans, which are intended to prevent accidental releases of regulated substances and to reduce the severity of any releases that do occur, will be made available to state and local government agencies and the public. EPA has been working with industry groups to develop model risk management programs. To review the model program, refer to EPA's Chemical Accident Prevention and Risk Management Planning website at http://www.epa.gov/swercepp/acc-pre.htm#Model Plans.

At present, EPA has established a list of 140 substances that are regulated by the Risk Management Planning regulations of the CAA. These substances were published in the *Federal Register* on January 31, 1994; EPA amended the list by rule, published on December 18, 1997. EPA may further amend the list in the future as needed.

Exhibit 3-9 presents selected process chemicals used in water supply operations.

Exhibit 3-9. Chemicals Used in Water Supply Activities

Activity	Process Chemicals Utilized
Coagulation, flocculation, and sedimentation	Alum (aluminum sulfate), ferrous sulfate, ferric chloride, cationic polymers, calcium hydroxide, and sodium aluminate
Filtration	Cationic polymers, anionic polymers, calcium carbonate, and calcium hydroxide
Disinfection	Chlorine (gas or liquid), sodium hypochlorite, calcium hypochlorite, chloramines, chlorine dioxide, and ozone
Softening	Lime and calcium carbonate
Residuals management	Lime and calcium carbonate
Water main repair/replacement	Sodium hypochlorite, calcium hypochlorite, and liquid chlorine
Pump maintenance	Petroleum-based lubricants and grease

Water supply facilities are responsible for operating the laboratory safely. To prevent laboratory accidents, chemicals should be stored in a properly ventilated and well lit room. All bottles and reagents should be clearly labeled and dated. Volatile liquids that could escape as a gas, such as ether, must be kept away from heat sources, sunlight, and electrical switches. Cylinders of gas being stored should also be capped and secured to prevent rolling or tipping.

3.9.1.3 Residuals Management

Residuals management includes managing the wide variety of waste products generated from the treatment of drinking water using screening, presedimentation, coagulation/flocculation/ sedimentation, filtration, disinfection, and softening processes. The residuals may be organic and inorganic compounds in liquid, solid, and gaseous forms, depending on the source of raw water and the type of treatment processes. Key residuals include the following:

- Sludges from coagulation/flocculation/sedimentation operations
- Sludges from softening operations
- Sludges from iron and manganese removal operations
- Solids in rapid-sand filter backwash water
- Solids from screening and presedimentation, slow-sand filtering, and other processes.

The primary aspect of residuals that may impact the environment is solid materials that, if discharged to waterways, could lead to increased suspended sediment levels in the water column and deposition at the bottom. Additional aspects include metals and chemical residuals that attach to the solids. The environmental impacts of these depend on the management method, which include dewatering and landfilling, as well as discharge to a POTW.

Sludge that is dewatered and placed in a landfill or properly applied to land has minimal environmental impact. Excessive land application, however, can lead to sludge runoff during rain events, thereby increasing sedimentation in water bodies. Liquid sludge discharged to a wastewater treatment plant may affect the integrity of the sewer system through excessive buildup of solids in the system. Liquid sludge discharged to a water body can increase sedimentation in that water body. Land application or land disposal of sludge may be regulated under RCRA solid waste regulations or state guidelines; liquid disposal to a treatment plant or directly to a waterbody is regulated under the CWA pretreatment and NPDES programs respectively.

3.9.2 Water Distribution System Operation and Maintenance

The operation and maintenance of the water distribution system includes upkeep of the pipes, storage tanks, and pumps that convey water from the water treatment plant to the customers. Because activities could affect the environment, they are regulated under environmental laws and regulations, indicated in the following list.

- Water pipe flushing—CWA and EPCRA
- Water main repair/replacement—CWA, EPCRA and CAA
- Storage tank maintenance—RCRA and CAA
- Pump maintenance—RCRA

In addition, cross contamination and backflow can contaminate waste distribution systems and, therefore, are subject to various building codes and regulations.

3.9.2.1 Cross Connection Control and Backflow Prevention

Cross connection control and backflow prevention are operational programs that a public water system and its customers must implement to prevent contaminants and non-potable water (e.g., wastewater, storm water, process water) from being drawn into the public drinking water system. Cross connections are physical, piped connections between potable water and an unsafe or polluted water source. Cross connections can threaten water quality and public health through the backflow of such hazardous substances as antifreeze, boiler water, and sewage. Backflow is a reverse flow of water from the customer or service connection into the water distribution system. Backflow typically occurs when distribution system pressure drops due to a water main break or due to firefighting demands. Cross connection control programs consist of building codes and other regulations that prohibit cross connections and require backflow prevention devices on particularly high risk service connections (e.g., a wastewater treatment plant). Education, inspection, and enforcement are also necessary to ensure compliance with the building codes and regulations.

3.9.2.2 Water Pipe Flushing

Water pipe flushing is performed on distribution systems to remove any accumulated sediments or other impurities that have been deposited in the pipe. Water pipe flushing also improves the flow of water through the distribution system, allowing it to work at capacity. Flushing is performed by isolating sections of the distribution system and opening flushing valves or more

commonly fire hydrants to cause a large volume of flow to pass through the isolated pipeline and suspend the settled sediment. Water mains may also be mechanically cleaned through the use of swabs or pigs, which are pulled through a section of line to scrape the accumulated debris off the inside of the pipe. The major environmental aspect of water pipe flushing is the discharge of flushed water, which may be high in suspended solids and other contaminants that can harm water bodies. The negative impacts of the discharge may be minimized by discharging the flush water into a sanitary sewer with adequate capacity or by discharging the flush water into a separate storm sewer system with storm water management measures, such as a detention pond, where solids can settle before the water is discharged. The discharge of water from flushing may be regulated under an NPDES permit.

3.9.2.3 Water Main Repair/Replacement

Water main repair/replacement must be performed to water systems to replace or repair broken, corroded, or leaking sections of pipe. The broken pipe section is either replaced or, as is often the case, a repair sleeve is placed around the outside of the broken pipe section and clamped into place. Following the repair of the pipe, the line is typically flushed and then disinfected with a chlorine solution. The chlorine solution is usually mixed onsite with powdered calcium hypochlorite or sodium hypochlorite. Pipe repair and replacement could affect the environment through:

- Erosion and sedimentation, which take place as a result of excavation, stockpiling, and backfilling

- Discharge of sediment laden water in the excavated area from groundwater and rainfall

- Discharge of sediment laden flush water and highly chlorinated disinfecting solution.

These impacts can be minimized through control measures. Sediment and erosion control measures that can be implemented for the excavation of the trench include stockpiling the excavated soil on the uphill side of the trench or installing silt fences on the downhill side of the excavation. The impacts associated with discharges from trench dewatering, pipe flushing, and pipe disinfecting can be reduced by discharging into storm water management facilities, such as detention ponds, where solids can settle and chlorine compounds can dissolve. The discharge of water from these activities may be regulated by the facility's NPDES permit, and storage and use of chlorine may be regulated under EPCRA or the CAA.

3.9.2.4 Storage Tank Maintenance

This activity includes frequent inspection and may require occasional repairs. The most frequent types of repairs are repainting the tanks and replacing screens over vents and other points of access to insects, birds, and rodents. Most tanks are made of steel and, therefore, subject to corrosion. To prevent corrosion, the tanks are painted on a regular basis. Tank painting can generate sandblasting residue, which results from preparing the tank's surface for receiving paint. This impact can be minimized by containing the area to be sandblasted and collecting and recycling the sandblasting residue. Sandblasting activities may be regulated under the State Implementation Plans developed under the CAA. Disposal of paint chips and dust, if they are determined to be hazardous, may be regulated under RCRA.

3.9.2.5 Pump Maintenance

Pump maintenance must be performed to ensure that booster and other distribution system pumps stay in working order. Maintenance of the pumps involves checking the pumps regularly for excessive vibration or noise, providing grease and lubrication regularly, and checking the pump bearings and packing glands. Using and storing the necessary petroleum-based grease and lubricants could affect the environment through spills to water or land. Disposal of these products may be regulated under the RCRA used oil regulations. Spills of oil that reach waterways may be required to be reported under the SPCC regulations of the CWA.

3.9.2.6 Safe Drinking Water Act Compliance

Local governments are responsible for complying with SDWA regulations, both for water treatment and the distribution system. As part of those regulations, water supply facilities are required to sample and analyze the water for specific chemicals to ensure they do not exceed the maximum contaminant levels (MCLs) for those chemicals. If and when MCLs are exceeded, local governments must notify the state within 48 hours. In addition, local governments are required to provide public notice of the exceedance. All local government water supply facilities also must maintain records, including bacteriological and chemical analyses, actions taken to correct violations, sanitary surveys of the system, and variances or exemptions granted to the system.

3.9.3 Vehicle/Equipment Maintenance

Local governments are responsible for maintaining all vehicles associated with water supply activities according to the operations described in Section 3.10.

3.9.4 Pollution Prevention in Water Supply

The collection, treatment and distribution of water is one of the largest and most expensive tasks of local governments. Water supply systems vary from community to community depending on various factors such as the source of water, age and infrastructure integrity, size and population of the community, and the needs of the population. For example, water conservation may be a very high priority in some locales, while other areas may enjoy an abundance of source water; both have a need to protect their water sources. Moreover, while the various water supply, treatment, and distribution methods and their related operations have their clear health and economic benefits, these processes also bring the potential to pollute. Some municipal water supply facilities have an opportunity to act as pollution prevention role models for other private water facilities and for their residential, commercial, and industrial customers. As with other local government activities, incorporating pollution prevention criteria into their decision making process, public policy makers and water supply operations managers can help prevent and reduce waste and pollution. Preventing and reducing potentially harmful chemical exposures to employees and neighbors will reduce risks of accidents and releases, as well as prevent or reduce potential liabilities and regulatory compliance burdens.

3.9.4.1 Typical Wastes Associated with Water Supply

- Solvent cleaners and paints, mercury switches and lamps, lubricants and other wastes from operations, and facility maintenance activities.
- Disinfection by-products (e.g., trihalomethanes).
- Corrosion by-products
- Leaking or broken lead from service lines, goose neck or service connections.
- Radon in wells.

- Pesticides in rinse waters and containers.

- Industrial, commercial, and household chemical discharges.

3.9.4.2 Top Pollution Prevention Opportunities

- Investigate alternatives or reductions (e.g., GAC, ozone treatment, ultraviolet) to chlorine water disinfection.

- Investigate reduced risk storage and handling of chlorine and other chemicals.

- Install plant dehumidification systems to reduce rusting/corrosion of plant equipment.

- Use lead-free solder, retrofitting the service lines with PVC instead of metal.

- Know your waste stream in order to identify high priority (or "low hanging fruit") for source reduction, reuse or recycling opportunities.

- Strategically plan for SDWA compliance through source protection and source selection strategies, operational strategies, collaborative arrangements, purchased-water transactions, or institutional restructuring.

- Perform self-evaluations regularly.

- Install water conservation devices (e.g., low-flow showerheads, low-flush toilets, motion sensing faucets.)

- Implement water conservation strategies (e.g., use grey water for irrigation), consider xeriscape (i.e., native, low water requirement) landscaping, consider pervious material for walkways and driveways.

- Look for energy efficiency improvements in designing or re-designing water pumping and treatment systems.

- Use national and local events to promote the pollution prevention ethic to employees and the public.

- Connect with local, state, national or international organizations to share information, techniques and approaches to continuous improvement through pollution prevention.

- Perform consistent and proper monitoring.

3.9.4.3 Success Story

The Cincinnati (Ohio) Water Works, a municipally owned and operated utility, was purchased by the City of Cincinnati from a private owner in 1839. The service area of the Cincinnati Water Works has grown and now includes the entire City of Cincinnati, approximately 90 percent of the rest of Hamilton County and three additional service areas in the adjacent counties of Butler and Warren. The City of Cincinnati and the great majority of Hamilton County are served on a retail or metered basis. The City of Cincinnati is responsible for the complete administration, operation, maintenance, and capital planning for the entire service area. The Cincinnati Water Works now supplies approximately 46 billion gallons of water a year through 2,742 miles of water main to more than 221,028 residential and commercial accounts representing more than 900,000 consumers in the Greater Cincinnati area.

The City of Cincinnati and the Cincinnati Water Works have taken steps to prevent and reduce pollution. The City has recently implemented a Pollution Prevention Program which seeks to identify pollution before it occurs and substitute a non-polluting process or material for that which would pollute. In other words, prevent or eliminate the source or cause of pollution so the environment does not have to be cleaned up later. Cincinnati has the only granular activated carbon (GAC) filtration plant of its kind in the nation and one of largest such plants in the world. Ninety percent of the water supplied by the Cincinnati Water Works is filtered through carbon filters. The other 10 percent is provided from the Water Works' well-water treatment plant in Butler County. The GAC removes organic substances from Ohio River water, which is Cincinnati's primary water source. The state-of-the-art GAC treatment process, installed in 1992, ensures that customers will receive high quality water and is considered a pollution prevention technology because the facility uses only one third the amount of chlorine as would otherwise be used in the treatment of water. The process enables Cincinnati Water Works to be in compliance not only with present Ohio and federal safe drinking water regulations, but allows Cincinnati to be prepared for future regulations.

The Natural Resource Defense Council called the Cincinnati Water Works GAC facility the "crown jewel" of the utility's treatment process. The *Milwaukee Journal* describes the Cincinnati

Water Works as a "model" water utility because of its treatment processes and aggressive research to find additional ways to improve its water quality.

In another area of pollution prevention, as a "covered" facility that will need to meet the CAA 112(r) (Risk Management Planning) requirements by June 21, 1999, the construction of the California chlorination facility may be considered pollution prevention. This is because risk of release and exposure has been reduced significantly by the creation of a containment building and the modification from four 55-ton chlorine storage tanks to 48 1-ton tanks.

Additionally, Cincinnati Water Works recently identified three pilot projects that may help prevent pollution. They include use of electric power mowers to maintain grounds, use of biodegradable antifreeze for facility vehicles and use of environmentally friendly ice and snow removal techniques, such as sand and nontoxic chemicals.

Resources

"For Your Information - Message from the Cincinnati Water Works," Issue 1, 1996.

"Preventing Pollution in Our Cities and Counties: A Compendium of Case Studies," NPPR, NACo, NACCHO and U.S. Conference of Mayors, 1995.

U.S. EPA Pollution Prevention Information Clearinghouse, 401 M Street, SW, Washington, D.C. 20460 *(http://www.epa.gov/opptintr/p2home).*

Smart Growth Network: 202/260-2750; *http://www.smartgrowth.org*.

U.S. EPA Design for the Environment (DfE): 202/260-1678; *http://es.inel.gov/dfe.*

"Safe Water from Every Tap - Improving Water Service to Small Communities" National Academy Press, 1998.

DRAFT "Pollution Prevention in Enforcement - Village of South Charleston, Ohio" Office of Pollution Prevention, Ohio Environmental Protection Agency, 1998

"Conservation Improvement Projects through Soil and Water Conservation Districts," Cooperative Extension Service The Ohio State University.

Local Government Environmental Assistance Network (LGEAN) through the International County and City Managers Association; Contact: David George at 202/962-3531; email: dgeorge@icma.org.

"Setting Standards: Risk Assessment Issues," edited by, Frederick W. Pontius, Denver CO., AWWA Journal, July 1995, pp10-16, 114.

"Safe Drinking Water From Small System: Treatment Options," edited by, James A. Goodrich, Cincinnati, OH. , AWWA Journal, May 1992, pp.49-55.

"Tools for Drinking Water Protection" Video Workshop - The League of Women Voters developed this excellent video on local government and citizen action on water quality issues. Their resources are listed on the web at *http://www.lwv.org/pubweb/resources.html*

"Chemicals Versus Microbial in Drinking Water: A Decision Sciences Perspective," edited by, Susan W. Putman, Boston MA, AWWA Journal, March 1993 pp 57-61.

"Drinking water, Pollution Prevention and Public Health" (8pp) - EPA/742/F-97/004

"Incentives and Disincentives for Adoption of P2 Measures Under EPA's Water Program" (94pp) - EPA/742/R-94/006

American Water Works Association Small System Hotline

U.S. EPA Drinking Water Hotline/National Drinking Water Clearinghouse

National Rural Water Association

Rural Community Assistance Corporation

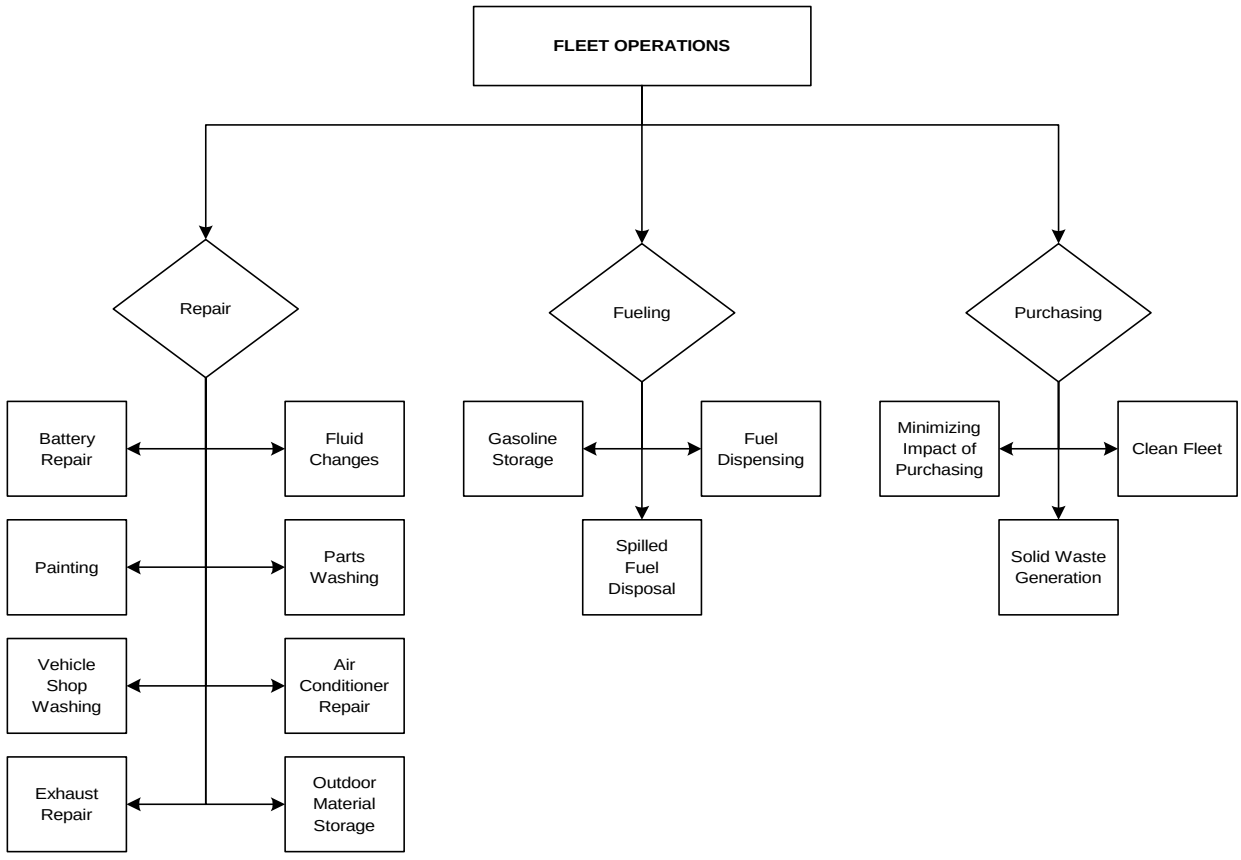
State Drinking Water Primacy Agency

For more information, contact J. Bruce Suits, City of Cincinnati, Office of Environmental Management Phone: 513/352-6270; Fax: 513/352-4970; E-mail: bruce.suits@cinems.rcc.org

3.10 VEHICLE/EQUIPMENT MAINTENANCE

Local governments are responsible for operating, maintaining, and purchasing motor vehicles and equipment to perform government services. Vehicles range from school buses, fire engines, snow plows, and heavy construction equipment to automobiles used by building inspectors, police departments, and government officials. Equipment may include pumps, tools, and boilers. As shown in Exhibit 3-10, local government fleet operations include vehicle repair shops, fueling stations, and purchasing operations. *(Note: While this section specifically discusses vehicle maintenance, many of the regulated activities apply to equipment maintenance.)*

Exhibit 3-10. Vehicle Maintenance Activities



3.10.1 Vehicle Repair Shops

Because vehicle repair shops conduct several activities that could affect the environment, these activities are regulated under environmental laws and regulations, as indicated in the following list.

- Fluid changes—RCRA and CWA
- Parts washing —RCRA, CAA, and CWA
- Battery maintenance—RCRA and CWA
- Air conditioner repair—CAA
- Vehicle and shop floor washing—CWA
- Exhaust system repair and replacement—CAA
- Painting—RCRA and CAA
- Outdoor material storage—CWA

Exhibit 3-11 illustrates some repair shop activities.

Exhibit 3-11. Vehicle Repair Shop Activities
(photo from CCAR-Greenlink)

3.10.1.1 Changing Vehicle Fluids

Changing vehicle fluids includes oil, transmission, and break lubrication, as well as antifreeze changes. Changing fluids also involves storing both new and waste fluids and managing or disposing of waste fluids. Fluids generally are drained from the vehicle to a pan or bucket placed below the vehicle. Full pans or buckets are then dumped into a larger container, such as a 55-gallon drum, UST, or aboveground storage tank, prior to off-site disposal. The potential environmental impacts from fluid changes are soil and water contamination from spills or improper disposal. Storage of new materials may be regulated under the SPCC provisions of the CWA, which require development of a spill prevention plan that generally includes providing secondary containment for all tanks and drums. Storage, recycling, and disposal of waste fluids are regulated under the used oil provisions of RCRA. The used oil provisions require used oil to be stored in structurally sound containers labeled with the words "used oil only" and ultimately recycled or burned for heat. Fluids disposed of or spilled in floor drains or surface drains or otherwise released from the facility property are regulated under the NPDES, pretreatment, or storm water provisions of the CWA. These provisions require notifying EPA, the state, or a local treatment plant, complying with permit provisions, and preventing untreated fluids from reaching surface waters. Fluids stored in underground tanks are regulated under the UST provisions of RCRA, which require that the tanks maintain spill prevention and leak detection devices and be made of specified structurally sound materials.

3.10.1.2 Washing Vehicle Parts

Washing vehicle parts consists of immersing the small parts, such as nuts, bolts, or carburetor pieces, into a solvent bath of chemical or water-based solvent or spraying them with a chemical or citrus-based solvent. Washing vehicle parts also may include spraying shop rags with solvent and rubbing the solvent on the part to clean it. Chemical solvent washers often consist of a metal sink attached to a 20-gallon drum of solvent. When the solvent is no longer usable, the drum is replaced. Water-based solvent washers consist of an enclosed bath with high pressure sprayers. The use of chemical solvent washers is regulated under the cold solvent bath section of the CAA, which requires sink lids to be kept closed and specifies additional practices to minimize the release of hazardous air pollutants. The disposal and recycling of used chemical solvent are regulated under RCRA, which specifies disposal methods. The disposal of wastewater from water-based solvent washers may be regulated under the pretreatment program or NPDES programs of the CWA. The disposal of solvent-contaminated rags may be regulated under RCRA.

3.10.1.3 Maintaining Vehicle Batteries

Maintaining vehicle batteries includes testing, changing, storing, and disposing of new and used vehicle batteries. The storage of batteries may be regulated under the NPDES storm water provisions of the CWA, which require that batteries be contained and covered to prevent potential leaks from coming in contact with storm water. Disposal of batteries may be regulated under RCRA, which requires that batteries either be returned to a supplier or recycler or meet stringent disposal requirements.

3.10.1.4 Repairing Air Conditioners

Repairing vehicle air conditioners includes adding, removing, and recycling CFC refrigerants, as well as performing general maintenance on vehicle air conditioners. These activities are regulated under the CAA, which is designed to prevent ozone depletion by requiring the capture and recovery of used refrigerants, the use of certified recycling equipment, and the training and certification of all operators.

3.10.1.5 Washing Vehicles and Shop Floors

Washing vehicles and shop floors includes spraying water and detergent on vehicles and floors and discharging the washwater through a drain to a septic tank, POTW, or waterway. Some facilities may dump used washwater on the ground outside of the facility. Washing vehicles and shop floors may be regulated under the pretreatment program or NPDES program of the CWA. These sections may require the facility to obtain permits, install oil and water separators, or comply with other provisions designed to prevent contaminated wastewater from reaching the environment.

3.10.1.6 Repairing or Replacing Exhaust Systems

Repairing or replacing exhaust systems consists of repairing or replacing catalytic converters. Any work that affects vehicle emissions is regulated under the CAA, which requires that records be kept of all converter repair and replacement, and specifies procedures for ensuring that removed converters are properly replaced.

3.10.1.7 Painting Vehicles

Vehicle painting includes overall body painting, touch up, paint and thinner mixing, and unusable paint and thinner disposal. Vehicle painting often is conducted in an enclosed room or booth that has positive pressure ventilation to ensure that paint fumes leave the room, rather than being inhaled by the painter. To minimize air pollution, air filters are placed in the vents and changed regularly. Vehicle painting also includes changing and disposing of these filters. If significant quantities of paints containing hazardous materials are used or if the local government is located in a designated geographic area, air emissions from painting operations may be regulated under the CAA, which may specify the type of ventilation system and the frequency for changing the filters. The disposal of air filters used to filter emissions from paints containing hazardous materials, disposal of many unusable paints, and disposal of spent thinners is regulated under RCRA. Preparing a vehicle for painting (e.g., stripping, sanding) may also be regulated under RCRA because such activities may result in a hazardous waste.

3.10.1.8 Storing Materials Outside

Due to space and safety concerns, many vehicle repair shops store drums of used and new fluids, hazardous materials, batteries, vehicle parts, or other wastes outside of the shop. The storage of any materials that could reach waterways through spills or storm water runoff are regulated under the NPDES direct discharge or storm water discharge provisions of the CWA, which require that the facility prevent these materials from coming in contact with storm water.

3.10.2 Fueling Stations

Local governments operate and maintain vehicle fueling stations to provide fuel to their vehicles. Because these activities could affect the environment, they are regulated under environmental laws and regulations, as indicated below.

- Fuel storage—CWA and RCRA
- Fuel dispensing—CAA
- Disposal of spilled unusable fuel—RCRA

3.10.2.1 Fuel Storage

Vehicle fuels, including gasoline, kerosene, and diesel fuel, are stored in underground or aboveground storage tanks that are connected by piping to the fuel dispensing unit. The

operation and maintenance of these tanks may be regulated under the SPCC section of the CWA which requires development and implementation of spill prevention plans and secondary containment for aboveground tanks and/or under the UST section of RCRA, which specifies structural, monitoring, and leak detection requirements for underground tanks.

3.10.2.2 Fuel Dispensing

Fuel dispensing units used at local government facilities are similar or identical to those used at retail service stations and could emit organic vapors to the atmosphere. In some areas, dispensing is regulated under the CAA which may require the dispensing units to have vapor recovery systems at the point of fueling and at the location where the aboveground or underground fuel storage tanks are filled. In addition, fuel dispensing units are required to dispense fuel at a prescribed gallons per minute rate to prevent spills.

3.10.2.3 Disposal of Unusable Fuel

In the course of fueling or fuel loading operations, fuel may be spilled. Fuel that cannot be dispensed into a vehicle for use must be disposed. The disposal of this fuel may be regulated under RCRA, which sets requirements for handling, storage, and ultimate disposal of hazardous wastes. A repair shop may be required to report any spill to local authorities.

3.10.3 Purchasing

Purchasing includes the acquisition of vehicles, equipment, and materials. The only purchasing activity that is regulated directly by environmental laws is the purchasing of clean fuel vehicles for local governments with large vehicle fleets, which is regulated under the CAA. Local governments that purchase new vehicles for certain size fleets are required to purchase a specified certain percentage of clean fuel vehicles each year that vehicles are purchased. Other purchasing decisions, such as the purchase of hazardous or water-based solvent, can directly impact whether the fleet operations are subject to additional environmental requirements.

3.10.4 Pollution Prevention in Vehicle/Equipment Maintenance

Pollution prevention opportunities abound in vehicle and equipment maintenance. Usually, three factors contribute to the level of success of a pollution prevention plan. The first factor involves auditing current procedures, researching pollution prevention opportunities, and committing to make appropriate and beneficial changes. This step requires researching alternative products and

funding equipment purchases. The second factor is funding. Generally, present funding can be reappropriated in a phased plan to purchase new equipment, products, and/or contract services. The third factor deals with the regulatory requirements and contract services available based on the facility's location. Some facilities base their decisions for a pollution prevention plan on the regulatory requirements contained in RCRA, OSHA, and/or local regulations. Pollution prevention technology implemented under this approach will enhance the safety of workers, improve regulatory compliance, and may lower the operating costs of the facility. There are many options for pollution prevention depending on the waste stream's characteristics and regulatory requirements. Some of the best ideas for pollution prevention can come from mechanics who peform the tasks every day, but changing old habits is the key to pollution prevention success. The most important item to remember is that pollution prevention can play an important role in any plan as long as appropriate research and planning are performed. The remainder of this section highlights pollution prevention options by waste stream.

3.10.4.1 Typical Wastes Generated

- Cleaning solvents
- Anti-freeze/coolant
- Used/soiled shop rags
- Unrecovered Freon from air conditioners
- Oil/lubricants
- Scrap metal

3.10.4.2 Parts Cleaning Systems

There are many different types of parts cleaning systems. Some utilize a pump to circulate cleaning solvent/solutions. These machines can be managed by the facility or contracted to a service that maintains the system and hauls away any generated wastes. The type of system and the solvent/solution (e.g., organic based, aqueous, citrus based) used in the system will determine the applicable regulatory management requirements and pollution prevention opportunities. Some systems have a distiller to clean the solvent and a reservoir tank to hold the waste that is "cooked" out, while others utilize filters to extract impurities. Protecting the integrity of the cleaning solvent/solution in order to extend its life and reduce disposal quantities is pollution prevention. For example, by managing your own system that utilizes filters, you can change the filters based on the system's use before they reach a regulated threshold and not because of a pre-set contracted service. Also, there are aqueous, semi-aqueous, and citrus-based systems that offer unique opportunities for pollution prevention. With any of these types of systems, it is

important not to introduce any non-compatible solvents/solutions into them that would cause them to become regulated hazardous waste.

Some Factors to Consider in a Filtered System

- Utilizes non-chlorinated solvents in the system.
- Has a high flash point solvent of more than 143 degrees.
- Can meet all regulatory requirements regarding disposal of filters.
- Has a closing lid for when the system is not being used to reduce evaporation and air emissions.
- Meets OSHA safety requirements.

Some Factors for Aqueous Solution Systems

- The system cleans to the standard required for the part to function properly.
- There will be minimal regulatory restrictions if disposal of the solution is required.
- A balance can be maintained for the bioremediation in the system to work properly.

Key Tips

Maintain the solution/solvent integrity to extend its life and increase frequency of filter replacement to reduce disposal costs of solvent/solution. Let the part sit in the wash basin and drip dry to reduce solvent "drag out" loss. Choosing aqueous systems may reduce regulatory requirements all together.

3.10.4.3 Pressurized/Aerosol Cleaners

Chlorinated solvents/solutions should not be used in any application to clean parts. Avoid using any aerosol cleaning products that are not RCRA approved. The use of these types of solvents/solutions can cross contaminate fluids and make them regulated under RCRA and increase OSHA requirements. Solvent/solutions purchased in bulk and applied with self-pressurizing applicators will reduce the use of the product and waste containers. Pre-cleaning with a putty knife and wire brush and utilizing recyclable shop rags will also reduce disposal cost and excess use of solvents/solutions. Verify compatibility of the solvent/solution with the parts washer's solvent/solution. Aqueous solutions may be the best option when utilized properly. There are pre-cleaning solvents/solutions that can affect the parts washing tank if, after use,

further cleaning of a part is required in that system. Eliminate overuse and set standards on the amount of cleaning required for the particular part to function properly.

Some Factors to Consider in a Self-pressurizing System

- Use of non-chlorinated solvents.
- Solvent/solution is compatible with the parts washer.
- Solvent/solution content affect on RCRA/OSHA regulatory requirements.
- Does the manufacturer/supplier offer system product support and/or training?

Key Tips. Utilizing a scraping device and/or wire brush, recyclable shop towels, and a non-regulated RCRA solvent/solution will reduce usage and hazardous waste regulatory requirements. Solvents/solutions with low VOC and low toxic contents produce less emissions that are harmful to the employee.

3.10.4.4 Anti-freeze/Coolant

Using manufacturer-specified antifreeze/coolant is required to maintain warranties and extend the life of the vehicle/equipment. Antifreeze/coolant can be recycled in various ways, to manufacture specifications and for reuse on site. The facility should verify that the vehicle/equipment warranty will be honored if this reused antifreeze/coolant is utilized. One method to recondition used antifreeze/coolant is to utilize a mobile service to perform onsite recycling at your facility. Verify that the service is licensed and has a neutral third party laboratory's test results to demonstrate the system works, and the service guarantees the system's product. Another approach is to purchase your own on-site recycling machine. This allows full management of the system's use and the quality of the product it produces. Either one of these will reduce new product purchases and associated RCRA disposal costs, as well as ensure a readily available product.

Some Factors to Consider in Choosing the Best Method for the Facility

- Verify warranty coverage of the vehicle/equipment for the system/service chosen.
- Verify disposal approval for filters generated from the recycling system.
- See if bulk containers for used/recycled anti-freeze are available and proper storage can be achieved.

Key Tip. Whatever method is chosen, make sure testing and warranties of the system's product is backed, and the manufacturer of the vehicle/equipment allows for the use of the reconditioned anti-freeze/coolant.

3.10.4.5 Shop Rags

Do not use disposable shop rags. Contract with a service to provide reusable rags for the facility as needed. Provide mechanics with a certain amount to perform the job. Require them to bring back and exchange used rags for new rags. Verify that the service selected has an approved method and facility for recycling the rags. The only exception to utilizing a service is if the facility's nonregulated waste is disposed of at a waste-to-energy plant that can incinerate waste rags. Remember, never use chlorinated solvents regardless of the recycling/disposal method.

Some Factors to Look for in Selecting a Service

- A regulatory approved method for the facility where the rags will be recycled.
- Will set a pick-up schedule for the used rags as required by your facility.
- Offers different rag selection based on the use for the facility.

Key Tip. Use as few rags as possible and always utilize a service to recycle rags at an approved facility.

3.10.4.6 Air Conditioning

There are several manufacturers that have different machines that will recover Freon from a system for off-site recycling. Other machines recover and recycle the Freon and then place the recycled Freon back into the repaired unit. These types of machines reduce new Freon purchases and disposal costs associated with the management requirements of the waste stream. If the repair of air conditioners is performed offsite, verify their practice for handling generated waste.

Some Factors to Look for in Selecting a Machine

- Is regulatory approved and registered.
- Is backed by third party test results verifying efficiency.
- Has factory warranty and supplier training.

3.10.4.7 Lubricating Oils

There are several types of lubricating oils in the various types of vehicles/equipment in use today. Changing these oils should be performed as determined by the use and not specific timed dates. If the vehicle/equipment is underutilized and/or is only needed for a specific task, changing the oils by a timed date is a waste of resources. Synthetic oils generally have a longer span of time for use before a change is required. When choosing the correct lubricant, verify warranty approval and track the miles/hours of use of the product in the vehicle/equipment. Check various options of disposal to see if refining of the waste oils is available over fuel blending for incineration. Keep non-compatible oils separate from one another to reduce possible cross contamination and increased disposal cost.

3.10.4.8 Metal Recycling

Most parts replaced are made of metal. Some metal parts must be exchanged for the new part when purchased. Many parts can be recycled, while saving the facility disposal costs. Lead tire weights, broken engine brackets, nuts and bolts, and body parts are just a few that have value for recycling. Set up places to store the recyclable metal, preferably out of the weather, and contract with a scrap dealer to pickup what is recycled at the facility on an as needed basis. Some scrap dealers will supply the container to the facility for the storage of the metal to be recycled. The scrap dealer may require separation of the different metal types.

3.10.4.9 Conclusion

Pollution prevention will have a positive effect on procedures/processes and regulated waste generated at the facility when the pollution prevention concept is initiated. When product use is decreased and/or eliminated, manufacturing, transporting, and handling are all affected. This decreases the need for energy and raw materials. Although the facility may not benefit entirely from this occurrence, the entire scope of pollution prevention for the industry does. Changing procedures and incorporating new technology to reduce or eliminate waste are true pollution prevention tactics and must be encouraged from top management to every employee. The key to incorporating a successful pollution prevention plan is to utilize current funds and available resources to implement the changes required in the plan. Inventory control, product research, operational procedures, and regulatory compliance requirements all must be evaluated before implementation occurs. Evaluate and document current product uses and procedures to verify the extent of the pollution prevention plan's success at the facility.

3.10.5 Success Story

The purpose of this case study was to evaluate and eliminate violations and the potential to violate RCRA at Lee County's Fleet Management Facility, to reduce associated liabilities regarding the facility's employees' health and safety, to implement and utilize BMPs, pollution prevention technologies and preferable purchasing techniques, where possible, and to perform research and institute recycling procedural requirements, where profitable.

The Fleet Management Facility maintains over 1,600 pieces of equipment from lawn mowers to heavy equipment utilized by various departments in Lee County. Several violations of RCRA were discovered in 1992 and Lee County was required by the Board of County Commissioners to fix the situation so violations did not occur again. A corrective plan was the first task, and later another operations plan was written to include pollution prevention, BMPs, and Reduce, Reuse, and Recycle (R3). The later plan initiated a three-year phased process that covered product substitution and/or elimination, equipment/chemical purchasing requirements, and employee training.

Some of the equipment purchased by Lee County to promote pollution prevention, BMPs, and R3 included:

- Parts washer with a multi-staged filter system that used a cleaner degreaser. Using this system allowed for the total elimination of hazardous waste that was being generated and then shipped off-site for disposal.

- Anti-freeze recycler used to filter impurities from used anti-freeze before chemically balanced to manufacturer specifications. This closed loop approach is the only way to ensure compliance is achieved and product integrity. As long as filters are changed appropriately, they do not accumulate regulated heavy metal amounts. Also, performing on-site recycling of the anti-freeze saved money required for new product purchases, testing to determine if it was a hazardous waste, and transportation/disposal.

- Air conditioning reclaimer/recycler, which cut the cost of freon purchases by 82 percent, with zero waste to dispose.

- Self-pressurizing solvent sprayer. In conjunction with recyclable rag service, there is no regulated hazardous waste. Also, changing to manual pressurizing dispensers eliminated use of chlorinated solvents.

The cost of hazardous waste disposal was reduced 100 percent for savings of $16,800 per year for an average year's cost. This includes solvent disposal contracts, anti-freeze disposal, and freon disposal. Recycling of fluids such as anti-freeze, used oil, parts cleaning solvent, and freon also reduced the facility's liability and saved in new product purchases. For more information, contact Dale Nottingham (see below).

References

Local, State, and National Vehicle Trade Associations

National Pollution Prevention Roundtable

State Pollution Prevention Roundtables

National Association of Counties

EPA Website

For more information, contact Dale L. Nottingham - Lee County Small Quantity Generator Program, 1500 Monroe Street, Fort Myers, FL 33901, Phone: (941) 479-8126, e-mail: nottindl@bocc.co.lee.fl.us.

3.11 LOCAL GOVERNMENT REGULATORY PROGRAMS

The preceding sections of this chapter present activities conducted by local governments in which the local government is the regulatee, (i.e., the one being regulated). There are some environmental programs at the local level, however, in which the local government is the regulator, (i.e., the one implementing and enforcing the program). This section discusses three distinct environmental programs in which the local government is the regulator.

It should be noted that in addition to the three programs discussed in this section any local government is also responsible for environmental programs and initiatives that may affect their populations. In their daily operations, for example, local governments must consider and address several high-profile EPA programs, including environmental justice, Brownfields, and the reduction of the exposure of children to lead-based paint or asbestos. Some of these programs, such as lead-based paint and asbestos, do have regulatory recourse on which the local government can rely. Others, however, do not have an explicit statutory basis and, as such, must

be developed and implemented by a local government through policies or standard operating procedures.

3.11.1 Pretreatment Program

Local governments are responsible for ensuring compliance with pretreatment program requirements. The national pretreatment program (CWA Section 307(b)) controls the indirect discharge of pollutants to POTWs by "industrial users." The goals of the pretreatment program are to protect municipal wastewater collection and treatment systems from adverse impacts resulting from the discharge of pollutants into the sewage system, prevent the pass through of pollutants to receiving waters, and protect the quality of the sludge.

EPA established the National Pretreatment Program and shares responsibilities for its implementation among the federal government, states, and local governments:

- EPA and the states are responsible for reviewing, approving, and overseeing local pretreatment programs and regulating discharges to POTWs that do not have local programs.

- Local governments are responsible for developing, implementing, and enforcing their local programs.

As part of their responsibilities, local governments conduct a variety of activities within the confines of the pretreatment program, including the following:

- Identifying industrial users that need to be regulated
- Reviewing permit applications from industrial users
- Drafting/writing permits
- Conducting sampling and inspections
- Evaluating the status of industrial user compliance (e.g., reviewing reports)
- Taking enforcement actions, as warranted.

Any POTW with a design flow of more than 5 million gallons per day is required to develop a pretreatment program. In addition, any POTW with a design flow of less than 5 million gallons per day may be required to develop a program if a potential exists for nondomestic wastes to cause POTW upsets, sludge contamination, violations of NPDES permit conditions, or exposure

of workers to hazardous chemicals or if their industrial users are subject to national pretreatment standards.

3.11.2 Air Pollution Control

Local governments are responsible for ensuring compliance with air program requirements to reduce the environmental impacts from other entities. Local governments usually are responsible for the following activities:

- Monitoring, including operating and overseeing maintenance of sampling stations
- Permitting, including issuing draft Title V permits, construction permits, and source registrations
- Conducting compliance and enforcement activities.

Local government responsibilities pertain primarily to stationary sources; states maintain control over mobile sources (e.g., vehicle inspections).

Local agencies conduct ambient air quality monitoring, which consists of collecting air samples to evaluate compliance with and/or progress toward meeting ambient air quality standards. Air quality monitoring programs are implemented by using state and local air monitoring stations (SLAMS) and/or special purpose monitoring stations (SPMS) to measure the criteria pollutants. Criteria pollutants are those that have documented effects on public health and the environment (e.g., carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide.) Some states also monitor fine particulate matter.

In addition, local governments are responsible for issuing permits, primarily Title V and construction permits, and for overseeing facility compliance with the permits. A Title V permit is an operating permit required for individual facilities under Title V of the CAA. The Title V permit brings together all federal, state, and city air pollution control requirements for a given facility into one permit. This permit includes information on the types of pollutants being released, permissible emission levels, and methods for reducing or eliminating pollution, including plans for monitoring and reporting emissions. Construction permits indicate that construction-related equipment and facilities meet all applicable air quality standards or requirements. Permits for new or modified facilities must be obtained before construction starts.

3.11.3 Land Use Planning/Zoning

At the local government level, urban planning and community and rural development involve planning, administering, and researching the development of urban and rural areas. In general, land use management involves making decisions regarding how a particular site will be used. Once land is zoned or used for one purpose, it cannot be used for another purpose.

Along these lines, EPA has launched a national effort (campaign) to restore "Brownfields" (i.e., abandoned or under-utilized industrial and commercial sites that are environmentally contaminated from previous use). In many situations, restoration or remediation of these areas would contribute to the economic revitalization of an area or community.

Effective and comprehensive land use planning requires coordination by federal, state, and local experts. Federal and state objectives that reflect the needs and conditions of county and municipal governments are appropriate, because land use management typically occurs at the local level. State and federal governments often grant local governments the necessary authority to implement national and state land use requirements, as well as review land use plans, in a manner appropriate to individual communities.

Land use planning and zoning activities do not themselves cause environmental effects. The results of these activities -- the actual land use -- pose environmental impacts. Land use determines whether natural resources are conserved or depleted. Land set aside for open space or parks obviously will conserve the resource and cause less severe environmental impacts than land zoned for industrial purposes. Land set aside for open space, however, is at risk for later development. Land used for residential, commercial, or industrial purposes can affect air, land, and water resources. On the other hand, abandoned sites that are restored can revitalize an area and reduce environmental risks as the site is remediated.

3.11.4 Pollution Prevention in Air Pollution Programs and Pretreatment Programs

Both of these regulatory programs often exist at the local government level and provide many important functions. As a result, these programs interact with many different types of businesses and industries and, therefore, have a tremendous opportunity to encourage pollution prevention and waste reduction at these sources. It will be at the discretion of each individual program where it wants to focus its efforts; however, there are common aspects of these regulatory programs that offer the opportunity for integration of pollution prevention. In addition to working with prevalent industries in the region, programs can also target sources of emissions or

discharges, which lead to problems specific to that region, such as ozone or specific treatment plant upsets. Although the priorities of these programs are often in the areas of permits, inspections, compliance and enforcement, it is important to remember that these programs also have a responsibility to educate the regulated community. By educating pollution sources on the benefits of, and opportunities for, waste reduction and pollution prevention, a program can more effectively and efficiently accomplish its mission of environmental protection. The following section lists some examples of opportunities to incorporate pollution prevention into existing regulatory programs.

3.11.4.1 Top Pollution Prevention Strategies

The following list highlights selected pollution prevention strategies associated with air pollution and pretreatment programs:

- Incorporate pollution prevention into the permitting process. Examples of opportunities include:
  - Providing recommendations for pollution prevention and waste minimization during permit applications for new facilities
  - Including pollution prevention work standards, practices, or conditions in permits
  - Requiring formal pollution prevention/waste minimization plans from facilities as part of their operating permits
  - Providing a definition of pollution prevention and information on available services, assistance, and benefits in permit renewal letters.
- Train engineers and inspectors on pollution prevention technologies and opportunities and have them include information and technical assistance during inspections, as well as in the permit and plan review and approval stages.
- Provide compliance assistance and pollution prevention information through descriptive brochures, BMPs, and implementation documents associated with regulatory standards. These can be provided with permits, distributed by inspectors, or handed out at workshops or training events.

- Provide various incentives such as relaxing inspection periods or reducing permit fees for sources that implement pollution prevention practices.

- Utilize surcharge and impact fees to encourage water re-use, conservation, and pollutant reduction. These fees can be scaled and should be based on the quantities and the concentrations of pollutants discharged to avoid dilution.

- Utilize national events, such as Clean Air Month, Earth Day, and National Pollution Prevention Week, to publicize pollution prevention initiatives and target local issues, such as high ozone levels and acid rain. This is a good opportunity to educate local sources on EPA initiatives, including Climate Wise and Energy Star.

- Incorporate implementation of pollution prevention projects into enforcement and settlement agreements. If a program is willing to offset a portion of the fines for facilities that agree to implement pollution prevention projects, they provide a much greater incentive for facilities to utilize this option.

- Get involved with other national and international organizations, such as the State & Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), Association of Metropolitan Sewerage Agencies, and the National Pollution Prevention Roundtable.

3.11.4.2 Case Study

In February 1993, the U.S. EPA promulgated, in Final Rule, the Standards for the Use and Disposal of Sewage Sludge (40 CFR 503). In response to this, the Metropolitan Water Reclamation District of Greater Chicago (the District) initiated a comprehensive plan, the 503 Enforcement Initiative (503EI), to achieve two primary objectives: (1) to "substantially reduce the discharge of metals of concern from the regulated industrial community," and (2) ensure "that the District's Water Reclamation Plants produce high quality sludge, which maximizes the District's opportunities for beneficial reuse." The main components of the 503EI included "(a) optimization of the District's existing Pretreatment Program, (b) increased monitoring of industrial point source discharges into its sewerage system, and (c) innovative pollution prevention assistance to the industrial community."

In cooperation with several local and regional agencies, the District began providing pollution prevention training, outreach, and technical assistance to local businesses and also developed a

public recognition program for businesses successful in implementing pollution prevention measures. In addition, the District cooperated with local industry stakeholders to develop a cost recovery system for the Pretreatment Program, to help cover the additional costs incurred by the Program for the 503EI. This system "brought direct financial liability to industrial users who are regulated for the discharge of these metals" and created a further incentive for these users to reduce their discharges. The District has found that by linking compliance performance to financial liability, Pretreatment Program administrative costs are more equitably distributed amongst the industrial users and "in conjunction with pollution prevention assistance programs, offer greater leverage to influence SIU (Significant Industrial User) behavior at lesser cost to Control Authorities and the industrial community." Overall, this program resulted in a more than 33% reduction in heavy metal discharges to the sewerage system between the years of 1992 and 1996, and it is an illustrative example of the benefits of incorporating pollution prevention into existing regulatory programs.

(Source: Richard Sustich et al., "Chicago's 503 Enforcement Initiative: A Great Industrial Clean-Up Experience," Metropolitan Water Reclamation District of Greater Chicago, presented at the Water Environment Federation Technical Expo and Conference, Chicago, Illinois, October 1997.)

For more information, contact Mr. Richard Sustich at the Metropolitan Water Reclamation District of Greater Chicago, (312) 751-3050.

3.11.5 Pollution Prevention in Land Use Planning & Zoning and Brownfield Redevelopment

Although the connections may not be immediately evident, poor planning and zoning decisions can lead to environmental impacts, particularly through environmentally irresponsible development patterns. The country's development patterns of low density single family housing, separation of uses, dependence on the automobile, loss of habitat and greenfields, and urban sprawl have greatly contributed to overall environmental degradation. This can be counteracted by promoting construction to optimize energy efficiency, infill development, Brownfield redevelopment, mixed land use, and pedestrian and transit-oriented development (TOD). These smart growth initiatives can benefit a community economically, financially, and socially through improved environmental quality and improved quality of life. If planning, zoning, and development are done carefully and with foresight, energy, water and other resources can be conserved, aquifers and watersheds can be protected, neighborhoods can become more self-sufficient, vehicle miles traveled (VMTs) can be reduced (as well as the pollution associated with

vehicles), money and other resources can be conserved through avoidance of the need for additional infrastructure, declining areas can be revitalized, and overall environmental quality can be improved both locally and regionally. Therefore, it is important to consider many factors at the planning and zoning stage, including current and potential future uses of the land, existing infrastructure in the area, potential impacts to nearby watersheds and aquifers (please refer to Section 3.8 of this profile for more information), and the accessibility to, and feasibility of, residents and employees using alternative means of transportation, such as mass transit, biking, or walking. There are several areas associated with planning and zoning operations which offer excellent opportunities to implement innovative ideas and projects to help prevent pollution and support smart growth.

3.11.5.1 Top Pollution Prevention Strategies

The following list highlights pollution prevention strategies associated with planning and zoning operations:

- Establish steering committees with representatives from various departments involved in the planning and zoning process to research the feasibility and encourage the implementation of smart growth initiatives. For example, an Infill Task Force can be established to research and address the existing barriers to smart growth and to develop an infill strategy for the community.

- Establish policies identifying areas for environmental resource preservation or conservation and establish rules to protect such areas from incompatible land uses and management practices. Examples may include:

  - Incorporate watershed management plans into Comprehensive Development Master Plans

  - Establish protective zones around aquifers and other drinking water sources to limit certain land uses and operations

  - Restrict certain land uses and operations in those areas served only by septic tanks

  - Minimize impervious surfaces in a development through compact design and reduction of road width and parking lot size (to reduce storm water run-off)

- Locate watershed development with an eye for preserving the natural land near lakes, rivers, and streams.

C Create an urban design manual for developers to educate them on smart growth concepts and opportunities for incorporation into their plans and projects.

C Establish incentives for developers who incorporate smart growth initiatives into their plans and projects. These incentives could include expedited approval processes, decreased permit fees, decreased impact fees, and priority in the provision of services, facilities, and allocation of financial resources.

C Modify economic incentive packages for Brownfield developers based on how closely they follow recommendations for pollution prevention implementation. For example, increase the economic package if they are willing to implement more pollution prevention initiatives.

C Establish policies requiring BMPs for particular land uses and activities to achieve pollution reduction goals.

C Incorporate pollution prevention language into local Brownfield codes and ordinances.

C Provide education opportunities (workshops, booklets, pamphlets, etc.) to encourage smart growth initiatives and implementation of pollution prevention and BMPs. This may include:

- Education of financial institutions on the benefits to them of providing loans for pollution prevention projects and equipment.

- Education of target Brownfield communities on the benefits of the developer and future business utilizing pollution prevention. Since it is added insurance that the property will not become contaminated again this may help win the community's approval for location of a new facility in a Brownfield area.

- Education of residents and businesses located in areas served by septic tanks on the operation and proper maintenance of these systems to prevent ground and groundwater contamination.

- Review and amend zoning subdivision regulations and other regulations to encourage TOD principles. This may include maximizing the use of existing urbanized areas accessible to transit through infill and redevelopment, reinforcing transit through land use planning, or reducing VMTs by creating opportunities to walk, bike, and use mass transit.

3.11.5.2 Case Study

Since the 1970s the City of San Jose, California, has been committed to growth management and sustainability and has been establishing initiatives and policies to promote smart growth. This commitment came in response to tremendous growth and urban sprawl in the 1950s and 1960s, when the city discovered that the revenue generated by urban development on the City's fringe was insufficient to cover the costs of providing the infrastructure and services to this area. The City realized that it must take action to prevent this trend from continuing and began approving numerous initiatives within their General Plan in order to ensure a sustainable and profitable future for the area. With policies such as the Sustainable City Major Strategy, the Greenline/Urban Growth Boundary, and the Intensification Corridors Special Strategy, the City has been implementing smart growth development in a variety of ways. Some of these include directing urban development to infill sites which are already provided with urban infrastructure and services, promoting high density housing and supportive mixed uses in close proximity to public transit corridors, and enacting building and site design policies to improve energy and water use efficiency.

Overall, the City's goal is to "ensure that urban development in San Jose is designed and built in a form that enhances the City's ability to provide adequate levels of urban services and ensuring the efficient use of existing infrastructure and services while protecting the natural environment to the maximum extent feasible." Through proactive planning and building, the City is helping to ensure smart growth today while providing adequate resources for future generations.

(Source: International Council for Local Environmental Initiatives (ICLEI), U.S. Office, Cities for Climate Protection Campaign Case Studies, San Jose, California Growth Management Plan)

Portland, Oregon is another city which has implemented a very proactive smart growth plan. For more information on San Jose, California or Portland, Oregon contact the ICLEI, U.S. Office, Cities for Climate Protection Campaign, at (510) 540-8843.

Resources

AMSA: (202) 833-2672; *http://www.amsa-cleanwater.org*

Clean Air Technology Center (CATC): (919) 541-0800; *http://www.epa.gov/ttn/catcCenter*

Center for Technology Transfer and Pollution Prevention (CT2P2): *http://ingis.acn.purdue.edu:9999/cttpp/cttpp.html*

Energy Star Buildings/Green Lights: (202) 233-9178; *http://www.epa.gov/appdstar/buildings/* and *http://www.epa.gov/greenlights.html*

Florida Sustainable Communities Center: *http://sustainable.state.fl.us*

International Council for Local Environmental Initiatives (ICLEI), U.S. Office, Cities for Climate Protection Campaign: (510) 540-8843; *http://www.iclei.org*

National Pollution Prevention Roundtable: (202) 466-7272; *http://www.p2.org*

$mart Growth Network: (202) 260-2750; *http://www.smartgrowth.org*

STAPPA/ALAPCO: (202) 624-7863; *http://www.4cleanair.org*

U.S. EPA Design for the Environment (DfE): (202) 260-1678; *http://www.epa.gov/dfe*

For more information, contact Nichole Hefty, Dade County DERM, Florida; Phone: (305) 372-6825; Fax: (305) 372-6760; E-mail: heftyn@co.miami-dade.fl.us.