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EPA FACILITIES MANUAL, VOLUME 4

Safety, Health, and Environmental Manual:

Environmental Management Guidelines

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Foreword

The *EPA Facilities Manual* is comprised of four distinct, yet complementary resources for planning and managing Environmental Protection Agency (EPA) facilities. These four volumes are meant to be used simultaneously to determine design intent, requirements, and the ongoing evaluation of all EPA facilities. The use of one volume without reference to the other three would result in an incomplete understanding of the requirements for EPA facilities.

Volume 1: The *Space Acquisition and Planning Guidelines* contain information on space planning, space estimation, environment, materials, furniture, process, and maintenance. EPA's Office of Administration and Resources Management developed this document to help EPA facilities managers, space managers, and line personnel plan and use their space.

Volume 2: *Architecture and Engineering Guidelines* (referred to as the *A&E Guidelines*) provide guidance for facilities management, engineering, planning, and architecture professionals in the design and construction of new EPA facilities and the evaluation of existing facilities.

Volume 3: The *Safety, Health, and Environmental Management Manual: Safety and Health Requirements* outlines safety and health considerations for owned or leased EPA facilities. The Manual's goal is to maintain a safe and healthful workplace that protects against injury, illness, and loss of life.

Volume 4: The *Safety, Health, and Environmental Management Manual*: *Environmental Management Guidelines*, establishes environmental specifications to be addressed by designers and managers of EPA facilities and related building systems.

Safety, Health and Environmental Manual: Environmental Management Guidelines

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Chapter 1 - Introduction

1.1 Purpose

The purpose of this Manual is to detail environmental considerations for facilities that are owned, leased, or occupied by the Environmental Protection Agency (EPA). The considerations or criteria in this Manual describe the full scope of the facility features required in EPA-occupied facilities to ensure compliance with applicable environmental regulatory standards to preserve environmental quality. These criteria also promote the successful integration of environmental requirements into facility design processes to prevent pollution and support EPA's goal of environmental stewardship.

1.2 Scope

The facility environmental considerations described in this Manual apply to facilities owned or leased by EPA, and facilities assigned to EPA by the General Services Administration (GSA) or other government agencies. In this Manual, owned and leased facilities shall be referred to as "EPA facilities." The criteria in this Manual, along with the criteria in the *Safety and Health Manual* and the *Architecture and Engineering Guidelines* (*A&E Guidelines*), are mandatory for new construction or new leased space. Where meeting these criteria at existing facilities does not seem feasible, consult the Architecture, Engineering and Asset Management Branch (AEAMB) for advice or a waiver. Under special circumstances, a waiver may be granted by the Safety, Health and Environmental Management Division (SHEMD).

If conflicts exist between state or local criteria and the criteria set forth in this Manual, the more stringent criteria shall apply. If there are conflicts between the local code and a model code, the discrepancy will be brought to the attention of AEAMB and SHEMD for resolution.

1.3 EPA Responsibilities

This section describes the responsibilities assigned to divisions or departments within EPA for enforcing the criteria set forth in this Manual.

- AEAMB is responsible for ensuring that the design and construction of EPA facilities comply with local codes as well as with the criteria described herein.

- AEAMB and SHEMD are jointly responsible for ensuring that EPA facilities provide safe, healthful, and environmentally sound work spaces for EPA personnel.

- AEAMB and SHEMD are jointly responsible, when appropriate, for reviewing and approving requests for a waiver for variances or exceptions to the criteria set forth in this Manual. The following criteria apply to requests for variances:

    (1) Requests for variances to the criteria described in this Manual must be submitted in writing to AEAMB and SHEMD for review.

(2) Documentation of granted variances must be maintained by the facility as long as applicable.

- AEAMB and SHEMD are jointly responsible for updating this Manual, as necessary, to reflect changes in technology and recognized standard practices in safety, health, and environmental management relative to EPA facilities.

1.4 Requirements

To meet the policy and objectives set forth above:

- AEAMB, with SHEMD's assistance, will review the criteria set forth in Programs of Requirements (PORs) and Solicitations for Offers (SFOs) for new EPA facilities, and for modifications to existing facilities, before awarding a design contract.

- At significant design and construction points, AEAMB, with SHEMD's assistance, will review, approve, and comment on the design plans and construction drawings for new and modified facilities.

- During construction, a representative acceptable to SHEMD shall inspect the critical environmental management features of a new or modified facility, such as wastewater systems and underground storage tanks (USTs), against the design and construction specifications. These features also shall be acceptance-tested against the design and construction specifications prior to occupancy.

- AEAMB, with the assistance of SHEMD, shall inspect and test leased spaces against the criteria contained in this Manual before signing the lease and shall document these criteria in the lease where appropriate.

- All newly occupied facilities shall be evaluated for environmental problems before occupancy. This evaluation shall include a record search and an audit, including an inspection for USTs, asbestos, radon, lead, and other environmental threats. Refer to the *Guidelines for Acquiring and Transferring EPA Real Property and Complying with the Community Environmental Response Facilitation Act (CERFA)*, EPA100-B-00-002 (December 2000).

Chapter 2 - Air Pollution Control

2.1 Purpose

This chapter establishes the standards that are applicable to activities at EPA facilities that may affect air quality. These activities include the construction, modification, or reconstruction of air emission sources, the control of hazardous air pollutants, and the maintenance and operation of systems containing ozone-depleting substances.

2.2 References

EPA facilities shall be designed and operated to comply with applicable air emission limits permitting requirements as specified by the Clean Air Act (CAA) regulations in 40 CFR Parts 60, 61, 63, and 82, as well as state and local restrictions.

2.3 Air Emissions Inventories

In accordance with prevailing federal, state and/or local requirements, potential sources of air pollution emissions at EPA facilities shall be identified in a documented inventory as an integral part of facility construction, modification, or reconstruction planning. An inventory of the emissions sources shall be established prior to facility and equipment construction, modification or reconstruction, considering the following point source emissions, at a minimum:

- Fossil-fuel fired boilers used to produce hot water or steam for heating purposes
- Internal combustion engines (e.g., emergency power generators)
- Solid/biological waste incinerators
- Research combustors and associated air pollution control devices
- Paint/mechanical shop exhausts
- Laboratory fume hoods
- Cooling towers
- Aboveground storage tanks (ASTs) and gasoline-dispensing operations.
- Miscellaneous air research and other equipment (e.g., stationary diesel engines, paint spray booths).

The air emissions source inventory shall include a list of point sources such as those described above, as well as information on types of fuels (for combustion equipment) and anticipated types

of pollutants, as information is available. In addition, inventories maintained by existing facilities must be updated to reflect the installation of new air emissions sources.

Prior to construction, modification, or reconstruction of any sources identified in the inventory, the maximum operating design capacity (e.g., British thermal units [Btu]/hour heat input capacity, horsepower rating), fuel type, and estimated annual fuel consumption shall be determined. Once this information has been determined, federal, state, and local air pollution control regulations shall be consulted to determine which preconstruction and operational permitting obligations must be fulfilled as a part of formal equipment commissioning. Appendix C of this Manual provides a list of state environmental agency contacts, including air pollution control organizations.

2.4 New Source Performance Standards

The following emissions sources shall be designed and equipped during construction, modification, or reconstruction in accordance with new source performance standards (NSPS) and other applicable technology considerations, as described below:

- Fossil-fuel-fired steam generators (boilers) with a maximum design heat capacity greater than 100 million (MM) Btu/hour (29 megawatts [MW]) shall meet the emission standards to control particulate matter (PM), sulfur dioxide (SO_2), and nitrogen oxides (NO_x), in accordance with 40 CFR Part 60, Subpart Db.

- Fossil-fuel-fired steam generators (boilers) with a maximum design heat capacity of 10 MM to 100 MM Btu/hour (29 MW) shall meet the emission standards to control PM, SO_2, and NO_x, in accordance with 40 CFR Part 60, Subpart Dc.

- Volatile organic liquid (VOL) storage (including petroleum liquid) vessels with a volume of 40 cubic meters (approximately 10,600 gallons) or greater shall meet the emission standards for volatile organic compounds, in accordance with 40 CFR Part 60, Subpart Kb.

- Sources of volatile organic compounds (VOCs) (e.g., laboratory fume hoods, painting operations, aboveground storage tanks) and NO_X (e.g., boilers) located in ozone nonattainment areas may qualify as "major sources" based on their emissions levels and the attainment classification of their air quality control region. Current nonattainment areas can be determined by contacting the Air Compliance Branch in the Air Toxics Division of the EPA Regional Office for the region where the source is located.

  Major sources of VOCs and NO_x are classified by their potential to emit these ozone-forming compounds. "Potential to emit" is defined as the maximum capacity of a stationary source to emit a pollutant under its physical or operational design. Table 2-1 identifies the threshold limits for emissions and the corresponding nonattainment area classifications for VOCs and NO_x.

Table 2-1. Ozone Nonattainment Area Classifications

Classification	Emission Thresholds for Major Sources (tons per year)
Marginal	100
Moderate	100
Serious	50
Severe	25
Extreme	10

Facilities with sources identified as "major" under the above criteria must be designed to reduce emissions by application of reasonably available control technology (RACT), best available control technology (BACT), or lowest available emission rate (LAER), as specified by state regulations and applicable federal Control Technical Guidelines adopted by state programs. The EPA Clean Air Technology Center (Office of Air Quality Planning and Standards) in Research Triangle Park, North Carolina, is a clearinghouse for information on approved control technologies for different types of air emissions sources. The technology center can be reached through its info-line by calling (919) 541-0800, or by accessing its Web site at http://www.epa.gov/ttn/catc.

2.5 Hazardous Air Pollutants

Under the Clean Air Act Amendments of 1990, EPA regulates emissions of 188 specific hazardous air pollutants (HAPs). Major sources of HAP emissions at EPA facilities shall comply with applicable requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAPs). Major sources include facilities with a stationary source, or group of stationary sources, located within a contiguous area and under common control that emit HAPs in quantities that exceed 10 tons per year for a any single HAP, or 25 tons per year of any combination of HAPs.

The construction or modification of facilities that have the potential to emit threshold quantities of these HAPs shall be designed in accordance with 40 CFR Parts 61 and 63. More stringent state toxic air pollution control regulations shall also be reviewed for technology considerations impacting facility construction and modification planning. Specific NESHAPs to be considered during construction and modification of EPA facilities include, but are not limited to:

- Asbestos. Activities involving the demolition or removal of asbestos-containing materials must be performed in accordance with the design and operational specifications of 40 CFR Part 61, Subpart M, and 29 CFR §1926.1011, as well as any more stringent state and local regulations. See also Chapter 6 of this manual for discussion on asbestos operation and maintenance.

- Hexavalent chromium (cooling towers). Facilities shall not be designed or modified to include the use of hexavalent chromium-containing biocides or scale inhibitors in cooling and circulation towers.

2.6 Ozone-Depleting Substances

Any contribution to the depletion of the ozone layer by the use of chlorofluorocarbons (CFCs) at EPA facilities is discouraged. EPA requires that selection of building materials and systems be consistent with the guidelines of the Protection of Stratospheric Ozone in 40 CFR Part 82. Particular attention shall be paid to the following building elements and systems:

- Building Materials. Insulation containing CFCs and other refrigerants harmful to the environment shall be avoided.

- Halon Fire-Extinguishing Systems. New halon fire-extinguishing systems shall not be installed in EPA facilities. This policy applies to both fixed systems containing Halon-1301 and portable extinguishers containing Halon-1211. See Chapter 2 of the *Safety Manual* for information on appropriate fire extinguishing systems.

  All existing EPA facility fire protection systems containing Halon-1301, Halon-1202, or Halon-1211 have been inventoried and are either already removed or planned for removal. These systems are to be replaced with systems containing alternatives approved under the Significant New Alternatives Policy (SNAP) codified at 40 CFR Part 82, Subpart G. The most current list of alternatives approved under SNAP is available through the Global Programs Division (Office of Air & Radiation, Office of Atmospheric Programs) Hotline at (800) 296-1996, or through its Web site at http://www.epa.gov/ozone/snap/lists/index.html.

  For existing systems requiring recharge, facilities should contact the Halon Recycling Corporation at (800) 258-1283 for information about recycled halon available from distributors.

- Heating, Ventilation, and Air-Conditioning (HVAC) Systems. Installation of new HVAC systems that contain chlorofluorocarbon (CFC) refrigerants shall be avoided in EPA facilities because of the production phaseout of ozone-depleting substances covered under Title VI of the Clean Air Act, as amended in 1990. New systems must use refrigerants acceptable under SNAP in 40 CFR Part 82, Subpart G, as described in Table 2-2. SNAP regulations prohibit users from replacing CFCs with chemicals that pose an even greater risk to human health and the environment.

  Each new system must also comply with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 15 and Guideline 3 to ensure that the equipment has the proper safety features. These safety features may include sensitive detectors, alert systems, and information on required ventilation systems.

Table 2-2. Acceptable Substitutes for Class I Substances in HVAC Systems

SNAP Acceptable Substitutes	Trade Name	Centrifugal Chillers		Reciprocating Chillers
		CFC-11	CFC-12	CFC-12
HCFC-123	123	R, N	N	
HCFC-22	22	N	N	N
HCFC-134a	134a	N	R, N	R, N
HFC-227ea		N	N	N
HFC-245fa		N		
R-401A, R-401B	MP-39, MP-66			R, N
R-409A (HCFC Blend Gamma)	409A			R, N
R-411A, R-411B	411A, 411B			R, N
FRIGC (HCFC Blend Beta)	FRIGC FR-12, 416A		R, N	R, N
Free Zone (HCFC Blend Delta)	Free Zone / RB-276		R, N	R, N
Hot Shot (HCFC Blend Omicron)	Hot Shot, KarKool, 414B		R, N	R, N
GHG-X4 (HCFC Blend Xi)	GHG-X4, Auofrost, McCool Chill-it, 414A		R, N	R, N
GHG-X5	GHG-X5		R, N	R, N
Freeze 12	Freeze 12		R, N	R, N
411C	G2018C		R, N	R, N
THR-02	THR-02		N	N
THR-03	THR-03		N	
Ikon A, Ikon-12 (Blend Zeta)	Ikon A, Ikon-12		R, N	
Ikon B	Ikon B		R, N	N
FOR12A, FOR12B	FOR12A, FOR12B		R, N	R, N
SP34E	SP34E			R, N
HCFC-22/HCFC-142b			R, N	R, N
Ammonia Vapor Compression		N	N	
Evaporative Cooling		N	N	N
Dessicant Cooling		N	N	N
Ammonia / Water Absorption		N	N	
Water / Lithium Bromide Absorption		N	N	

R = Retrofit Uses N = New Uses
The information in this chart should be periodically updated by calling the EPA Global Programs Division Hotline at (800) 296-1996, or by accessing its Web site at http://www.epa.gov/ozone/snap/lists/index.html.

Existing HVAC systems that contain CFC refrigerants shall be maintained in accordance with the practices described below.

(1) Retrofitting Existing Systems. AEAMB recommends that existing HVAC systems containing CFCs be replaced, not retrofitted. If, however, retrofitting is the option selected, existing systems can be retrofitted with the refrigerants listed in Table 2-3. EPA facilities shall follow the retrofit instructions provided by the refrigerant manufacturer and the HVAC equipment manufacturer.

Table 2-3. Existing CFC System Retrofit Options

System Type	Existing System	Acceptable Retrofit	Unacceptable Retrofit
Centrifugal	CFC-11	HCFC-123	HCFC-141b
Centrifugal	CFC-12	HFC-134a 416-A RB-276 414B 414A GHG-X5 Freeze 12 G2018C Ikon A, Ikon-12 Ikon B FOR12A, FOR12B HCFC-22/HCFC-142b	HCFC-22/HFC- 142b/CFC-12
Reciprocating	CFC-12	HFC-134a R-401A, R-401B R-409A R-411A, R411-B 416A RB-276 414B 414A GHG-X5 Freeze 12 G2018C FOR12A, FOR12B SP34E HCFC-22/HCFC-142b	HCFC-22/HFC- 142b/CFC-12
The information in this chart should be periodically updated by calling the EPA Global Programs Division Hotline at (800) 296-1996, or by accessing its Web site at http://www.epa.gov/ozone/snap/lists/index.html.			

(2) Maintenance and operation of existing equipment. All persons who maintain, service, or repair appliances, except motor vehicle air conditioners (MVACs), and all persons who dispose of appliances, except for small appliances, room air conditioners, and MVACs, must be certified by an approved technician certification program as specified in 40 CFR §82.161. Facilities shall keep servicing records documenting the date and type of service and the quantities of refrigerant added. Facilities also shall keep copies of technician certifications at the facility for 3 years.

No person maintaining, repairing, or disposing of appliances may knowingly vent, or otherwise release into the atmosphere, a Class I or II substance (see Appendix C for the list of EPA-regulated ozone-depleting substances) used as a refrigerant in such equipment unless this venting or releasing is associated with a good faith attempt to recover or recycle the refrigerant (40 CFR §82.154). All persons opening HVAC systems for maintenance, service, or repair, must evacuate the refrigerant to a system receiver or a recovery or recycling machine certified pursuant to 40 CFR §82.158. Table 2-4 lists the required evacuation levels, as specified in 40 CFR §82.156. Systems equipped with a noncondensables purge device must not release more than 3 percent of the quantity of refrigerant being recycled through noncondensables purging under the conditions of the American Refrigeration Institute (ARI) Standard 740-1993.

Table 2-4. CFC Equipment Servicing

Type of Appliance	Required Evacuation Levels in Inches of Hg Vacuum (relative to standard atmospheric pressure of 29.9 inches Hg)	
	Using recovery or recycling equipment manufactured or imported before 11/15/93	Using recovery or recycling equipment manufactured or imported on or after 11/15/93
HCFC-22 appliances, or isolated component of such appliances, normally containing less than 200 pounds of refrigerant	0	0
HCFC-22 appliances, or isolated component of such appliances, normally containing 200 pounds or more of refrigerant	4	10
Other high-pressure appliances, or isolated component of such appliances, normally containing less than 200 pounds of refrigerant	4	10
Other high-pressure appliances, or isolated component of such appliances, normally containing 200 pounds or more of refrigerant	4	15
Very-high-pressure appliances	0	0
Low-pressure appliance	25	25 [a]

[a] mm Hg absolute

Organizations servicing equipment containing Class I or Class II refrigerants must certify to EPA that its recovery and recycling equipment is certified to the above standards. Certifications shall be sent to the appropriate EPA Regional Office listed in 40 CFR §82.162 based on the location of the facility. Reclaimed refrigerants for use in EPA facilities must fulfill the purity standards set forth in ARI Standard 700-1993.

If commercial and industrial refrigeration equipment with a refrigerant charge of 50 pounds or more is leaking at a rate exceeding 35 percent of the total annual charge, it must be repaired within 30 days. For maintenance and servicing of MVACs, refrigerant recovery and recycling equipment must be used that meets the standards in Appendix A to Subpart B of 40 CFR Part 82.

(3) System decommissioning. Persons disposing of appliances (except for small appliances, MVACs, and MVAC-like appliances) must evacuate refrigerants to the levels in Table 2-4.

Several organizations will accept or buy surplus halons and CFCs from EPA facilities. Some are government sponsored, as follows:

Halon Recycling Corporation	(800) 258-1283
Arlington, VA	(703) 524-6636
Defense Logistics Agency	(804) 279-4525
Richmond, Virginia	(804) 279-5202
e-mail: odsreserve@dscr.dla.mil	(804) 279-5203
	(804) 279-6102

The Defense Logistics Agency repository will accept surplus CFC-11, CFC-12, CFC-114, and Halon-1202, Halon-1211 and Halon-1301. Recovered halon and CFCs may be shipped in any size cylinder provided that the cylinder is tagged and labeled with the shipper's name, address, and telephone number; the type and quantity of ozone-depleting substance shipped; and the appropriate U.S. Department of Transportation (DOT) warning labels. The repository will also accept fire extinguishers and halon spheres. Prior to shipment, fire suppression systems with electrical charges must be deactivated, and safety caps must be used to cover exposed activation mechanisms. Once arrangements have been made, the shipping address is:

Halon Recycling Manager
Defense Depot Richmond Virginia
SW0004
Attn: Cylinder Operations
8000 Jefferson Davis Highway
Richmond, VA 23297-5000

Chapter 3 - Water Pollution Control

3.1 Purpose

This chapter describes the statutory and regulatory requirements for controlling water pollution as a result of EPA facility activities. These activities include the direct and indirect discharge of wastewaters, as well as construction activities contributing to storm water runoff and wetlands impacts. This chapter also describes the regulatory requirements associated with potable water supplies at EPA facilities.

3.2 References

All wastewater discharges from EPA facilities, including discharges during construction activities, shall comply with Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) requirements, as well as state and local restrictions. Drinking water monitoring shall be conducted as specified in this chapter unless approved by the Architecture, Engineering and Asset Management Branch (AEAMB) and the Safety, Health and Environmental Management Division (SHEMD). Guidance for compliance with requirements described in this chapter is provided in the following documents:

- *Industrial User Inspection and Sampling Manual for POTWs*, EPA831-B-94-001 (April 1994)
- *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices*, Office of Water, EPA (July 1994)
- *Lead in School Drinking Water*, EPA57019-89-001 (January 1989).

3.3 Direct Wastewater Discharges

As authorized by the CWA, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Potential sources of NPDES-regulated discharges to surface water at EPA facilities shall be identified in a documented inventory of point and non-point discharge sources. NPDES discharge source inventories shall be an integral part of facility construction or modification planning and shall include:

- Process effluent discharges
- Non-contact cooling-water discharges
- Storm water discharges.

The anticipated operating conditions of discharge sources (e.g., flow rate and concentrations of discharged constituents) shall be evaluated to determine applicable federal and/or state NPDES permit requirements. In most cases, the NPDES permit program is administered by authorized states, and permit conditions must be negotiated with the state environmental agency. Applicable NPDES permitting conditions shall be reflected in design specifications, including representative flow monitoring, sampling, special pretreatment systems, and drainage. Special engineering

design and control technologies shall be considered and developed in accordance with applicable NPDES permit conditions and effluent guidelines established in 40 CFR Parts 403 to 471.

3.4 Indirect Wastewater Discharges

For facilities discharging effluent to a publicly owned treatment works (POTW), applicable federal (see 40 CFR §403.5(b)) and state (see Appendix B for state water pollution control contacts) pretreatment standards, local sewer use ordinance, permitting, and effluent monitoring requirements shall be determined. If applicable, permitting and pretreatment obligations for significant industrial users must be achieved in design and installation. The monitoring and sampling requirements shall be determined for all discharge points and shall include, at a minimum, flow rate, pH measurement, and representative influent/effluent sample collection. Additionally, the facility shall have a plumbing design configuration to facilitate mapping of effluent discharge pathways, identification of representative sampling points, and future plumbing system modifications.

Elementary neutralization systems shall be provided to neutralize and monitor wastewater discharges for facilities with corrosive effluents to ensure EPA facility conformance with the CWA pretreatment standards in 40 CFR §403.5(b)(2) and standards imposed by local POTWs. The system shall include flow-rate measurement, pH sensors, pH adjustment capabilities, and engineering features to enable the collection of representative effluent samples. The system engineering controls shall provide the capability to identify and mitigate unacceptable discharges; such controls include pH excursion alarms and automatic flow cutoff devices. System designs shall provide for the routine operation and maintenance of key components such as agitators, pumps, and pH probes. Guidance on collecting representative wastewater samples to determine effluent quality can be obtained from the EPA publication, *Industrial User Inspection and Sampling Manual for POTWs.*

State and local requirements shall be identified for facilities that will discharge to septic systems or aquifers. Compliance with these provisions will be achieved by incorporating the appropriate design and engineering controls. AEAMB shall be contacted for approval of any non-stormwater discharges into septic systems or aquifers.

3.5 Storm Water Management

Storm water discharges are generated by runoff from land and impervious areas such as paved streets, parking lots, and building rooftops during rainfall and snow events that often contain pollutants in quantities that could adversely affect water quality. Most storm water discharges are considered point sources and require coverage by an NPDES permit. Specifically, construction activities at EPA facilities that impact over one acre of land shall comply with applicable NPDES construction storm water permits. The permit requirements are defined by the NPDES permitting authority (state or Federal), but generally include:

- Submission of a Notice of Intent (NOI) that includes general information and a certification that the activity will not impact endangered or threatened species. This certification is unique to EPA's NOI and is not a requirement of most NPDES-delegated State's NOIs

- Development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) with appropriate best management practices (BMPs) to minimize the discharge of pollutants from the site.

- Submission of a Notice of Termination (NOT) when final stabilization of the site has been achieved as defined in the permit or when another operator has assumed control of the site.

The primary method to control storm water discharges is through the use of BMPs. Refer to *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices* for guidance on development of SWPPPs and examples of proven stormwater management BMPs.

3.6 Wetlands

The CWA regulates the discharge of dredged or fill material into "waters of the United States," which include wetlands. For purposes of the CWA, wetlands is a collective term that includes "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (40 CFR §230.3(t)). All EPA construction activities that have a potential for significant impact on wetlands shall comply with the CWA requirements described below.

Section 404 of the CWA, jointly administered by the U.S. Army Corps of Engineers and EPA, requires a permit is required for activities with significant wetland impact potential. The permit applicant must show that:

- All available alternatives to the impact have been considered, and no practicable alternative exists which would have less adverse impact on the aquatic ecosystem.
- The discharge does not violate other applicable laws, including state water quality standards, toxic effluent standards, the Endangered Species Act, and marine sanctuary protections.
- The discharge cannot cause or contribute to significant degradation of wetlands by adversely impacting wildlife, ecosystem integrity, recreation, aesthetics, and economic values.
- All appropriate and practicable steps will be taken to minimize adverse impacts of the discharge on wetlands.

Only after avoidance and minimization criteria are satisfied can wetlands mitigation be considered. In establishing mitigation requirements, the applicant must strive to achieve a goal of no overall net loss of wetland values and functions, meaning a minimum of one-for-one functional replacement with an adequate margin of safety to reflect scientific uncertainty. An environmental assessment or Environmental Impact Statement (EIS) must be prepared for each individual permit application (refer to Chapter 10 of this Manual for more information about preparing EISs).

Section 401 of the CWA, the State Water Quality Certification program, requires that states certify compliance of federal permits or licenses with state water quality requirements and other applicable state laws. Under Section 401, states have authority to review any federal permit or license (such as a 404 permit) that may result in a discharge to wetlands and other waters under state jurisdiction, to ensure that the actions would be consistent with the state's water quality requirements. A Section 404 permit for activities in wetlands cannot be issued by the Corps until this state certification has been obtained or waived as provided by federal law.

3.7 Drinking Water

Facility construction planning should include a determination of the source of potable water supplies. Facilities that obtain drinking water from municipal sources have limited responsibilities for monitoring drinking water, except during initial construction or leasing as specified below.

- All newly leased and constructed facilities shall have the potable water tested (optimally, a sample should be drawn from the main supply line to the facility) to ensure conformance with the following levels: aluminum (0.2 milligrams per liter [mg/L]), chloride (250 mg/L), color (15 color units), copper (1.3 mg/L), iron (0.3 mg/L), lead (0.015 mg/L), manganese (0.05 mg/L), pH (6.5-8.5), silver (0.1 mg/L), sulfate (250 mg/L), total dissolved solids (500 mg/L), and zinc (5 mg/L).

- All newly acquired facilities or newly plumbed systems shall test for lead (action level of 15 micrograms per liter [µg/L]) and copper (action level of 1.3 mg/L) to ensure conformance with action levels in response to major facility modifications, plumbing system alterations, or the addition of new water supply fixtures (e.g., water coolers). Potable water shall be tested for lead content in accordance with the EPA publication entitled *Lead in School Drinking Water*. For copper monitoring of potable water, the Office of Water recommends that one 30-second flush sample be taken at an internal tap from which water is typically drawn for consumption.

Where drinking water is derived from on-site wells and is provided to more than 25 individuals or 15 service connections for at least 60 days out of the year, facilities must comply with the requirements for “public drinking water systems” under the SDWA regulations. These systems are subject to periodic monitoring for physical, chemical, radiological, and biological parameters as specified in 40 CFR Parts 141 and 143.

Facilities that obtain drinking water from on-site wells should also be designed with sufficient pretreatment capabilities to ensure the safety and aesthetic quality of the water for general consumption. At a minimum, pretreatment systems for water obtained from on-site sources should provide levels of performance that ensure fulfillment of the primary maximum contaminant levels in 40 CFR Part 141, the lead and copper action levels in 40 CFR §141.80, and the secondary maximum contaminant levels in 40 CFR Part 143.

Chapter 4 - Hazardous and Solid Waste

4.1 Purpose

This chapter describes the hazardous and solid waste management requirements to be addressed by building designers and facility managers. The chapter focuses on the regulations of the Resource Conservation Recovery Act (RCRA) for the various types of hazardous waste handlers: generators; transporters; and treatment, storage, and disposal facilities. This chapter also discussed hazardous waste minimization and nonhazardous solid waste management. Details are discussed for integrating design standards for waste management into the facility planning process.

4.2 References

Federal hazardous waste requirements are found in 40 CFR Parts 260 through 279. Parts 262, 264, and 265 are the most relevant to facility design. Additionally, the *EPA Safety, Health, and Environmental Management Guidelines* can be consulted for guidance on operational issues related to facility waste management.

4.3 Hazardous Waste Generator Requirements

The majority of EPA facilities operate solely as generators of hazardous waste. The specific regulatory standards that EPA facilities must follow are based upon the amount of regulated hazardous waste they generate on a monthly basis and all regulated hazardous waste accumulated on site. Under the federal rules, there are three generator classes:

- Conditionally Exempt Small Quantity Generator (CESQG). CESQGs generate no more than 100 kg of hazardous waste, 1 kg of acute hazardous waste, or 100 kg of spill residues per month. Most EPA offices and administrative buildings will qualify as CESQGs. EPA facilities operating under CESQG status are generally not subject to substantive regulation under federal and state hazardous waste laws. CESQGs must deliver their hazardous waste to approved facilities and comply with applicable DOT requirements when sending these wastes off site (40 CFR §261.5).

- Small Quantity Generator (SQG). SQGs generate between 100 and 1,000 kg of hazardous waste and no more than 1 kg of acute hazardous waste per month. Additionally, they can only accumulate wastes on site for up to 180 days (or 270 days when transporting over 200 miles) and can accumulate no more than 6,000 kg of hazardous waste on site at any time.

- Large Quantity Generator (LQG). LQGs generate greater than 1000 kg of hazardous waste, 1 kg of acute hazardous waste, or 100 kg of contaminated waste from an acute spill per month. Additionally, they can accumulate wastes on site without a quantity limit but only for up to 90 days.

EPA facilities managing large amounts of chemicals (e.g., laboratories) may generate enough hazardous waste to qualify as SQG or LQG. General design requirements for these facilities are summarized below. To ensure full regulatory compliance with federal requirements, facilities should consult 40 CFR Part 262 and applicable state regulations.

- Waste Collection and Accumulation Requirements. Hazardous waste accumulation areas must comply with the requirements specified below. In addition, inside hazardous waste accumulation areas must comply with the requirements outlined in Chapter 4 of the *Safety and Health Manual*. Hazardous waste can be stored in the following units:

  (a) Containers. Hazardous wastes at EPA facilities are most commonly held in containers, such as glass solvent jugs, plastic jerry cans, and 55-gallon drums. Containers in accumulation areas must be left closed except when adding or removing waste, must be in good condition, must be compatible with the waste they contain, and must be inspected weekly. Sufficient space must be allowed, or a protective barrier installed, so that incompatible wastes (e.g., oxidizers and ignitables) can be separated by a safe distance or means. Container management areas should have sufficient capacity to contain at least 10 percent of the volume of containers or the volume of the largest container to be accumulated, whichever is greater. The base of the containment system must be free of cracks and gaps and be sufficiently impervious to contain leaks or spills until the collected material is detected and removed. If ignitable or reactive wastes are generated, the accumulation facility or area must be located at least 50 feet from the facility's property line.

  (b) Tanks. Tanks and ancillary equipment (tank systems) must be properly installed and kept in good condition. The installation of hazardous waste tanks shall provide for sufficient area for visual tank inspection. Personnel must inspect tank system integrity and monitoring equipment daily. Tank systems at LQG facilities must have appropriate secondary containment (e.g., double-walls, dikes, berms) in case of tank system failure (40 CFR Part 265, Subpart J). If ignitable or reactive wastes are intended for management within tank systems, a minimum distance of 50 feet from the property boundary shall be maintained.

  (c) Other Accumulation Units. LQGs are also permitted to store hazardous wastes on drip pads or within containment buildings and must follow the specific standards for these storage units (40 CFR §262.34(a)).

- Emergency Preparedness and Response. Aisle space in hazardous waste accumulation areas shall be sufficient to allow for container inspection and for the unobstructed movement of personnel and emergency equipment. State regulations may indicate exact distances.

  Fire extinguishers and other fire control equipment shall be available at hazardous waste accumulation points. Water must be available in sufficient volume and at sufficient pressure to facilitate fire-fighting operations (for example, sprinklers and hose streams). In addition, other safety equipment such as eyewashes and safety showers shall be

provided in accordance with the provisions of Chapter 4 of the *Safety and Health Manual*.

Two-way communications, such as radios or telephones, and alarm systems to initiate emergency response shall be immediately available to hazardous waste accumulation areas (see 40 CFR §265.32).

- Employee Training. SQG facilities must provide basic training to their employees that makes them thoroughly familiar with proper waste handling and emergency procedures relevant to their responsibilities (40 CFR §262.34). LQGs shall develop a full training program in proper waste management and emergency procedures for their employees and review this training on an annual basis (40 CFR §262.34). Training for LQG employees must be documented and those records kept on file.

Facility managers may follow reduced standards when certain materials are sent for recycling. A facility handling any of these special waste streams under separate guidelines must consider those standards within their facility design plan. Items such as hazardous waste batteries, lamps, mercury thermostats, and pesticides sent for recycling can be managed under universal waste standards (40 CFR Part 273). In addition, used oil destined for recycling should be managed under the used oil management standards (40 CFR Part 279). Facilities storing used oil should also consult the requirements for petroleum storage discussed in Chapter 5 of this volume.

State requirements may also be more stringent than federal regulations. State agencies and implementing regulations shall be consulted to help identify applicable standards and determine whether requirements exceed federal regulations. Appendix C of this Manual provides a contact list of state hazardous waste management agencies.

4.5 Hazardous Waste Transporter Requirements

EPA facilities that conduct their own waste transport off site must comply with hazardous waste transporter requirements (40 CFR Part 263). Buildings serving as temporary storage areas for waste materials in transit must be considered in the design for these facilities. State implementing agencies may also have more stringent standards for transfer facilities.

4.6 Hazardous Waste Treatment, Storage, and Disposal Facilities

EPA facilities that operate long-term storage units, perform other types of treatment, or dispose of hazardous waste on site must comply with permitted or interim status facility standards (40 CFR Part 264 – Permitted; Part 265 – Interim Status).

All facilities with hazardous waste management permits or seeking permits (i.e., interim status) must comply with general facility standards, preparedness and prevention procedures, contingency plans and emergency procedures, manifest requirements, and recordkeeping guidelines. Additionally, there are specific design requirements based on the type of activity they conduct (e.g., storage, disposal) and the permitted units they operate (e.g., incinerators, landfills). To assure full regulatory compliance, permitted and interim status facility managers must consult 40 CFR Part 264/265 for all applicable federal regulations and consider these

guidelines in their facility design. Facilities must also consult state implementing agencies to identify more stringent state hazardous waste management requirements.

To apply for a permit to treat, store, or dispose of hazardous waste, facility managers must submit applications to their implementing agency following specific regulatory procedures. Permits must be granted to the facility prior to beginning these types of operations (40 CFR Part 270).

4.7 Hazardous Waste Minimization

Hazardous waste generator facilities and treatment, storage, and disposal facilities must make efforts to minimize hazardous wastes generation and disposal through source reduction and recycling efforts. Generators must certify on hazardous waste manifests that they make efforts or have programs in place to minimize hazardous waste generation at their facility. Treatment, storage, and disposal facilities are required to certify annually that they have waste minimization programs in place and maintain this certification in their operating record.

Facility managers should design waste minimization programs that set explicit goals for reducing the volume and toxicity of wastestreams, that encourage personnel input on ways to meet these goals, and that recognize individual and collective accomplishments in meeting goals. Managers should characterize waste generation amounts and toxicity as well as quantify waste management costs. They should use this information to identify activities that produce the most wastes and take opportunities to prevent waste generation and toxicity at these points, thereby reducing management costs. Managers should additionally exchange technical information with other facilities to foster their own minimization and recycling programs. Finally, facility managers should conduct assessments of program effectiveness and implement any recommendations identified in these assessments that will lead to minimization improvements.

4.8 Solid Waste Management

EPA facilities generate a variety of nonhazardous waste such as office trash, used packing materials, discarded equipment, and other garbage. Facilities must comply with requirements related to the collection and storage of this solid waste as well as regulations regarding its proper disposal (40 CFR Part 243).

- Storage. Facility design shall provide for adequate size and number of waste storage areas. These areas must be designed such that the waste stored will not constitute a fire, health, or safety hazard. Solid waste must be stored in ways that prevent a nuisance (e.g., odors) and in ways that do not attract vectors (e.g., animals or insects). Facilities shall also arrange for solid waste collection with sufficient frequency to inhibit the creation of such nuisances or attraction of such vectors.

- Disposal. EPA facilities will generally not have their own on-site solid waste disposal units. Facilities must arrange to have their wastes disposed of through municipal or private haulers at municipal solid waste landfills or another approved disposal facilities. Some materials may be prohibited from disposal in municipal landfills, and facility

personnel shall determine if there are any wastes they cannot dispose of in their regular trash according to local solid waste regulations.

- Recycling. The facility shall be designed to support an aggressive solid waste recycling plan during construction and after occupancy. The facility design shall properly locate, and provide for, spaces that facilitate the collection, separation, compaction, storage, shipment and composting of all recyclable materials. General office space, freight elevator area, shipping and storage area, and loading docks shall be designed with this important activity in mind.

Chapter 5 - Petroleum Storage

5.1 Purpose

This chapter outlines the requirements for petroleum tank storage at EPA facilities. Specific areas covered by this chapter include underground storage tank (UST) and aboveground storage tank (AST) standards, and spill prevention, control and countermeasure (SPCC) requirements.

5.2 References

Unless otherwise specified in this Manual or approved by the Architecture, Engineering and Asset Management Branch (AEAMB) and the Safety, Health and Environmental Management Division (SHEMD), all tank designs and installations shall conform to the applicable requirements of 40 CFR Part 280, 40 CFR Part 112, NFPA 30, 29 CFR Part 1910, and state and local requirements

5.3 General Requirements

Prior to determining the tank specifications and design, the following requirements shall be assessed and considered.

- Type of material. The type of material and the composition of the substance requiring storage shall be assessed. Tank compatibility with the substances to be stored shall be determined. Other characteristics of the material to be assessed may include specific gravity, immiscibility in water, and volatility of vapor level detection in soils.

- Volume and throughput requirements. The amount of material to be stored at any one time and the rate of material usage shall be determined. The maximum length of time the material may be needed and the rate of material usage during emergency situations also shall be determined.

- Surrounding conditions. The surrounding conditions of the tank and associated piping shall be addressed, including maximum and minimum operating and exposure temperatures; soil type and background levels of contamination relative to the material to be stored; groundwater level; proximity to navigable waters, adjacent property, and buildings; and location of floodplain, utility lines, and service points. If a tank system is to be upgraded, the age, as-built design specifications, current tank conditions, and contents will need to be determined.

- Nature of activity. Whether the tank under consideration is a replacement tank, an upgrade project, or a new installation is critical to determining the design and performance criteria. For logistical consideration of installation sequence and location, it should be established whether the tank is replacing an existing UST or AST. Also, if a tank is being replaced, the closure method should be assessed because this may impact the location of the replacement tank.

5.4 Underground Storage Tanks (USTs)

5.4.1 GENERAL

EPA defines a UST as any tank, including associated piping, that has at least 10 percent of its volume underground. Generally, if the tank bottom cannot be seen, it likely meets the UST definition. The federal UST provisions of 40 CFR Part 280 apply to underground tanks storing petroleum and hazardous substances, with the following exceptions:

- Tanks with a storage capacity of less than 110 gallons
- Tanks storing heating oil used on the premises where stored
- Tanks on the floor or above underground areas (i.e., visual inspection is feasible)
- Septic tanks and systems for collecting stormwater and wastewater
- Oil-water separators
- Emergency spill and overfill tanks
- Flow-through process tanks.

Additionally, states may establish regulations that prescribe more stringent UST design standards. See Appendix B for state UST contact information.

5.4.2 LOCATION

USTs shall be located in consideration of existing building foundations. All USTs shall be set on firm foundations. Distance or clearance of USTs from buildings should be in accordance with section 2-4 of NFPA 30, including those requirements described below:

- For areas subject to traffic, the UST shall be protected with 3 feet of earth or with 18 inches of earth well tamped and 6 inches of reinforced concrete;
- For tanks storing Class I liquids, the distance from any part of the tank to the nearest wall of any basement or pit shall not be less than 1 foot, and the distance to any property line that may be built upon, not less than 3 feet;
- For tanks storing Class II or III liquids, the distance from any part of the tank to the nearest wall of any basement or pit or to the nearest property line shall not be less than 1 foot.

5.4.3 DESIGN STANDARDS

All tanks and piping shall be designed according to 40 CFR Part 280, including referenced national consensus standards (e.g., American Petroleum Institute standards), 40 CFR Part 112, NFPA 30, 29 CFR Part 1910, and state and local requirements. Specific UST system design requirements include:

- Corrosion Protection. All parts of the UST system that are underground and routinely contain petroleum must have corrosion protection. This includes the tank, associated piping, and any metal components (e.g., connectors, joints, fittings, and pumps). For new UST systems installations, tank systems (including piping) must be constructed of fiberglass-reinforced plastic or other noncorrodible material. Existing tanks made of corrodible material (e.g., steel) must be provided cathodic protection. Approved cathodic protection shall be designed in accordance with 40 CFR §§280.20(a)(2) and (b)(2). Methods of cathodic protection include:

  (1) Sacrificial Anode Systems: Facilities must test the systems in accordance with nationally recognized practices, such as those developed by the National Association of Corrosion Engineers. Qualified corrosion testers must test the system within 6 months of installation, at least 3 years after a previous test, and within 6 months of any repairs to a UST system. Facilities must keep the results of at least the last two tests on file.

  (2) Impressed Current Systems: Facilities must ensure performance by using the same testing standards and schedule as sacrificial anode systems. Facility personnel must inspect the impressed current rectifier at least every 60 days, keeping records of at least the last 3 rectifier readings. Personnel must keep the impressed current rectifier operating at all times.

  (3) Internally Lined Tanks: This option is only available for tanks installed before December 22, 1988. Within 10 years after lining installation and at least every 5 years thereafter, a trained professional must internally inspect the lining in accordance with standard codes of practice. Facilities must keep records as specified by industry standards for lining inspections.

- Spill and Overfill Equipment. Spill and overfill protection equipment is required if the UST ever receives more than 25 gallons at a time. Facilities must attach spill prevention equipment (e.g., spill catchment basins or buckets) to prevent the release of product when the transfer hose is detached from the fill pipe. Overfill prevention equipment shall be installed to accomplish one or more of the following:

  a. Automatically shut off flow into the tank at 95 percent capacity

  b. Alert the transfer operator at 90 percent capacity with a high-level alarm or flow gauge

  c. Restrict flow 30 minutes prior to overfilling

  d. Alert the transfer operator with high-level alarm 1 minute before overfilling

  e. Automatically shut off flow to prevent tank-top fittings from product exposure.

  Facilities must ensure that the chosen overfill system is functioning properly by having a qualified inspector periodically examine the system. Personnel should also properly

maintain the spill equipment empty of liquids; periodically check the catchment basin to remove any debris; and periodically inspect the device to ensure that it is liquid tight.

Personnel should post signs that delivery persons can easily read, alerting them of the overfill devices and alarms in use at the facility.

- Secondary containment. Secondary containment must be provided for new petroleum-hazardous-substance tanks installed at EPA facilities so that the tank system can contain any released product until the product is detected and removed, thereby preventing the release of regulated substances into the environment. Double-walled tanks should be provided to contain a release from the inner tank and to allow for the detection of the failure of the inner wall.

- Vent pipes. Vent pipe requirements for USTs should be in accordance with NFPA 30, including those requirements described below:

  (1) For Class I liquid tanks, vent pipes shall be located so that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 feet above the adjacent ground level;

  (2) For tanks containing Class II or III flammable liquid, vent pipes from tanks shall terminate outside of buildings and higher than the fill pipe opening, with outlets above normal snow level. Normal snow level can be calculated by using the method presented in the International Building Code or another nationally recognized method.

- Tank openings. Connections and openings for gauging, vapor recovery, and fill pipes should be designed in accordance with NFPA 30, including, but not limited to, the requirements described below:

  (1) Connections for all tank openings and manual gauging openings should be liquid tight.

  (2) Fill and discharge lines shall enter through the top, and fill lines shall be sloped toward the tank. Fill pipes that enter through the top shall terminate within 6 inches of the tank bottom.

  (3) Class I liquid tanks having a capacity of greater than 1,000 gallons shall be equipped with a tight fill device for connecting the fill hose to the tank

  (4) Valves, openings, and connections for tanks equipped with vapor recovery shall be designed in accordance with NFPA 30 and any other applicable requirements.

- Release Detection. All UST systems must be provided a method or combination of methods that can detect a release from any portion of the tank. The release detection method must be installed, calibrated, operated and maintained in accordance with the manufacturer's instructions and must meet the requirements of 40 CFR §280.43 and §280.44. The chosen method must be capable of detecting a leak rate with a probability

of detection (Pd) of 0.95 and a probability of false alarm (Pfa) of 0.05. Facilities should have documentation from the manufacturer, vendor, or installer indicating that the method can meet the performance requirements. Acceptable methods of release detection include:

(1) Automatic tank gauging (ATG) systems
(2) Secondary containment with interstitial monitoring
(3) Vapor monitoring
(4) Groundwater monitoring
(5) Agency approved methods that meet the performance standard (e.g., statistical inventory reconciliation).

The following release detection methods can also be used under certain conditions:

(1) Tank Tightness Testing with Inventory Control: This method is generally allowed for only 10 years (40 CFR §280.41). After such time, facilities must switch to one of the more permanent methods listed above.

(2) Manual Tank Gauging: Tanks of 1,000 gallons or less can use this method as the sole release detection method. Tanks with capacity between 1,001 and 2,000 gallons can use this method if combined with periodic tank tightness testing. Tanks with volumes greater than 2,000 gallons cannot use manual tank gauging as a method of release detection.

For piping associated with a UST system, the following release detection requirements must be met:

(1) Pressurized piping: Pressurized piping must have an automatic line leak detector (LLD) that can detect a leak within 1 hour at least as small as 3 gallons per hour at 10 pounds per square inch line pressure. Upon detection, the system must restrict product flow, shut off product flow, or trigger an audible or visual alarm. Pressurized piping must also have either an annual line tightness test conducted in accordance with 40 CFR §280.44(b) or one of the permanent monthly monitoring methods for tanks (i.e., secondary containment, groundwater or vapor monitoring, or an agency approved method meeting the performance criteria).

(2) Petroleum suction piping requires an annual line tightness test that meets the standards of 40 CFR §280.44(b), or one of the permanent monthly monitoring methods for tanks (i.e., secondary containment, groundwater or vapor monitoring, or an agency approved method meeting the performance criteria). Suction piping does not require release detection if the following conditions are met:

- Below-grade piping operates at less than atmospheric pressure
- Below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if suction is released

- Only one check valve is included in each suction line
- The check valve is located directly below, and as close as practical to, the suction pump
- A method is provided that allows compliance with the above conditions to be readily determined.

5.4.4 INSTALLATION AND CERTIFICATION

All tanks and piping must be properly installed and tested in accordance with the manufacturer's instructions. The following installation procedures may be used:

- American Petroleum Institute Publication 1615, *Installation of Underground Petroleum Storage System*
- Petroleum Engineers Institute Publication RP100, *Recommended Practices for Installation of Underground Liquid Storage Systems*
- ANSI standard B31.4, *Liquid Petroleum Transportation Piping System.*

One of the following testing, inspection, and certification methods should be used to demonstrate the proper installation:

- The installer shall be certified by the tank and piping manufacturers or by the implementing agency
- The installation shall either be inspected and certified by a registered professional engineer with education and experience in UST system installation or shall be inspected and approved by the implementing agency
- The manufacturer's installation instructions (e.g., tank tightness tests, verification of fitting and tank integrity, ventilation of tank position and anchors, validating cathodic protection) have been performed and completed.

All UST system repairs must be made in accordance with 40 CFR §280.33 and nationally recognized standards or according to independent laboratory testing requirements. Within 30 days of repair completion, all repaired UST systems must be tightness tested in compliance with 40 CFR §280.43(c) and §280.44(b).

5.4.5 CLOSURE

USTs may be closed either temporarily or permanently in accordance with the following requirements:

- Temporary Closure. USTs may be closed temporarily under certain conditions. Operation and maintenance of corrosion protection and release detection must continue during temporary closure. If the UST is temporarily closed for 3 months or more, lines and pumps must be capped and secured, and vent lines left open.

- Permanent Closure. Facilities must notify the UST regulatory agency at least 30 days prior to final closure. Facility personnel must conduct a site assessment to determine if contamination is present. The UST must be excavated and removed or left in place and filled with an inert substance, such as sand or gravel. Facilities must keep closure documentation for 3 years, or mail the records to the appropriate UST agency.

5.5 Aboveground Storage Tanks (ASTs)

Facilities must design all aboveground tanks (ASTs) and piping according to 40 CFR Part 112, NFPA 30 (Section 2.2), 29 CFR Part 1910, American Petroleum Institute standards, and state and local requirements. Many states have adopted fire codes, technical standards, and permitting or registration requirements to regulate ASTs. The most common provisions are secondary containment standards, such as dike construction, impervious lining, and volume capacity requirements. Other requirements include release detection, corrosion protection, overfill protection, piping and valve standards, as well as impermeable barriers or double bottoms for new ASTs. Chapters 2 and 3 of NFPA 30 include the following requirements for ASTs exceeding a 660-gallon capacity:

- Location and spacing of ASTs shall be in accordance with NFPA 30
- Liquefied propane gas (LPG) containers shall be separated from flammable or combustible-liquid storage tanks by 20 feet
- Volume of diked area shall not be less than the capacity of the largest tank within the diked area and should meet other NFPA 30 requirements
- Tanks taken out of service or abandoned shall be emptied of liquid, rendered vapor-free, and safeguarded against trespassing
- When vent pipe outlets for tanks storing Class I liquids are adjacent to buildings or public ways, vents should discharge 12 feet above ground level. In addition, facilities must consider the placement of vent pipe outlets relative to building air intakes.

AST design requirements associated with spill prevention, control, and countermeasures (40 CFR Part 112) are described later in this chapter.

5.6 Inside Tanks

Tanks shall not be permitted inside buildings unless the storage of liquids in outside underground or aboveground tanks is not practical because of government regulations, temperature considerations, or production considerations. In such circumstances, facilities shall design and maintain the tanks in accordance with 29 CFR Part 1910 and NFPA 30 where applicable. Chapter 4 of the *Safety and Health Manual* discusses in more detail the requirements such as separation, location, and ventilation of inside chemical storage areas.

5.7 Spill Prevention and Control Planning

EPA facilities that meet the applicability criteria of 40 CFR Part 112 shall determine the potential spill risks associated with storing petroleum and hazardous substances and shall perform an assessment of the magnitude of these risks to facilitate effective prevention and control planning. Facilities must comply with the spill prevention control and countermeasures (SPCC) requirements if both of the following conditions describe the facility operations:

- The facility is a non-transportation-related fixed facility that could reasonably expect to discharge oil into or upon navigable waters of the U.S. or adjoining shorelines.

- The facility has 1) a total aboveground oil storage capacity of more than 1,320 gallons; or 2) a total underground buried storage capacity of more than 42,000 gallons.

Facilities that meet the above criteria must comply with the following design and operational requirements:

- Determination of potential spill risks. Potential spill risks are presented by petroleum storage vessels of all kinds, including aboveground, underground, and internal storage tanks; container and drum storage areas; flow systems (valves and controls); receiving and shipping terminals; waste treatment and disposal areas; and large mineral oil transformers. An accurate inventory of these spill risks shall be documented, including the tank area, size, volume, storage capacity, contents, and function. A facility layout shall be prepared identifying the spill risk areas and probable dispersion pathways, topography, facility boundaries, and all buildings and structures. The preventive systems, sources of water for fire fighting, and service and emergency facilities relative to the spill risk areas shall be clearly represented in the layout. Major community receptors related to the spill risk area shall be represented on the layout or on a separate layout.

- Risk assessment. Spill prevention and control planning requires performance of a risk assessment of the type of material storage, the quantity and type of material, and the incompatible surrounding storage conditions. There should be an evaluation of whether multiple or single releases could occur and what impact the release would have given the potential exposure pathways, direction and rate of spill flow, and the sensitive environmental areas and natural resources surrounding the storage area and facility. Sensitive environmental areas may include waterways, wetlands, recreational and park areas, forests, and wildlife sanctuaries. Natural resources, such as fish and wildlife, forest, waterways, agriculture, and groundwater critical to the local community, shall be assessed and the required measures taken to mitigate risk.

- Secondary containment for covered facilities. Facilities shall have appropriate secondary containment or diversionary structures to prevent discharged petroleum products from reaching navigable waters. For onshore facilities these may include, but are not limited to, dikes, berms, and retaining walls; curbing; culverts, gutters, or other drainage systems; weirs, booms, or other barriers; spill diversion ponds; retention ponds; and sorbent materials. (See memorandum from Don Clay on the Use of Alternative

Secondary Containment Measures at Facilities Regulated Under the Oil Pollution Prevention Regulation [40 CFR Part 112] in Appendix F of this Manual.)

- Secondary containment for bulk storage tank systems. Bulk storage tanks shall be compatible with the material stored and provide secondary containment for the entire contents of the largest tank plus freeboard for precipitation. These tanks shall include drainage and alternative containment, high-liquid-level alarms and pump, communication, and liquid-level sensors and gauges in accordance with 40 CFR §112.8(c). Facilities must position portable tanks to prevent spills from reaching navigable waters and away from areas prone to flooding.

- Drainage systems. Facilities must control drainage of diked storage areas by using manual open/close valves. Undiked areas must drain into ponds, lagoons, or catchment basins that are designed to avoid flooding. Facilities shall use a diversion system to retain uncontrolled spills when there is final discharge of all in-plant ditches. In addition, facilities shall create treatment units for drainage, which can be used for gravity flow or backup pumping systems. Drainage areas shall prevent oil from reaching navigable waters in the event of equipment failure or human error.

- Security. Security measures for tanks must follow the provisions of 40 CFR §112.7(g), including, but not limited to, fencing, entrance gates with locks, locking valves and pump controls, capped, locked and marked transfer points, and adequate lighting for visibility at night.

- Facility transfer operations. Aboveground pipelines shall be properly located allowing for regular integrity and leak inspections. Pipe supports shall avoid abrasion and corrosion and allow for expansion and contraction. Newly installed or replacement buried piping must have a protective wrapping and coating. If a pipeline is expected to be out of service for an extended period of time, facilities must cap and/or blank flange the terminal connection design of the transfer point and mark the origin.

Chapter 6 - Toxic Substances Management

6.1 Purpose

This chapter describes standards for the safe management of hazardous and toxic substances, including polychlorinated biphenyls (PCBs), mercury, asbestos, radon, and lead.

6.2 References

Unless otherwise specified, management and abatement of toxic substances shall follow the guidelines specified in this chapter and the following guidance documents:

- *Guidance for Controlling Asbestos Materials in Buildings*, EPA560/5-85-024 (July 1985)
- *Managing Asbestos in Place: A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials*, EPA 20T-2003 (July 1990)
- *Policy and Program for the Management of Asbestos-Containing Building Materials at EPA Facilities*.

6.3 Polychlorinated Biphenyls (PCBs)

The Toxic Substances Control Act (TSCA) Section 6(e) prohibits the manufacture, processing, and distribution in commerce of PCBs after 1978. Therefore, EPA facilities shall not install PCB-containing transformers, capacitors, switches, or other types of electrical equipment. All dielectric fluid-containing equipment currently in use, including transformers and capacitors manufactured before 1978, must be evaluated to determine PCB content. Equipment found to contain PCBs must be labeled in accordance with 40 CFR §761.40 and registered and should be prioritized for removal.

Light ballasts used within fluorescent light assemblies may also contain PCBs if manufactured before 1978. Such ballasts must be evaluated for PCB content upon removal for routine maintenance or as part of formal energy conservation upgrades (e.g., Energy Star upgrade projects). PCB concentration information can often be obtained by contacting the ballast manufacturer and providing the equipment lot and serial number. Ballasts can generally be sent to municipal landfills, but preference should be given to PCB ballast recycling and recovery facilities. Ballasts found to be leaking must be sent to an approved TSCA facility (See Appendix F - Lighting Waste Guidance).

PCBs may also be present in EPA laboratories as analytical standards. For analytical standards with concentrations of 50 ppm or greater, the storage container/area must be marked with the PCB label. All PCB wastes resulting from research activities (e.g., spent laboratory samples, residuals, contaminated pipettes) must be stored and disposed appropriately as described below.

Special handling and storage requirements apply to any waste material with a concentration greater than 50 ppm of PCBs. PCB containers and PCB items containing over 50 ppm of PCBs

may be stored for up to one year prior to disposal. Storage facilities must meet the following design requirements:

- Be protected by roof and walls to prevent the infiltration of rainwater or runoff of PCBs, and have smooth, impervious flooring without drains, cracks, or expansion joints
- Have continuous curbing of a minimum 6-inch height sufficient to contain at least 25 percent of the volume of containers being stored
- Have posted on the outside entrance of the facility or area the official PCB mark shown in 40 CFR §761.45.

In addition, PCB storage areas must be inspected at least every 30 days and records of the inspections must be maintained. EPA allows for temporary storage (up to 30 days) of PCB wastes in areas that do not meet the design requirements above, for provided that these temporary storage areas are labeled, and the containers marked and not leaking. SPCC plans must also be prepared and implemented for temporary storage areas where containers of liquid PCBs at concentrations between 50 and 500 ppm are stored. SPCC plans are not required for long-term storage areas. Refer to Chapter 5 of this Manual for a description of SPCC requirements.

If the facility disposes of PCB wastes, the facility must obtain an EPA identification number, prepare manifests for all PCB wastes shipped off site, and obtain certificates of disposal for all shipments.

6.4 Mercury

Mercury is a common ingredient in most energy-efficient lamps, such as fluorescent and high intensity discharge (HID) lamps. Lamps that contain enough mercury to exceed the toxicity characteristic leaching procedure (TCLP) level of 0.2 mg/L are hazardous wastes regulated under RCRA. Upon removal of mercury-containing lamps for disposal, facilities must determine if the lamps are considered hazardous by either testing the lamps or obtaining manufacturer information regarding the mercury content of the lamps.

Hazardous lamps must be managed either under the traditional hazardous waste regulations or as universal wastes. If the lamps are managed as hazardous wastes, facilities must follow the hazardous waste generator requirements described in Chapter 4 of this volume and must dispose the lamps at a hazardous waste landfill or a lamp recycling facility. Lamps may also be managed under the streamlined provisions of the Universal Waste Rule (40 CFR Part 273), created to encourage the recycling of consumer products with specific toxic or hazardous constituents. Universal waste standards require the facility to:

- Store unbroken lamps in a box or fiber drum to prevent breakage and keep that container in a secure, protected area
- Label the container “Universal Waste Lamps,” “Waste Lamps,” or “Used Lamps” and mark it with the date on which accumulation began

- Have these lamps collected by or deliver them to an authorized lamp recycler, hazardous waste transporter, or another universal waste handler within one year of the date marked on the container.

Lamp wastes generated in small quantities (see "Conditionally Exempt Small Quantity Generators" in Chapter 4 of this volume) and used lamps that do not test hazardous under RCRA can generally be disposed in a properly managed municipal solid waste landfill (RCRA Subtitle D facility). Facilities must check with state environmental agencies for information on more stringent disposal requirements.

6.5 Lead

New facility construction, modification, and renovation actions shall not use lead-based paints. When a construction activity requires sanding, burning, welding, or scraping of existing painted surfaces, the paint must be tested for lead content before any such activities begin. If any lead is found, appropriate risk-control measures must be implemented in accordance with 29 CFR §1910.1025 and 29 CFR §1926.62 for lead and 29 CFR §1926.353 for ventilation when welding or cutting.

Lead compounds in paints and other interior coatings are of particular concern in child-care facilities. In these facilities, all surface coatings should be tested for lead, and coatings should be removed if they contain lead. For further guidance, see the EPA publication *Reducing Lead Hazards When Remodeling Your Home*, EPA 747-K-97-001, September 1997.

Lead-containing plumbing, lead-based solder, lead-soldered tanks and valves shall not be used for potable drinking water supplies. Drinking water plumbing products (faucets, valves, fittings, piping) shall be prohibited from use in EPA facilities unless they bear the National Sanitation Foundation (NSF) Standard 61 certifying mark indicating compliance with the Safe Drinking Water Act.

6.6 Radon

EPA seeks to limit the presence of radon and radon daughters at EPA facilities. Building materials, such as concrete and aggregate stone, shall be selected from sources with low probability of radioactivity. Radon concentrations identified above the EPA action level of 4 picocuries per liter (pCi/L) should be addressed through appropriate engineering and administrative controls. In areas known to have high radon in structures, buildings shall be designed to include preventive techniques such as caulking of all joints between concrete slab and walls below grade, caulking of all pipe penetrations, and venting of all nonoccupied spaces below grade. Radon in drinking water supplies, measured as combined radium-226 and radium-228, shall not exceed 5 pCi/L.

6.7 Asbestos

Asbestos, and facility-related products that contain asbestos, shall not be installed in any EPA facility. Existing asbestos shall be managed in accordance with the EPA publication *Policy and*

Program for the Management of Asbestos-Containing Building Materials at EPA Facilities. Specific procedures related to asbestos-containing materials (ACM) are as follows:

- Ensure that the facility has been inspected for ACM in accordance with the EPA publication *Guidance for Controlling Asbestos Materials in Buildings*, 29 CFR §1926.58, and 40 CFR Part 61, Subpart M. Ensure that leased space is, or has been, inspected or certified for the presence of asbestos.

- If ACM is present, and if it is in good condition and is not likely to be disturbed, ensure that a management program is implemented to manage the asbestos in place in accordance with the EPA publication *Managing Asbestos in Place: A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials*.

- If ACM is present and is not in good condition or is likely to be disturbed during routine operations or construction activities, the asbestos must be abated in accordance with the EPA publication *Managing Asbestos in Place: A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials* and the criteria contained in 29 CFR §1926.58.

- Ensure that a prealteration asbestos assessment is performed, supplementing available information as appropriate, for any activity that may disturb any ACM. Conduct the asbestos assessment in accordance with the guidelines and requirements mentioned above.

Chapter 7 - Pesticides

7.1 Purpose

This chapter describes the safe handling and proper application of pesticides at EPA owned, leased or occupied facilities. Specific topics discussed in this section include pesticide storage and application, and the use of integrated pest management.

7.2 References

Unless otherwise specified in this Manual or approved by the Architecture, Engineering and Asset Management Branch (AEAMB) and the Safety, Health and Environmental Management Division (SHEMD), pesticide storage areas shall conform to applicable local building codes and NFPA 101. Pesticide application shall conform to applicable state standards based on 40 CFR Part 171.

7.3 Pesticide Storage

Any facility storing pesticides classified as highly toxic or moderately toxic (40 CFR Part 156), and whose labels are required to bear the signal words "Danger," "Poison," or "Warning," or the skull and crossbones symbol, should inventory and monitor its storage facilities even if application is performed by a licensed contractor. Pesticide storage areas shall be identified by signs placed on rooms, buildings, and fences to advise of the contents and warn of their hazardous nature. Signage on the outside of pesticide storage areas shall include "Danger," "Poison," or "Pesticide Storage," or use the NFPA 704 hazard classification system. Pesticide storage facilities should be designed with the following safeguards:

- Facilities should be dry, well-ventilated areas within a separate room, building, or covered area that is provided with fire protection.
- Eyewash and safety shower equipment should be available to users of the pesticide storage area (See Chapter 4 of this Manual for information on emergency equipment and showers).
- Facilities should be protected by security measures such as locks and fences to prevent unauthorized entry.
- To prevent runoff of pesticides and pesticide-contaminated residues, facilities should have secondary containment systems such as dikes, berms, or other devices that are separate from the facility sanitary sewer or stormwater collection system.
- Where feasible, a wash basin should be present for collecting and containing wastewater from decontaminating pesticide application equipment.

7.4 Pesticide Use and Disposal

Pesticide application at EPA facilities shall be conducted in accordance with the pesticide label instructions. Protective equipment shall be worn while handling and mixing pesticides. Restricted use pesticides may be applied only by or under the direct supervision of trained and certified applicators.

Disposal instructions for excess and residue pesticides are typically described on the pesticide label. All residues and rinsates should be collected and used according to their labeled application method or they should be mixed similar solutions of the pesticide. Alternatively, the pesticide residues may be given to another pesticide applicator to use according to label directions. If the pesticide is a restricted use pesticide, it can be given only to a licensed applicator. If the pesticide will be disposed, it must be sent to an approved disposal facility. Refer to Chapter 4 of this Manual for requirements for disposal of pesticides classified as hazardous wastes.

7.5 Integrated Pest Management

Integrated pest management (IPM) is an effective and environmentally sensitive approach to manage pest damage by the most economical means and with the least possible hazard to people, property, and the environment. IPM programs take advantage of all pest management options possibly including, but not limited to, the judicious use of pesticides. Prevention and control of pest populations is focused on creating inhospitable environments, by removing some of the basic elements pests need to survive, or by blocking their access into buildings. Pests can also be managed by other methods such as traps and vacuums.

EPA facilities shall consider IPM measures to reduce the need for pesticide applications, including sanitation and structural repair, and employing physical and mechanical controls such as screens, traps, weeders, and air doors. For example, special attention shall be given to minimizing development of rodent warrens (e.g., nests) in areas such as garbage collection areas, dumpsters, and cafeterias.

7.6 Antifoulant Paints

Tributyltin (TBT) compounds are registered for use in paint formulations as antifoulants on vessel hulls and other marine structures to inhibit the growth of aquatic organisms such as barnacles and algae. All TBT antifouling paints used in EPA marine vessels shall meet the following conditions to minimize potential impacts on human health and the environment:

- Average daily release rate of 4.0 mg/organism/cm^2 per day or less
- Not used on nonaluminum vessels that are less than 82 feet long (non-TBT paints must be used on these types of vessels)
- Classified as restricted pesticides (only sold to and applied by certified commercial applicators)
- Labeled in compliance with OSHA regulations

In addition, antifoulant paints containing mercury shall not be used for interior finishes, as they are intended solely for exterior applications. A list of certified antifoulant paint manufacturers can be obtained by contacting the EPA Office of Pesticide Programs, Antimicrobials Division at (703) 308-6411.

Chapter 8 – Radioactive Materials Management

8.1 Purpose

This chapter describes the methods for managing radioactive materials to ensure regulatory compliance and protection of the public, the workers, and the environment at EPA owned, leased or occupied facilities. Each EPA facility that maintains a radioactive materials license, must develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities.

8.2 References

The primary federal agency with responsibility for the management of radioactive materials is the U.S. Nuclear Regulatory Commission (NRC). NRC licenses and regulates the commercial use of radioactive materials. NRC may relinquish portions of its regulatory authority to states, referred to as Agreement States. All operations involving radioactive material shall comply with the NRC regulations listed below, as well as state and local restrictions.

- 10 CFR Part 19 – Notices, Instructions, Reports to Workers: Inspection and Investigations
- 10 CFR Part 20 – Standards for Protection Against Radiation
- 10 CFR Part 21 – Reporting of Defects and Noncompliance
- 10 CFR Part 30 – Domestic Licensing of Byproduct Material
- 10 CFR Part 71 – Packaging and Transportation of Radioactive Material

Further requirements and guidance for EPA facilities is contained in EPA Manual 1440, Volume 2, *Safety, Health and Environmental Management Guidelines.* Specifically, Section 38 *Radiation Safety and Health Protection Program* addresses practices, procedures and training to help ensure EPA workers' exposure to ionizing radiation is maintained as low as reasonably achievable (ALARA).

In addition to the regulations listed above, guidance for regulatory compliance is available in published Regulatory Guides and standards. Suggested guidance documents and applicable sections of EPA SHEMD's *Safety, Health and Environmental Management Guidelines* that offer additional resources are provided in each section.

8.3 Policy Statement

Operations involving radioactive materials handled at EPA facilities shall be conducted in accordance with this policy:

- All operations shall comply with the requirements and the intent of the facility license.
- All operations shall be performed only as directed in written procedures.
- All operations shall be performed under the direction of management.
- Personnel working with radioactive material shall be trained in the basic concepts of

radiation safety.
- All required records shall be prepared and maintained in accordance with written procedures.
- EPA is committed to the principle of keeping radiation doses to ALARA.

Section 38-06 of EPA SHEMD's *Safety, Health and Environmental Management Guidelines* addresses the dose limitation system and ALARA principles for EPA facilities. Also refer to Regulatory Guide 8.10, *Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable*, for methods for an acceptable ALARA program. Special considerations addressing the use of radioactive material is contained in the *Health Physics Manual of Good Practices for Reducing Radiation Exposure to Levels That Are As Low As Reasonably Achievable (ALARA)*, Pacific Northwest Laboratory (PNL-6577).

8.4 General Design Considerations

Design information that must be provided in license or permit applications should be reviewed to identify aspects of the design that are of particular interest to the NRC or the Agreement State, as appropriate. Consideration should also be given to configuring sample-receiving areas to accommodate the equipment to screen unknown samples for radiation contamination, as appropriate for the scope of facility operations. For a typical EPA laboratory facility, this information is available in NRC Regulatory Guide 10.7, *Guide for the Preparation of Applications for License for Laboratory and Industrial Use of Small Quantities of Byproduct Material*.

8.5 Employee Training

Section 19.12 of 10 CFR Part 19 requires that persons that may receive 100 millirem in a year be instructed in the health protection issues associated with exposure to radioactive materials or radiation. NRC Regulatory Guide 8.29, *Instruction Concerning Risks from Occupational Radiation Exposure*, describes the instruction that should be provided to the worker concerning health risks from occupational exposure.

EPA also requires sufficient training be provided to personnel working in designated radiation areas and around sources of ionizing radiation. In addition to basic radiation safety training, biennial refresher training and advanced radiation training for defined workers must be included as part of the training program. EPA SHEMD's *Safety, Health and Environmental Management Guidelines* Section 38-05 provides the knowledge base that should be demonstrated by successful completion of an examination for personnel required to attend radiation safety training.

8.6 Monitoring of Radiation

Radiation monitoring is an important element in the overall requirements for radiation protection. Requirements and guidance for monitoring are contained in EPA SHEMD's *Safety, Health and Environmental Management Guidelines* Section 38-07. Discussion includes monitoring for external and internal exposure, radon exposure, administrative control limits, contractor, and visitor monitoring. The standard ANSI N13.2-1969, *Guide for Administrative Practices in Radiation Monitoring*, also provides general guidance as to monitoring programs and should be

reviewed during the early planning stages or engineering phase of any new installation, as well as during operation, in order to provide an adequate radiation monitoring program.

EPA facilities must monitor exposures to radiation and radioactive material at levels sufficient to demonstrate compliance with dose limits established in Section 38-06 of EPA SHEMD's *Safety, Health and Environmental Management Guidelines*. EPA has established an administrative control level of 500 mrem committed effective dose equivalent from intake plus external whole-body dose in any period of 12 consecutive months.

EPA facilities with NRC licenses must also comply with the monitoring requirements of 10 CFR Part 20. Monitoring of an individual's external radiation exposure is required by 10 CFR 20.1502(a) if the dose is likely to exceed 10% of the dose limit. The personnel monitoring program must provide for a continuing review of radiation exposure to individuals with mechanisms to assure against over exposure, and periodic reports to the individuals and the NRC. The requirements for recording individual monitoring results are contained in 10 CFR §20.2106. Listed below are several Regulatory Guides that address personnel monitoring.

- Regulatory Guide 8.2, *Guide for Administrative Practices in Radiation Monitoring*
- Regulatory Guide 8.4, *Direct-Reading and Indirect-Reading Pocket Dosimeters*
- Regulatory Guide 8.7, *Instructions for Recording and Reporting Occupational Radiation Exposure Data*
- Regulatory Guide 8.28, *Audible-Alarm Dosimeters*
- Regulatory Guide 8.34, *Monitoring Criteria and Methods to Calculate Occupational Radiation Doses*
- Regulatory Guide 8.36, *Radiation Dose to the Embryo/Fetus*

Monitoring of the intake of radioactive material is required by 10 CFR §20.1502(b) if the intake is likely to exceed 0.1 annual limit on intake (ALI) during the year. Air sampling in the workplace is an acceptable method for meeting the dose assessment requirements. In addition, a bioassay program may also be used to measure the deposition of radioisotopes in potentially exposed personnel. Regulatory Guide 8.9, *Acceptable Concepts, Models, Equations, and Assumptions for a Bioassay Program*, and Regulatory Guide 8.25, *Air Sampling in the Workplace*, provide additional direction on acceptable methods for monitoring personnel internal exposures to radioactive material.

An environmental program may be established to monitor potential exposure to the public and for the radiological impact of the facility's operations. An environmental monitoring program may include effluent air samples, water samples, soil samples, and ambient radiation. Design engineers should consult the Radiation Safety Officer to determine if special considerations should be made for sampling stations.

Most EPA laboratories do not use sufficient quantities of radioactive material to require special emission control or monitoring equipment to meet established public radiation exposure limits in 10 CFR Part 20, Subpart D, beyond conventional laboratory engineering controls. Special use facilities or operations potentially handling significant quantities of radioactive materials should be evaluated on a case-by-case basis for specialized systems or controls necessary to fulfill established NRC limits in 10 CFR Part 20 or applicable license conditions.

8.7 Workplace Control for Airborne Radioactive Material

NRC requires the use of engineered controls (e.g., radioisotope fume hoods, glove boxes) as the primary means of protecting workers from exposure to airborne contaminants, including radioactive materials. Sealed sources generally require no special precautions. For the low concentrations of radioactive materials in powder or liquid form typically used at EPA facilities, the confinement afforded by a radioisotope laboratory fume hood will generally provide adequate control (see also Chapter 4 of the *Safety and Health Manual* and Section 15 of the *A&E Guidelines* for additional guidance). In general, airflow should always be from clean to contaminated areas, and ductwork and other components should include design features that minimize the potential for internal accumulation of radioactive materials as well as to facilitate decontamination. In some situations, the Radiation Safety Officer may determine that radioactive materials used by the facility are of low enough radioactivity to be used safely within a conventional laboratory fume hood.

Extensive guidance on design of systems for controlling airborne radioactive material, both in the workplace and in emissions from a facility, is available in the *Nuclear Air Cleaning Handbook*, Energy Research and Development Administration (ERDA) 76-21, and in *Nuclear Power Plant Air Cleaning Units and Components*, ANSI/American Society of Mechanical Engineers (ASME) N509.

8.8 Workplace Control for Surface Contamination

Facilities where unsealed radioactive sources or material will be used shall include design features to minimize the potential for contamination of surfaces with radioactive material and to facilitate decontamination. Construction materials and methods should be specified that minimize cracks, crevices, and porous materials that can readily accumulate contamination. Work surfaces should be sealed, and seamless flooring rather than tiles should be considered. The standards contained in ANSI N512, *Protective Coatings for Nuclear Applications,* shall be considered.

8.9 Access Control

NRC regulations contain requirements for "restricted areas." Restricted areas are defined as any area to which the facility licensee limits access for purposes of protecting individuals against undue risks from exposure to radiation or radioactive materials. Such areas, including waste storage facilities, shall be posted in accordance with the radiation caution signs specified in 10 CFR §20.1901 through §20.1903.

Activities with radioactive material shall be performed within an area where physical access can be controlled. Space may be required at the egress to the restricted area to facilitate monitoring of personnel or items for radioactive contamination. Additionally, more stringent regulatory requirements for controlling access to smaller areas within the restricted area may apply depending on the radiation levels and quantities and form of radioactive material. High-hazard facilities with containment provided within the laboratory shall consider using special engineering design features such as an airlock with interlocked doors or special air-monitoring

and warning systems. Lockable cabinets are necessary for storing radioactive materials that are not in use. Design engineers must consult with individuals familiar with both the intended use of the facility and the applicable regulatory requirements to ensure that appropriate physical access controls are included in the design.

8.10 Shielding

Special shielding may be required to limit the radiation dose rates within the restricted area to levels consistent with EPA administrative limits for occupational radiation exposure and, outside of the restricted area, to levels specified in NRC regulations. Proper shield design requires knowledge of the maximum inventory of each isotope of radioactive material and where and how it will be used or stored in the facility. High-energy electronic radiation-generating devices may also require shielding. Detailed guidance on radiation shielding design is available in ANSI N43.3, *General Radiation Safety Installations Using Non-Medical X-ray and Sealed Gamma Ray Sources for Energies up to 10 MeV* and EPA's *Safety Guidelines for the Installation and Operation of X-Ray Generating Equipment at EPA Facilities.*

8.11 Waste Management

NRC regulations 10 CFR §20.2003 impose strict conditions on the discharge of radioactive materials to sanitary sewers. In designing a new facility, determination should be made as to whether the quantities and chemical and physical forms of liquid radioactive wastes can be disposed of in accordance with those regulations. If not, a liquid radioactive waste and mixed waste storage and treatment system must be provided. Facility design should provide for segregation of radioactive waste, where practicable, from all other types of liquid wastes, particularly hazardous chemicals.

Facilities that will use solid radioactive materials, other than sealed sources, which may generate radioactive waste should be provided with adequate space for temporary storage, packaging, monitoring, and preparing shipments to an authorized disposal facility. Provisions should be made for monitoring potentially contaminated waste prior to packaging so that contaminated and uncontaminated wastes can be segregated. Depending on the types and quantities of radioactive material used in the facility, shielding and/or physical access controls may be required for the solid waste storage area.

Mixed low-level radioactive waste is regulated under both the NRC regulations and the hazardous waste management standards promulgated pursuant to the Resource Conservation and Recovery Act. Therefore, the storage and management of these wastes require compliance with the requirements of this chapter and the hazardous waste standards in Chapter 4 of this Manual. The generation of these wastes should be minimized.

8.12 Transport of Radioactive Materials

Regulations of the Department of Transportation (DOT), NRC, and the U.S. Postal Service (USPS), specify certain procedures, limits, and documentation requirements for radioactive material shipments. The DOT regulates the shipments while they are in transit, and sets standards for labeling and smaller quantity packages. The NRC oversees the safety of the

transportation of radioactive materials through a combination of regulatory requirements, transportation package certification, inspections, and a system of monitoring to ensure that safety requirements are being met. The DOT regulations for transporting hazardous materials, including radioactive materials, are contained in 49 CFR Parts 171 – 179. The NRC has the responsibility for transferring radioactive materials that exceed Type A quantities as defined in 10 CFR Part 71. In addition, the NRC is responsible for overseeing compliance of licensees for the DOT regulations involving radioactive material. Title 39 CFR Part 124 contains the USPS regulations for the transport of radioactive material through the mail.

8.13 Emergency Planning

Section 38-09 of EPA SHEMD's *Safety, Health and Environmental Management Guidelines* requires written emergency plans and procedures be developed, implemented, and executed prior to the start of work. Depending on the quantity of radioactive material that a facility is licensed to posses, an NRC approved emergency response plan may also be required. The criteria and recommendations contained in NUREG-0654/FEMA-REP-1, *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,* are considered by the NRC to be acceptable methods for complying with NRC standards that must be met in onsite and offsite emergency response plans.

The facility design should emphasize the use of prevention features to limit the release of radioactive material in the event of an incident. Prevention is the use of design features to reduce the frequency of events that could result in radiological release. Prevention features should be incorporated into the design to ensure that the operational controls important to radiological safety are not compromised during an event. The design of systems for controlling radioactive material should consider events such as loss-of-power, fire, and inclement weather to determine the impact on the safety systems ability to control radioactive material.

8.14 Recordkeeping

Radiation protection program and systems that support operations involving radioactive materials must be well documented. As part of the written radiation protection program, procedures, requirements on recordkeeping, reporting, and retention of records should be addressed in accordance with NRC regulations. During the engineering and construction phase of any new installation that supports licensed activities, the drawings and operating instructions shall be documented and verified that the system is built and operates within specifications. A compilation of all reporting requirements applicable to various types of NRC licenses is included in Regulatory Guide 10.1, *Compilation of Reporting Requirements for Persons Subject to NRC Regulations*.

In accordance with Section 38-08 of EPA SHEMD's *Safety, Health and Environmental Management Guidelines,* facilities must maintain a computer-based Radiation Safety Information System (RADSIMS) for storing exposure records for all participating EPA workers.

Chapter 9 - National Environmental Policy Act

9.1 Purpose

The purpose of this chapter is to present procedural guidance for EPA Regional Site Mangers and Headquarter's Project Mangers on the requirements of NEPA. This chapter presents information and procedures for the proper implementation of NEPA and for the integration of environmental impact analysis/assessment into EPA's project management process for property transfers, closures, acquisitions, new construction, renovations, and new additions. The strategies and procedures stated in this chapter should be used for all projects employing building and facility (B&F) funds and may be applied to projects employing alternative funding.

9.2 References

These guidelines are designed to comply with the following NEPA guidance documents, regulations, and statues. Unless otherwise specified herein, the execution of projects that are considered to be "major Federal actions," potentially causing environmental and socioeconomic consequences shall conform to the requirements of NEPA as specified below:

- The National Environmental Policy Act, 42 United States Code 4321 - 4347, as amended by Pub. L. 94- 52, July 3, 1975 and Pub. L. 94-83, August 9, 1975
- 40 CFR Part 6, Subpart I (EPA NEPA Regulations)
- 40 CFR Parts 1500 to 1508 (Council on Environmental Quality [CEQ] NEPA Regulations)
- *National Environmental Policy Act Review Procedures for EPA Facilities,* May 1998
- NEPA General Information Pamphlet, March 2001
- NEPA General Information, Regulatory Cross-Cutters, and Project Level Compliance Booklet

Basic NEPA terms used throughout this chapter are defined below in Figure 9-1. Additional terms are explained in Appendix F of the *NEPA Review Procedures for EPA Facilities*.

9.3 Overview of NEPA Process / General Program Requirements

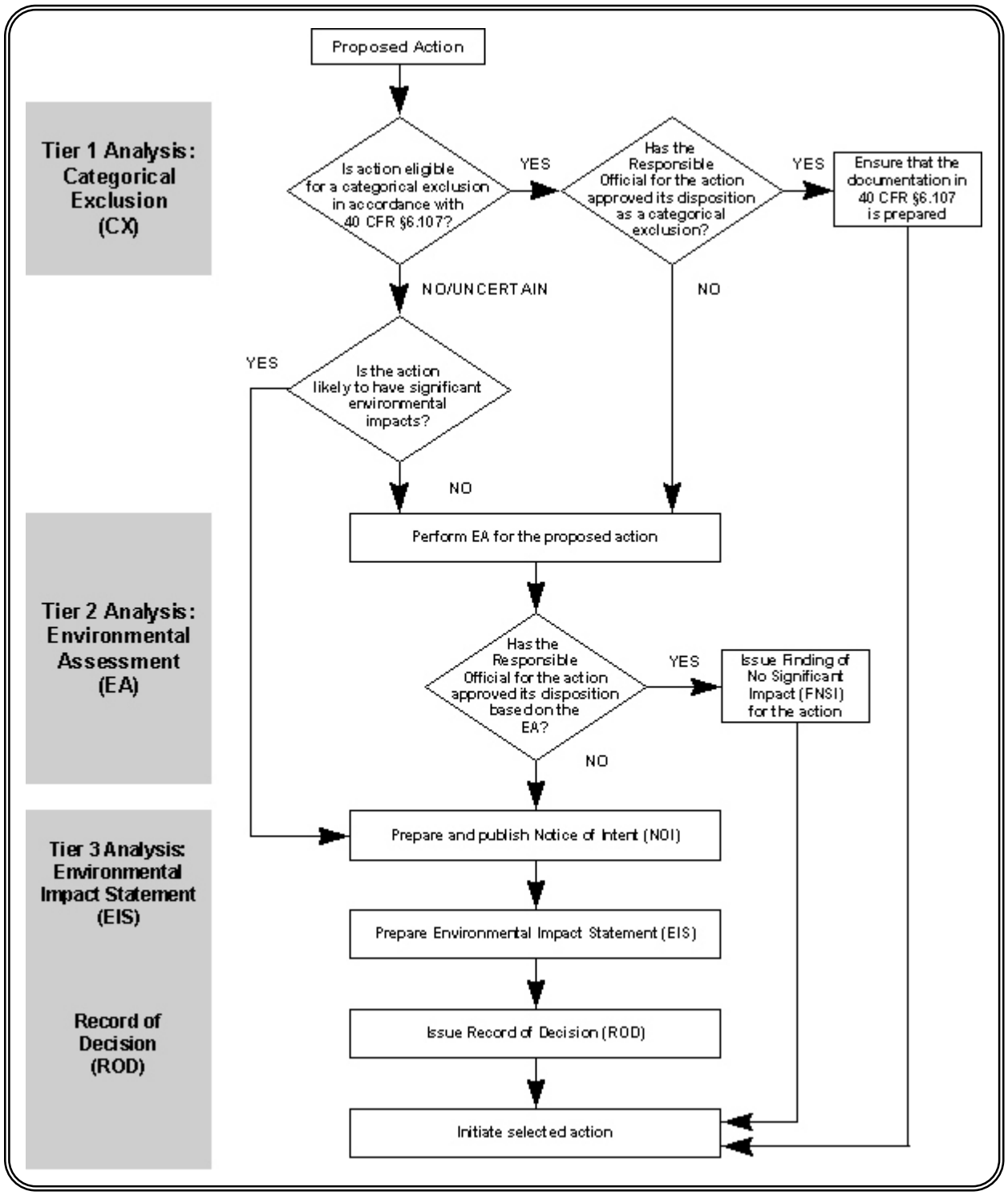
NEPA ensures that environmental impacts and associated public concerns are considered in decision of Federal projects. EPA and other Federal agencies follow a three-tiered procedures review process when an action that could affect the environment is proposed. This chapter focuses on the overall NEPA process or methodology and provides specific instruction in preparing documents for tiers 1 and 2 of the NEPA process. Figure 9-2 gives an overview of the process. Tier 1 determines whether the project qualifies for a categorical exclusion (CX). Tier 2 determines whether the project qualifies for a finding of not significant impact (FNSI) after performing an environmental assessment (EA). If no significant impacts are discovered in the EA process the project qualifies for a FNSI. If significant impacts are discovered in the EA process, an EIS must be prepared. Tier 3 entails preparing an EIS and issuing a Record of Decision (ROD). Each of these tiers is discussed in greater detail in Chapters 2 to 4 of the

National Environmental Policy Act Review Procedures for EPA Facilities and pages 4 to 21 of *Understanding the Environmental Policy Act: A Self-Study Training Booklet.*

Figure 9-1. Definitions

Categorical Exclusion (CX):	Categories of actions which do not individually, cumulatively over time, or in conjunction with other Federal, State, local, or private actions have a significant effect on the quality of the human environment and which have been identified as having no such effect based on the requirements in 40 CFR §6.505, may be exempted from the substantive environmental review requirements for this part. Environmental information documents, environmental assessments (EAs), or environmental impact statements (EISs) will not be required for excluded actions. A CX is prepared to document that a project will not cause significant environmental impacts.
Environmental Assessment (EA):	A concise document prepared to provide sufficient data, evidence, and analysis to determine whether an environmental impact statement (EIS) or finding of no significant impact (FNSI) is required for an action. Preparing a formal EA is not necessary in cases where the EPA determines that a CX is appropriate or when an EIS will automatically be prepared.
Environmental Impact Statement (EIS):	A detailed, succinct document required if Federal actions are likely to have significant impacts on the environment. The document may be directly prepared if the project is presumed to have a significant impact or if an environmental assessment (EA) determines that an EIS should be prepared. An EIS provides the public and decision makers with clear, written documentation of possible environmental effects.
Finding of No Significant Impact (FNSI):	A document providing succinct evidence of why a proposed action will not have a significant impact on the environment. An accepted FNSI nullifies the requirement for submission of an environmental impact statement (EIS).
Notice of Intent (NOI):	A brief notice placed in the *Federal Register* by EPA, notifying readers that EPA is considering a major action and that an EIS will be prepared to consider the consequences of a major Federal action. The NOI describes the proposed action and possible alternatives, details the proposed scoping process (i.e., location and time of meetings), and provides the name and address of a point of contact (POC) within EPA to answer questions about the proposed action and the EIS.
Record of Decision (ROD):	A concise, public environmental document, required under the provisions of 40 CFR §1505.2, stating the final decision on an action for which a final EIS has been prepared on a proposed major Federal action and the alternatives considered by EPA. Furthermore, a ROD states whether all precautions to avoid or minimize injury to the environment were adopted, and if not, includes a statement explaining why precautions were not taken. RODs must be made available to the public and disseminated to parties that commented on the draft and final EIS.

Figure 9-2. Overview of NEPA Process



On rare occasion, a project is granted a statutory exception (as determined by the Office of General Counsel) or an emergency deviation is granted by the Assistant Administrator of the Office of Enforcement and Compliance Assurance (OECA). Otherwise, all projects that are considered to be potential major federal actions, with potential environmental impacts are subjected to the NEPA review process. For further information on a statutory exception or an emergency deviation, see the *NEPA Review Procedures for EPA Facilities*, Chapter 2, page 2-1 and Chapter 3, pages 3-1 and 3-2.

9.4 EPA Responsibilities

AEAMB is responsible for ensuring that all construction projects comply with NEPA regulations. A responsible official is designated for each construction project. In cases where AEAMB receives and manages design and construction funding, the Chief of AEAMB is the responsible for NEPA matters. If design and construction funding is received and managed by one of the EPA Regional Offices or Laboratories, the Regional Administrator (RA) or Laboratory Director is designated responsible official or by one of EPA's Program Offices, the Assistant Administrator (AA) or an individual is designated the responsible official. If the office of Administration and Resources Management (OARM), Research Triangle Park (RTP), or Cincinnati is responsible for design and construction funding, the Directors of OARM/RTP/Cincinnati are considered the responsible officials. If the EPA is working with the General Services Administration (GSA) to construct new space, the GSA is the lead agency and will prepare the environmental documentation with the cooperation of EPA on design and use specifications. The responsible official is charged with ensuring that the procedures outlined in this manual are completed for all major action construction projects.

For further information in EPA staff roles and responsibilities, please refer to page 1-2 of the *National Environmental Policy Act Review Procedures for EPA Facilities*.

9.5 Project-Level Compliance

The NEPA review process should not be viewed as an independent activity, but rather as an integral component of a project's environmental compliance program. At the outset of a project, the NEPA the NEPA review facilitates the assessment of project-specific variables, including regulatory, environmental, and socioeconomic factors. To assist in identifying relevant project considerations, personnel overseeing NEPA review activities should consult with the appropriate Regional NEPA Coordinator (see Appendix A of the *National Environmental Policy Act Review Procedures for EPA Facilities*). These individuals represent a valuable information resource and maintain access to recent or current NEPA documentation.

Regulatory factors include those requirements that need to be considered to achieve compliance with standards, permits, and plans. Environmental factors must be evaluated to establish baseline conditions, determine site suitability, and identify potential impacts. Socioeconomic considerations include potential effects on local residential dwellings, traffic, public utilities and facilities. Figure 9-3 provides a project level compliance worksheet that can be used to prepare an initial assessment of project-specific variables. Other important factors, such as safety considerations, energy conservation, pollution prevention, or recycling programs, are also required to considered in the design and assessment of major actions.

Figure 9-3 Project Level Compliance Worksheet

Assessment Factors	Regulations		Length of Impact		Effect on Environment				Mitigation Required
	Permits	Standards	Temporary (T)	Permanent (P)	None	Moderately Adverse	Significantly Adverse	Beneficial	
I. Regulatory Factors									
A. Air Pollution Control (including CFCs)									
B. Drinking Water Management									
C. Water Pollution Control									
D. Hazardous Waste Management									
E. Solid Waste Management									
F. PCB Management									
G. Underground Storage Tank Management									
H. Radioactive Materials Management									
I. Light Emissions									
II. Environmental Factors									
A. Natural Factors									
1. Fish and Wildlife									
2. Vegetation									
3. Endangered Species									
4. Water and Hydrology									
5. Air and Noise									
6. Physiography									
7. Soils and Erosion									
8. Historical, Archaeological, Paleontological Resources									
9. Prime Farmlands									
10. Wetlands									
11. Floodplains									
12. Wild and Scenic Rivers									
13. Coastal Zone Areas									
14. Coastal Barriers Resources									
15. National Wilderness									
B. Human Factors									
1. Demography									
2. Housing									
3. Utilities									
4. Police, Fire, and Schools									
5. Social Services									
6. Recreation and Aesthetics									
7. Land Use									
8. Traffic and Transportation									
9. Quality of Life									
10. Environmental Justice									
III. Socioeconomic Factors									
A. Residential Dwellings									
B. Local Employment									
C. Public Health and Well-Being									
D. Relocation of Public Utilities									
E. Traffic and Congestion									
F. Safety									
G. Effect on Population Trends									
H. Adverse Community Reaction to the Project									

Environmental permits may be required for construction projects. EPA is responsible for preparing permit application and work with permitting authorities to identify permit conditions/considerations. Much of the data developed in support of permitting will be useful in the NEPA review process, and therefore it is critical that these two activities be closely coordinated.

9.5 Cross-Cutters

Congress has passed many environmental laws, regulations, and executive orders (EO) that address Federal responsibility for protecting and conserving special resources. These laws are generally referred to as "cross-cutters" because the requirement to comply with them cuts across all Federal programs. The cross-cutters require all Federal agencies to consider the impact that their programs that individual actions might have on particular resources to document such consideration as part of the agency's decision making process. Generally, the process involves coordination with the agencies administering the cross-cutters, and providing an opportunity for public comment before making a decision on an action. The evaluation that is conducted under cross-cutters is usually integrated with the environmental reviews carried out under NEPA to reduce paperwork and the potential for delays. Figure 9-5 gives an overview of cross-cutters applicable to EPA NEPA projects.

Figure 9-5. Cross-Cutters

LEGISLATION/ EXECUTIVE ORDER	DESCRIPTION AND INTENT	ADMINISTERING AGENCIES	IMPLEMENTING REGULATIONS
Endangered Species Act, 16 U.S.C. 1531, *et seq.*	• Ensures that Federal Agencies protect and conserve endangered and threatened species. • Prevents or requires modification of projects that could jeopardize endangered/threatened species and/or destroy or adversely modify critical habitat of such species.	• U.S. Fish and Wildlife Service • National Marine Fisheries Service	50 CFR Part 402 50 CFR Parts 450, 451, 452, and 453
The National Historic Preservation Act, 16 U.S.C. 470, *et seq.*	• Requires Federal Agencies to provide the Advisory Council on Historic Preservation with an opportunity for comment on undertaking, affecting properties listed or eligible for listings on the National Register for Historic Places.	• National Park Service • Advisory Council on Historic Preservation • State Historic Preservation Offices	36 CFR Parts 60, 61, 63, 68, 79, and 800 48 FR 190, Part IV 53 FR 4727-46
Archaeological and Historic Preservation Act, as amended, 16 U.S.C. 469-469c	• Provides for recovery or preservation of cultural resources that may be damaged by Federal construction activities. • Requires notification to the Secretary of Interior when unanticipated archaeological materials are discovered in construction.	• Departmental Consulting Archaeologist, National Park Service	36 CFR Part 800

LEGISLATION/ EXECUTIVE ORDER	DESCRIPTION AND INTENT	ADMINISTERING AGENCIES	IMPLEMENTING REGULATIONS
The Wild and Scenic Rivers Act, 16 U.S.C. 271, *et seq.*	• Prohibits Federal agencies from assisting the construction of water resource projects having direct, adverse effects on rivers listed in the National Wild and Scenic River System or rivers under study for inclusion in the system.	• National Park Service • Bureau of Land Management • U.S. Fish and Wildlife Service • Forest Service	36 CFR Part 297, Subpart A
The Fish and Wildlife Coordination Act, 16 U.S.C. 661, *et seq.*	• Protects fish and wildlife when Federal actions result in the control or modification of a natural stream or body of water. • Requires Federal agencies to consider the effect that water-related projects would have on fish and wildlife resources, take action to prevent loss or damage to these resources, and provide for the development or improvement of these resources.	• U.S. Fish and Wildlife Service • National Marine Fisheries Service	None
Executive Order 12898 – Environmental Justice	• Requires Federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations.	• Each Federal agency must prepare its own implementing procedures	None
Coastal Zone Management Act, 16 U.S.C. Section 1451, *et seq.*	• Requires Federal agencies conducting or supporting activities affecting the coastal zone to conduct/support those activities to the maximum extent possible in a manner consistent with approved state coastal management programs.	• Office of Ocean and Coastal Resource Management • National Oceanic and Atmospheric Administration	15 CFR Part 930, Subpart D 15 CFR Part 923
Coastal Barrier Resources Act, 16 U.S.C. 3501, *et seq.*	• Protects ecologically sensitive coastal barriers along the U.S. coasts. • Prohibits new Federal expenditures or financial assistance for development within the established Coastal Barrier Resources System.	• U.S. Fish and Wildlife Service	U.S. Department of Interior Coastal Barrier Act Advisory Guidelines
The Wilderness Act, 16 U.S.C. 1131, *et seq.*	• Establishes a system of National Wilderness Areas. • Prohibits motorized equipment, structures, installations, roads, commercial enterprises, aircraft landings, and mechanical transport in the National Wilderness Areas.	• U.S. Fish and Wildlife Service • Bureau of Land Management • National Park Service • Forest Service	43 CFR Parts 19 and 8560 50 CFR Parts 35, 219, 261, and 293
Farmland Protection Policy Act, 7 U.S.C. 4201, *et seq.*	• Requires Federal agencies to consider the adverse effects of their program on farmland preservation, including the extent to which programs contribute to unnecessary and irreversible conversion of farmland to non-agricultural uses.	• Soil Conservation Service	7 CFR 658

LEGISLATION/ EXECUTIVE ORDER	DESCRIPTION AND INTENT	ADMINISTERING AGENCIES	IMPLEMENTING REGULATIONS
Executive Order 11990 – Protection of Wetlands	• Minimizes destruction, loss, degradation of wetlands. • Preserves and enhances natural and beneficial values of wetlands. • Requires Federal agencies to consider alternatives to wetlands sites and limit potential damage if an activity affecting a wetland cannot be avoided.	• Each Federal agency must prepare its own implementing procedures	40 CFR Part 6, Appendix A
Executive Order 11988 – Floodplain Management	• Requires Federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with occupancy and modification of floodplains.	• Each Federal agency must prepare its own implementing procedures	40 CFR Part 6, Appendix A

Chapter 10 - Environmental Due Diligence Process

10.1 Purpose

This chapter describes the environmental due diligence process (EDDP) that must be applied when acquiring, transferring, or terminating EPA's interests in real property.

10.2 References

Unless otherwise specified, EPA real property transfers shall follow the EDDP as described in the *Guidelines for Acquiring and Transferring EPA Real Property and Complying with the Community Environmental Response Facilitation Act (CERFA)*, EPA100-B-00-002 (December 2000).

10.3 General Requirements

The EDDP requires the evaluation of the environmental condition of real property prior to transfer to allow EPA to take the appropriate steps to eliminate or minimize EPA's potential or actual environmental risk or liability associated with that real property. EPA's EDDP phase includes three phases:

- Phase I – Qualitatively characterize the site and identify any suspected areas of contamination that may require further investigation or remediation
- Phase II – Confirm the presence or absence of suspected contamination identified in the Phase I EDDP by conducting confirmatory sampling of areas of concern
- Phase III – Characterize site contaminants, develop remedial approaches and cost estimates, and perform remediation of contaminated areas.

A Phase I EDDP shall be conducted for all real property that EPA considering acquiring. The Phase I EDDP shall include a thorough and detailed records review and site investigation. The site investigation includes general observations and an evaluation of the presence of underground and aboveground tanks, waste handling practices, radioactive materials, PCBs, asbestos, lead-based paint, pesticides, radon, and sensitive environmental areas. Detailed Phase I procedures can be found in Chapter 4 of the *Guidelines for Acquiring and Transferring EPA Real Property and Complying with the Community Environmental Response Facilitation Act (CERFA)*.
Phase II EDDP activities may be needed to properly characterize the environmental condition of the property. However, if a Phase II EDDP is needed, EPA must evaluate its options on whether to move forward with the acquisition process or pursue other parcels of land. A Phase III EDDP is unlikely, since EPA generally would not acquire property found to be contaminated unless it was prepared to pay for cleanup, or able to negotiate a reduced sale price adjusted for cleanup costs.

Appendix A - List of Standards and References

Appendix A - List of Standards and References

This appendix lists the standards and references used in this Manual. Where possible, contact information is provided.

- 10 CFR Part 20, Standards for Protection Against Radiation
- 29 CFR Part 1910, Occupational Safety and Health Act of 1970
- 29 CFR Part 1960, Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters
- 40 CFR Part 6, Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy Act
- 40 CFR Part 60, Standards of Performance for New Stationary Sources
- 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants
- 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories
- 40 CFR Part 82, Protection of Stratospheric Ozone
- 40 CFR Part 112, Oil Pollution Prevention
- 40 CFR Part 141, National Primary Drinking Water Regulations
- 40 CFR Part 142, National Primary Drinking Water Regulations Implementation
- 40 CFR Part 143, National Secondary Drinking Water Regulations
- 40 CFR Part 261, Identification and Listing of Hazardous Waste
- 40 CFR Part 262, Standards Applicable to Generators of Hazardous Waste
- 40 CFR Part 263, Standards Applicable to Transporters of Hazardous Waste
- 40 CFR Part 264, Standards for Owners and Operators of Hazardous Waste Treatment
- 40 CFR Part 265, Interim Status Standards for Owners and Operators of Hazardous Waste
- 40 CFR Part 266, Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
- 40 CFR Part 268, Land Disposal Restrictions
- 40 CFR Part 270, EPA Administered Permit Programs: The Hazardous Waste Permit Program

- 40 CFR Part 273, Standards for Universal Waste Management
- 40 CFR Part 279, Standards for the Management of Used Oil
- 40 CFR Part 280, Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks
- 40 CFR 403.5(b)(2), National Pretreatment Standards: Prohibited Discharges
- 40 CFR Part 761, Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
- 40 CFR Part 1500, Purpose, Policy, and Mandate
- 40 CFR Part 1501, NEPA and Agency Planning
- 40 CFR Part 1502, Environmental Impact Statement
- 40 CFR Part 1503, Commenting
- 40 CFR Part 1504, Predecision Referrals to the Council of Proposed Federal Actions Determined to Be Environmentally Unsatisfactory
- 40 CFR Part 1505, NEPA and Agency Decisionmaking
- 40 CFR Part 1506, Other Requirements of NEPA
- 40 CFR Part 1507, Agency Compliance
- 41 CFR 101-20, Federal Property Management Regulations
- EO 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
- EO 13123: Greening the Government Through Efficient Energy Management
- EO 13148: Greening the Government Through Leadership in Environmental Management
- *Building Air Quality: A Guide for Building Owners and Facility Managers*. U.S. Department of Health and Human Services (DHHS), Center for Disease Control (CDC), National Institute of Occupational Safety and Health (NIOSH) Pub. No. 91-114
- *Criteria for Siting of Laboratory Facilities Based on Safety Environmental Factors*, prepared for U.S. EPA by Johns Hopkins University, School of Hygiene and Public Health, Peter S. J. Lees and Morton Corn, 1981
- *EPA Program for the Management of Lead-Based Paint at EPA Facilities*
- EPA *Safety, Health, and Environmental Management Guidelines*
- *Facilities Standards for the Public Buildings Service* (GSA PBS-P100)

- *Federal Facility Pollution Prevention Project Analysis: A Primer for Applying Life Cycle and Total Cost Assessment Concepts*, Office of Enforcement and Compliance Assurance, EPA
- *Flammable and Combustible Liquids Code* (NFPA 30)
- *Greening Federal Facilities: An Energy, Environmental, and Economic Resource Guide for Federal Facility Managers and Designers*, Department of Energy
- *Guidance for Controlling Asbestos-Containing Materials in Buildings*, EPA Publication 560/5-85-024, 1985
- *Guide for the Preparation of Applications for License for Laboratory and Industrial Use of Small Quantities of Byproduct Material*, NRC Regulatory Guide 10.7
- *Health Physics Manual of Good Practices for Reducing Radiation Exposure to Levels That Are As Low As Reasonably Achievable (ALARA),* Pacific Northwest Laboratory (PNL-6577)
- *Industrial User Inspection and Sampling Manual for POTWs*, EPA 831-B-94-001, April 1994
- *Installation of Underground Petroleum Storage System*, American Petroleum Institute (API) Publication 1615
- *Lead in School Drinking Water*, EPA 57019-89-001, January 1989
- Liquid Petroleum Transportation Piping System, ANSI B31.4
- *Managing Asbestos in Place, A Building Owners Guide to Operations and Maintenance Programs for Asbestos Containing Materials*, EPA Publication 20T-2003, 1990
- *NEPA Review Procedures for EPA Facilities*
- Nuclear Regulatory Commission (NRC) Regulatory Guide 10.7, *Guide for the Preparation of Applications for License for Laboratory and Industrial Use of Small Quantities of Byproduct Materials*
- *Nuclear Air Cleaning Handbook*, Energy Research and Development Administration 76-21
- *Policy and Program for the Management of Asbestos-Containing Building Materials at EPA Facilities* (July 1994)
- *Recommended Practices for Installation of Underground Liquid Storage Systems*, Petroleum Engineers Institute (PEI) Publication RP100

Most of the documents listed above can be obtained by contacting the agencies listed here. In some cases, the agency that published the document may need to be contacted.

ANSI
Attn: Customer Service
11 West 42nd Street
New York, NY 10036
(212) 642-4900
http://www.ansi.org/catalog.html

ASHRAE
1791 Tullie Circle, NE
Atlanta, GA 30329-2305
(404) 636-8400

NFPA
1 Battery March Park
P.O. Box 9101
Quincy, MA 02269-9101
(617) 770-3000
http://www.wpt.edu/nfpe/nfpa.html

National Technical Information Service
Sales Desk
(800) 553-6847

Appendix B - List of State Environmental Contacts

Appendix B - List of State Environmental Contacts

STATE	STATE AGENCIES			
	Air Management	Hazardous Waste Management	Underground Storage Tanks	Water Management
Alabama	334 271-7861	334 271-7741	334 271-7759	334 271-7823
Alaska	800 770-8818	907 269-7529	907 451-2182	907 269-7500
Arizona	602 207-2308	602 207-4105	602 207-4315	602 207-4209
Arkansas	501 682-0730	501 570-0856	501 562-0973	501 682-0656
California	916 322-2990	510 540-2122	916 341-5752	916 341-5250
Colorado	303 692-3115	303 692-3320	303 318-8547	303 692-3509
Connecticut	860 424-3026	888 424-4193	860 424-3370	860 424-3704
Delaware	302 739-4791	302 739-3689	302 395-2500	302 739-4860
District of	202 535-2257	202 535-2289	202 535-2525	202 535-2190
Florida	850 488-0114	850 921-9247	850 487-3299	850 487-1855
Georgia	404 363-7000	404 657-8831	404 657-6014	404 657-6232
Hawaii	808 586-4200	808 586-4226	808 586-4226	808 586-4309
Idaho	208 373-0148	208 373-0458	208 373-0502	208 373-0413
Illinois	217 785-4140	217 524-3300	217 785-7808* 217 785-1020**	217 782-1654
Indiana	317 232-8603	317 308-3341	317 308-3039	317 232-8603
Iowa	515 281 8034	913 551-7633	515 281-8135	515 281-4312
Kansas	913 296-1579	913 296-1608	913 296-1678	913 296-5500
Kentucky	502 573-3382	502 564-6716	502 564-6716	502 564-3410
Louisiana	504 756-0219	504 765-0355	504 765-0223	504 765-0634
Maine	207 287-2437	207 287-2651	207 287-2651	207 287-7688
Maryland	410 631-3255	410 631-3345	410 631-3442	410 631-3390
Massachusetts	617 292-5609	617 292-5574	617 887-5970	617 292-5503
Michigan	517 373-7023	800 662-9278	517 373-8168	517 373-1949
Minnesota	651 297-2274	651 297-8588	651 297-8608	651 297-2274
Mississippi	601 961-5176	601 961-5171	601 961-5142	601 961-5667
Missouri	800 361-4827	573 751-2747	573 751-6822	800 361-4827
Montana	406 444-3490	406 444-4096	406 444-0487	406 444-3080
Nebraska	402 471-2186	402 471-8308	402 471-9467	402 471-2186
Nevada	775 687-4670	702 486-2854	775 687-4670	775 687-4684
New Hampshire	603 271-1370	603 271-2942	603 271-3644	603 271-3503

* Underground Storage Tank Cleanups (EPA) ** Underground Storage Tanks (Fire Marshall)

	Air Management	Hazardous Waste Management	Underground Storage Tanks	Water Management
New Jersey	609 292-6710	609 292-9880	609 984-3644	609 292-2957
New Mexico	505 827-1494	505 827-4308	505 827-0188	505 827-0187
New York	518 402-8452	518 402-8633	618 402-9549	518 402-8233
North Carolina	919 733-7015	919 733-2178	919 733-8466	919 733-3221
North Dakota	701 328-5188	701 328-5166	701 328-5166	701 328-5210
Ohio	614 644-2270	614 644-2917	614 752-7938	614 644-2001
Oklahoma	405 702-4100	405 702-5100	405 521-4683	405 702-8100
Oregon	503 229-5359	503 229-6511	503 229-6834	503 229-5279
Pennsylvania	717 787-9702	717 787-6239	717 772-5599	717 787-4686
Puerto Rico	787 729-6951	787 767-8031	212 637-3953	787 729-6951
Rhode Island	401 222-2808	401 222-4700	401 222-4700	401 222-3961
South Carolina	803 898-4123	803 896-4172	803 896-6258	803 898-4300
South Dakota	605 773-3151	605 773-3153	605 773-3296	605 773-3352
Tennessee	615 532-0554	615 532-0829	615 532-0987	615 532-0625
Texas	512 239-1240	512 239-2334	512 239-1270	512 463-4114
Utah	801 536-4000	801 538-6170	801 538-4100	801 538-6146
Vermont	802 241-3840	802 241-3878	802 241-3882	802 241-3790
Virginia	804 698-4000	804 698-4199	804 698-4269	804 698-4002
Washington	360 407-6880	360 407-6755	360 407-6264	360 407-6405
West Virginia	304 926-3647	304 558-5989	304 558-6371	304 558-2107
Wisconsin	608 266-7718	608 266-2111	608 266-3723	608 267-7662
Wyoming	307 777-7391	307 777-7752	307 777-7095	307 777-7781

Appendix C - List of Class I and Class II Ozone-Depleting Substances

Appendix C - List of Class I and Class II Ozone-Depleting Substances

1. List of Class I Substances

From Section 602 of the Clean Air Act, and 40 CFR Part 82, Subpart A, Appendix A:

Group I	CFC-11	Trichlorofluoromethane
	CFC-12	Dichlorodifluoromethane
	CFC-113	1,1,2-Trichlorotrifluoroethane
	CFC-114	Dichlorotetrafluoroethane
	CFC-115	Monochloropentafluoroethane
Group II	Halon-1211	Bromochlorodifluoromethane
	Halon-1301	Bromotrifluoromethane
	Halon-2402	Dibromotetrafluoromethane
Group III	CFC-13	Chlorotrifluoromethane
	CFC-111	Pentachlorofluoroethane
	CFC-112	Tetrachlorodifluoroethane
	CFC-211	Heptachlorofluoropropane
	CFC-212	Hexachlorotetrafluoropropane
	CFC-213	Pentachlorotrifluoropropane
	CFC-214	Tetrachlorotetrafluoropropane
	CFC-215	Trichloropentafluoropropane
	CFC-216	Dichlorohexafluoropropane
	CFC-217	Chloroheptafluoropropane
Group IV	Carbon tetrachloride	
Group V	Methyl chloroform	
Group VI	Methyl bromide	
Group VII	$CHFBr_2$	
	CHF_2Br (HBFC-2201)	
	CH_2FBr	
	C_2HFBr_4	
	$C_2HF_2Br_3$	
	$C_2HF_3Br_2$	
	C_2HF_4Br	
	$C_2H_2FBr_3$	
	$C_2H_2F_2Br_2$	
	$C_2H_2F_3Br$	
	$C_2H_3FBr_2$	

Group VII	$C_2H_3F_2Br$	$C_3H_2F_5Br$
	C_2H_4FBr	$C_3H_3FBr_4$
	C_3HFBr_6	$C_3H_3F_2Br_3$
	$C_3HF_2Br_5$	$C_3H_3F_3Br_2$
	$C_3HF_3Br_4$	$C_3H_3F_4Br$
	$C_3HF_4Br_3$	$C_3H_4FBr_3$
	$C_3HF_5Br_2$	$C_3H_4F_2Br_2$
	C_3HF_6Br	$C_3H_4F_3Br$
	$C_3H_2FBr_5$	$C_3H_5FBr_2$
	$C_3H_2F_2Br_4$	$C_3H_5F_2Br$
	$C_3H_2F_3Br_3$	C_3H_6FBr
	$C_3H_2F_4Br_2$	

2. List of Class II Substances - (Hydrochlorofluorocarbon compounds, or HCFCs)

From Section 602 of the CAA, and 40 CFR Part 82, Subpart A, Appendix B:

HCFC-21	Dichlorofluoromethane
HCFC-22	Monochlorodifluoromethane
HCFC-31	Monochlorofluorocarbon
HCFC-121	Tetrachlorofluoroethane
HCFC-122	Trichlorodifluoroethane
HCFC-123	Dichlorotrifluoroethane
HCFC-124	Monochlorotetrafluoroethane
HCFC-131	Trichlorofluoroethane
HCFC-132b	Dichlorodifluoroethane
HCFC-133a	Monochlorotrifluoroethane
HCFC-141b	Dichlorofluoroethane
HCFC-142b	Monochlorodifluoroethane
HCFC-221	Hexachlorofluoropropane
HCFC-222	Pentachlorodifluoropropane
HCFC-223	Tetrachlorotrifluoropropane
HCFC-224	Trichlorotetrafluoropropane
HCFC-225ca	Dichloropentafluoropropane
HCFC-225cb	Dichloropentafluoropropane
HCFC-226	Monochlorohexafluoropropane
HCFC-231	Pentachlorofluoropropane
HCFC-232	Tetrachlorodifluoropropane
HCFC-233	Trichlorotrifluoropropane
HCFC-234	Dichlorotetrafluoropropane
HCFC-235	Monochloropentafluoropropane
HCFC-241	Tetrachlorofluoropropane
HCFC-242	Trichlorodifluoropropane
HCFC-243	Dichlorotrifluoropropane
HCFC-244	Monochlorotetrafluoropropane

HCFC-251	Trichlorofluoropropane
HCFC-252	Dichlorodifluoropropane
HCFC-253	Monochlorotrifluoropropane
HCFC-261	Dichlorofluoropropane
HCFC-262	Monochlorodifluoropropane
HCFC-271	Monochlorofluoropropane

The initial list under Section 602 of the CAA shall also include the isomers of the substances listed above.

Appendix D - List of Acronyms and Abbreviations

Appendix D - List of Acronyms and Abbreviations

ACGIH	American Conference of Government Industrial Hygienists
ACM	asbestos-containing materials
ADA	Americans with Disabilities Act
A&E	Architecture and Engineering
AEAMB	Architecture, Engineering and Asset Management Branch
AIHA	American Industrial Hygiene Association
ALARA	as low as reasonably achievable
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ARI	American Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
BACT	best available control technology
BAT	best available technology
Btu	British thermal units
CEQ	Council on Environmental Quality
CESQG	conditionally exempt small quantity generator
CFC	chlorofluorocarbon
CFM	cubic feet per minute
CFR	Code of Federal Regulations
cm	centimeters
CPSC	Consumer Product Safety Commission
CX	categorical exclusion
°C	degrees Celsius
DoD	Department of Defense
DOT	Department of Transportation
EA	environmental assessment
EDDP	environmental due diligence process
EIS	environmental impact statement
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
°F	degrees Fahrenheit

FM	Factory Mutual
FMSD	Facilities Management and Services Division
FNSI	Finding of No Significant Impact
fpm	feet per minute
FPMR	Federal Property Management Regulations
gpm	gallons per minute
GSA	General Services Administration
HAP	hazardous air pollutant
HAZMAT	hazardous materials
HCFC	hydrochlorofluorocarbon
HEPA	High-Efficiency Particulate Air
HFC	hydrofluorocarbon
HVAC	heating, ventilation, and air-conditioning
lbs.	pounds
LNG	liquefied natural gas
LQG	large quantity generator
LPG	liquefied propane gas
µg/L	micrograms per liter
mg/L	milligrams per liter
MVAC	motor vehicle air conditioner
NC/LC	noncombustible/limited combustible
NEC	National Electrical Code
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NOI	Notice of Intent
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NSF	National Sanitation Foundation
NSPS	New Source Performance Standards
OARM	Office of Administration and Resources Management
OSHA	Occupational Safety and Health Administration
PBS	Public Buildings Service
PCBs	polychlorinated biphenyls
pCi/L	picocuries per liter
Pd	probability of detection
PEI	Petroleum Engineers Institute

Pfa	probability of false alarm
POR	Program of Requirements
POTW	publicly owned treatment works
ppm	parts per million
RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act
RSO	Radiation Safety Officer
RTP	Research Triangle Park North Carolina
SEFA	Scientific Equipment and Furniture Association
SF	Standard Form
SFO	Solicitation for Offers
SHEMD	Safety, Health and Environmental Management Division
SHEMP	Safety, Health and Environmental Management Program
SNAP	Significant New Alternatives Policy
SPCC	spill prevention control and countermeasures
SQG	small quantity generator
TBT	tributyltin
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters Laboratory, Incorporated
UBC	Uniform Building Code
UPS	uninterruptible power supply
UST	underground storage tank
VAV	variable air volume
VOCs	volatile organic compounds

Appendix E - Lighting Waste Guidance

Appendix F - SPCC Memorandum

Index

Index

The *Environmental Management Guidelines* are indexed by major subject area. Where a topic contains only a cross-reference to another section of this manual or to another publication, the page numbers have been set in *italic* type.

United States
Environmental Protection
Agency

Air and Radiation
6202J

EPA 430-B-95-004
September 1998

LIGHTING WASTEd DISPOSALd

Upgrading a lighting system will likely involve the removal and disposal of lamps and ballasts. Some of this waste may be hazardous, and you must manage it accordingly. This document provides an overview of issues relating to the disposal of lamps and ballasts. For project-specific assistance, please refer to the information resources provided at the end of this document.

Note: The information in this document is believed to be correct as of September 1998. EPA does not provide legal advice, nor does this document. Generators of lighting wastes should check with local, state and regional authorities for the most up-to-date information.

CONTENTS

DISPOSAL OF PCB-d CONTAINING BALLASTSd

ACTION CHECKLISTd

- ✓ Investigate and follow state and local requirements for handling and disposing of ballasts.
- ✓ Identify ballasts that contain PCBs and ballasts that are leaking PCBs.
- ✓ Remove, handle, and dispose of *leaking* PCB-containing ballasts by high-temperature incineration.
- ✓ The Green Lights and ENERGY STAR Buildings Partnership recommends disposing of non-leaking PCB-containing ballasts in an environmentally responsible manner, such as by high-temperature incineration, recycling, or chemical or hazardous waste landfill.
- ✓ Maintain permanent records of PCB-containing ballast disposal.

DISPOSAL OF MERCURY-d CONTAINING LAMPSd

ACTION CHECKLISTd

- ✓ Investigate and follow state and local requirements for handling and disposing of lamps.
- ✓ If you have not tested, or have state-accepted proof, to show that your mercury-containing lamps are not hazardous, then assume they are hazardous and dispose of them as hazardous waste.
- ✓ Mercury-containing lamps that test hazardous must be handled in compliance with hazardous waste regulations.
- ✓ Maintain permanent records of mercury-containing lamps that are disposed as hazardous waste.

PCB-CONTAININGd BALLASTSd

The primary concern regarding the disposal of used fluorescent ballasts is the health risk associated with polychlorinated biphenyls (PCBs). Human exposure to these possible carcinogens can cause skin, liver, and reproductive disorders. Fluorescent and high-intensity discharge (HID) ballasts contain a small capacitor that may contain high concentrations of PCBs (greater than 90% pure PCBs or 900,000 ppm). These chemical compounds were widely used as insulators in electrical equipment such as capacitors, switches, and voltage regulators through the late 1970s.

The Toxic Substances Control Act (TSCA) was enacted in 1976, and subsequently banned the production of PCBs in the United States. The specific regulations governing the use and disposal of PCBs are found in Volume 40 Code of Federal Regulations (CFR) Part 761.

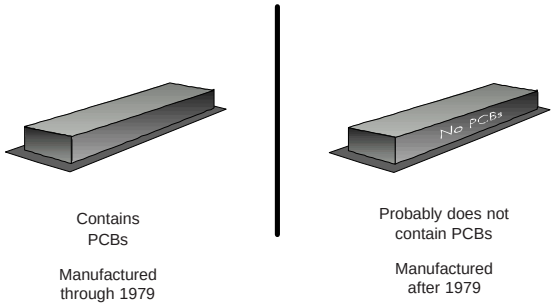
The proper method for disposing used ballasts depends on several factors, such as the type and condition of the ballasts and the regulations or recommendations in effect in the state(s) where you remove or discard them. TSCA specifies the disposal method for ballasts that are *leaking* PCBs. In addition, generators of PCB-containing ballast wastes may be subject to notification and liability provisions under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) — also known as "Superfund." To select the appropriate disposal method for PCB-containing ballasts, refer to the decision flow chart on the following page.

Because disposal requirements vary from state to state, check with regional, state, or local authorities for all applicable regulations in your area. For your convenience, information resources are listed at the end of this document.

Identifying PCB Ballastsd

Use the following guidelines to identify ballasts that contain PCBs.

- All ballasts manufactured through 1979 contain PCBs.
- Ballasts manufactured after 1979 that do not contain PCBs are labeled **"No PCBs."**
- If a ballast is not labeled "No PCBs," *assume it contains PCBs.*



Contains PCBs

Manufactured through 1979

Probably does not contain PCBs

Manufactured after 1979

It is extremely important to find out if a ballast containing PCBs is leaking *before you remove it from the fixture*, so that you can handle it properly.

Federal Requirementsd

Non-Leaking PCB Ballast Disposal

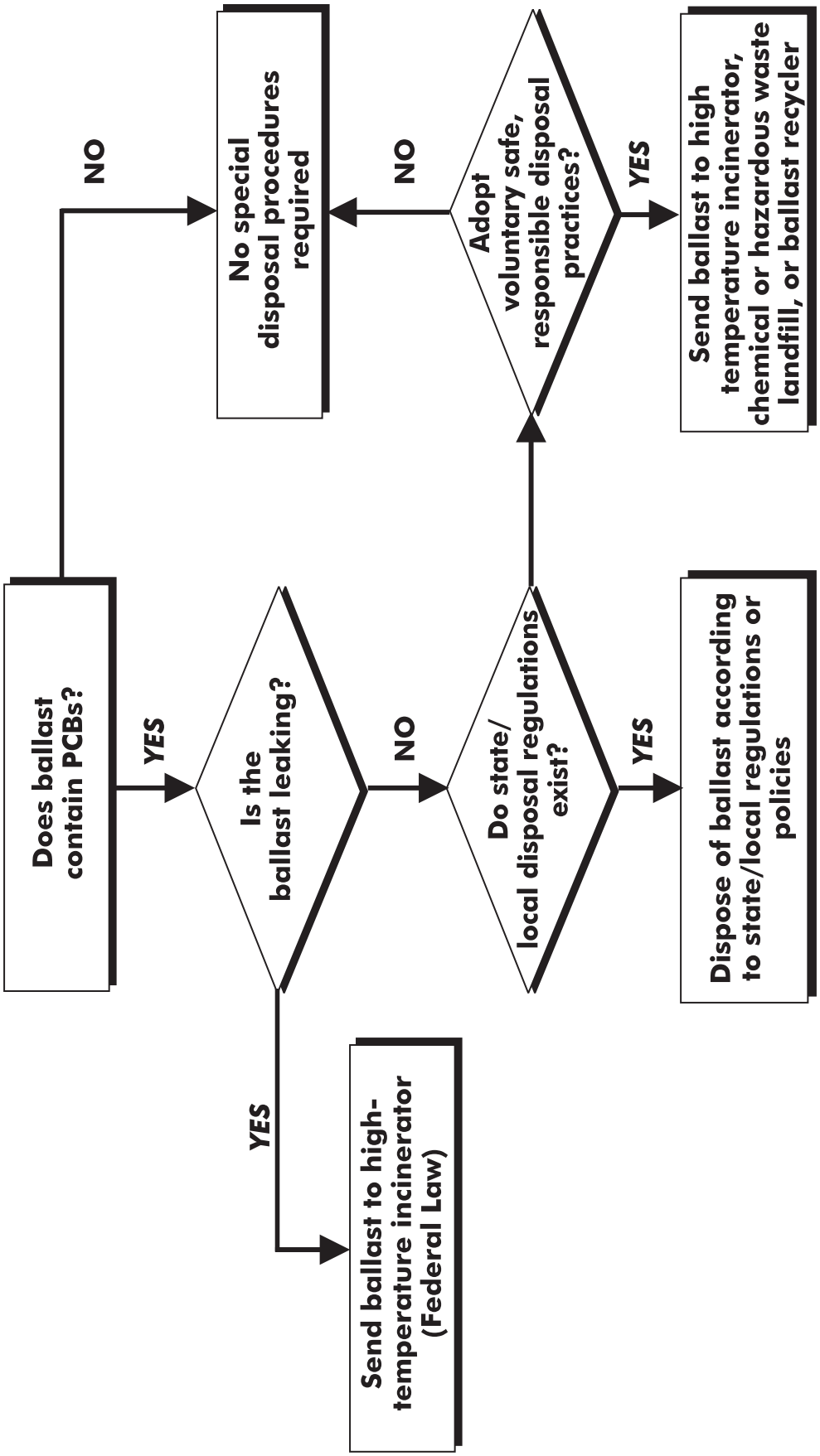
TSCA regulates ballasts that contain PCBs (40 CFR 761.60(b)(2)(ii)). Under TSCA, intact fluorescent and HID ballasts that are *not leaking* PCBs may be disposed in a municipal solid waste landfill. EPA recommends packing and sealing the intact ballasts in 55 gallon drums. Green Lights also encourages its participants to dispose of PCB-containing ballast wastes responsibly, and recommends high-temperature incineration, recycling, or a chemical or hazardous waste landfill.

In addition, CERCLA regulates the disposal of non-leaking PCB-containing ballasts. CERCLA requires building owners and waste generators to notify the National Response Center at (800) 424-8802. They must notify when disposing a pound or more of PCBs (roughly equivalent to 12-16 fluorescent ballasts) in a 24-hour period.

As a generator of PCB-containing ballast wastes, you could be liable in any subsequent Superfund cleanup at a municipal, hazardous, or chemical land disposal site, incinerator, or recycling facility.

EPA encouraged proper disposal of PCB-containing ballasts in the preamble to the 1979 PCB Ban Rule (44 FR 31514) and in the preamble to the final rule on August 25, 1982 (47 FR 37342).

"EPA encourages commercial and industrial firms that use and dispose of large quantities of small PCB capacitors to establish voluntarily a collection and disposal program that would result in the waste capacitors going to chemical or hazardous waste landfills or high-temperature incinerators."


Does ballast contain PCBs?
NO
YES
Is the ballast leaking?
YES
Send ballast to high-temperature incinerator (Federal Law)
NO
Do state/ local disposal regulations exist?
YES
Dispose of ballast according to state/local regulations or policies
NO
Adopt voluntary safe, responsible disposal practices?
YES
Send ballast to high temperature incinerator, chemical or hazardous waste landfill, or ballast recycler
No special disposal procedures required

Leaking PCB Ballast Disposal

A puncture or other damage to ballasts in a lighting system exposes an oily tar-like substance. If this substance contains PCBs, the ballast and all materials it contacts are considered PCB waste, and are subject to TSCA requirements. ***Leaking PCB-containing ballasts must be incinerated at an EPA-approved high-temperature incinerator.*** (See last section for a list of incinerators).

It is very important that you remove, handle, and dispose PCB-containing ballasts *properly*. Take precautions to prevent exposure of the leaking ballast, ***since all materials that contact the ballast or the leaking substance are also PCB waste***. Use trained personnel or contractors to handle and dispose leaking PCB-containing ballasts.

For proper packing, storage, transportation, and disposal information call the TSCA assistance information hotline at (202) 554-1404.

State Requirementsd

Non-Leaking PCB Ballast Disposal

Many states have developed regulations governing the disposal of non-leaking PCB-containing ballasts that are more stringent than Federal regulations. In addition, some EPA Regional offices published policies specifying ballast disposal methods adopted by individual states.

State standards can take several forms (e.g., written regulations, regional policies, written and verbal recommendations, transportation documentation). Some states do not regulate PCB-containing ballasts as toxic waste, but prohibit their disposal in municipal solid waste landfills. The table on the next page provides a listing of state regulations and recommendations. The last section of this document lists solid and hazardous waste agencies for states and EPA Regions.

All generators of PCB-containing ballasts should thoroughly investigate their state's regulations and follow local requirements.

Green Lights recommends three methods for disposing of *non-leaking* PCB-containing ballasts: high-temperature incineration, recycling, and chemical or hazardous waste landfill.

When upgrading lighting, make sure your contractor removes all disconnected PCB-containing ballasts from the lighting fixtures. Non-leaking PCB-containing ballasts may still be hazardous if left in upgraded fixtures, especially in case of fire.

High-Temperature Incineration

High-temperature incineration is the method preferred by many companies because it *destroys PCBs, removing them from the waste stream permanently and removing the potential for future CERCLA liability*. Incinerating a PCB-containing ballast costs more than sending it to a hazardous waste landfill, but this additional cost is one many organizations are willing to absorb.

Recycling Ballasts

Recyclers remove the PCB-containing materials (i.e., the capacitor and possibly the asphalt potting material surrounding the capacitor) for incineration or land disposal. Metals, such as copper and steel, can be reclaimed from the ballasts for use in manufacturing other products. You may recycle used non-leaking ballasts despite PCBs. The last section of this document contains a list of companies that recycle ballasts.

Chemical or Hazardous Waste Landfill

PCB-containing ballasts may also be disposed in a chemical or hazardous waste landfill. Landfill disposal is less expensive than high-temperature incineration or recycling, but does not eliminate PCBs from the waste stream permanently. While chemical or hazardous waste landfill disposal is an acceptable, regulated disposal method, your organization may be legitimately concerned about potential future CERCLA liability using this method.

Packing PCB Ballasts for Disposald

Despite the disposal method selected, ballasts are packed — according to PCB regulations — in 55-gallon drums for transportation.

- ☞ One drum holds 150 to 300 ballasts depending on how tightly the ballasts are packed.
- ☞ Fill void space with an absorbent packing material for safety reasons.
- ☞ Label drums according to Department of Transportation regulations.
- ☞ Note that tightly packed drums may weigh more than 1,000 pounds, which may present a safety risk, particularly when moving the drum for loading or unloading.

STATE REGULATIONS REGARDING BALLAST DISPOSAL

AL	In-State landfill requires prior approval. Recommend incineration or chemical waste landfill.
AR	PCB-containing ballasts tranported as hazardous waste.
CA	PCB-containing ballasts should be handled, transported, and disposed of as hazardous waste.
CO	Non-leaking PCB ballasts require prior approval from solid waste landfill operator. Leaking PCB ballasts must be sent to high-temperature incinerator in accord to TSCA regulations. Non-PCB ballasts require approval from solid waste landfill operator.
CT	PCB ballasts must be incinerated or sent to a chemical waste landfill.
DE	Ballast disposal is regulated under the Deleware Regulations Governing Solid Waste.
FL	Follow EPA Region 4 Policy. Per Florida regulations, PCB capacitors or other contaminated ballast material cannot be disposed in any solid waste management facility in Florida. Recycling of non-PCB ballast components is highly recommended.
GA	Follow EPA Region 4 Policy.
ID	PCB-containing ballasts are governed according to EPA Region 10 policy (leaking ballasts or generation of more than 5 ballasts/year must be handled as PCB waste).
IL	Leaking PCB-containing ballasts meet definition of special waste (35 IAC).
IN	Disposing > 25 non-leaking ballasts (or small capacitors) requires written approval prior to disposal at a municipal solid waste landfill. Recycling requires approval pursuant to 329 IAC 4-1-5(7) as incorporated from 40 CFR 761.60e.
KY	Recommend recycling, chemical landfill, or incineration.
LA	Ballasts may be recycled as regulated by the recycling regulations. If disposed, it is a solid waste and it must be determined if it is a hazard as specified by the Louisiana Environmental Regulatory Code.
MA	Considered hazardous waste at point of consolidation or dismantling. See DEP Policy HW 92-01.
MD	PCBs > 500 ppm regulated as acute hazardous waste. 1kg (based on entire weight of the ballasts) subject to full regulation as hazardous waste. Average limit is 1-2 ballasts.
ME	PCBs > 50 ppm regulated as hazardous waste.
MI	Follow EPA Region 5 policy.
MN	Ballasts that are NOT marked "Does not nontain PCBs" must be managed 1) as hazardous waste, or 2) according to MPCA special waste guidelines.
MO	PCB ballasts must be disposed in a chemical waste landfill or incinerated .
NC	PCB >50 ppm not allowed in municipal solid waste landfills.
ND	Encourage recycling. PCB ballasts are allowed to be disposed in permitted municipal landfills.
NJ	PCBs > 50 ppm considered hazardous waste.
NM	Follow EPA Region 6 policy.
NY	Ballast disposal must comply with 6NYCRR Part 364 (permitting of waste haulers) and 6NYCRR Part 360 (solid waste disposal).
OR	Follow EPA Region 10 policy (>5 ballasts/year must be incinerated or sent to chemical waste landfill.)
PA	PCB ballasts must go to an approved PCB disposal facility.
RI	PCBs > 50 ppm regulated as hazardous waste. No exemptions for small quantity generators of hazardous waste.
SC	PCB waste may NOT be disposed of in a municipal landfill.
SD	PCB ballasts are allowed to be disposed of at municipal landfills as long as the generator is not in the business of manufacturing these items.
TX	PCBs > 50 ppm may be disposed of at hazardous waste landfills which are also authorized for PCB disposal or at authorized hazardous waste disposal facilities.
VA	PCB-containing materials regulated as Special Solid Waste. PCBs > 50 ppm may NOT be disposed or stored without EPA approval. PCBs between 1 and 50 ppm restricted to disposal in sanitary landfills or industrial waste landfills.
VT	Intact and non-leaking PCB-containing ballasts may be managed as Universal Waste. Follow Vermont Hazardous Waste Management Regulations - 1998 Revision, Subchapter 9, Universal Waste Management Standards.
WA	Follow EPA Region 10 policy (>5 ballasts/yr must be incinerated or sent to chemical waste landfill.)
WI	Regulates all PCB-containing ballasts as hazardous waste. Recommend recycling of PCB ballasts.
WV	Follow EPA Region 3 policy. PCBs below Federal regulatory level are considered a special waste by WV Solid Waste Permit Section.
WY	Recommend recycling of all ballasts. Follow EPA Region 8 policy.

States not listed follow Federal Regulations.

PCB Ballast Disposal Costsd

High-temperature incineration and chemical or hazardous waste landfill costs can vary considerably. Disposal prices vary according to the following.

- quantity of waste generated
- location of removal site
- proximity to an EPA-approved high-temperature incinerator or chemical or hazardous waste landfill
- state and local taxes

When shopping for ballast disposal services, request cost estimates in terms of both pounds and number of ballasts. Typical F40 (fluorescent) ballasts weigh about 3.5 lbs., and F96 (fluorescent) ballasts weigh about 8 lbs. Negotiate with hazardous waste brokers, transporters, waste management companies, and disposal sites to obtain the lowest fees.

High-Temperature Incineration Costs

Incineration costs are calculated by weight.

- Costs range from $0.55/lb. to $2.10/lb.
- Average cost is $1.50/lb., which equals approximately **$5.25 per F40 ballast**.

Note: Estimated costs do not include packaging, transportation, or profile fees.

Recycling Costs

When recyclers remove the PCB-containing capacitor, the volume and weight of the ballast are reduced. This change results in lower packing, transportation, and incineration or disposal costs.

Recycling costs are calculated by weight.

- Costs range from $0.75/lb. to $1.75/lb.
- Average cost is $1.00/lb., which equals approximately **$3.50 per F40 ballast.**

Note: Recycling cost can range from $1.25 per F40 ballast (if the PCB wastes are sent to a chemical or hazardous waste landfill) to approximately $3.50 per F40 ballast (if the PCB wastes are high-temperature incinerated). Estimated costs do not include packaging, transportation, or profile fees.

Chemical or Hazardous Waste Landfill Costs

Chemical or hazardous waste landfill costs are calculated per 55-gallon drum.

- Costs range from $65/drum to $165/drum.
- Average cost is $100/drum, which equals approximately **$0.50/F40 ballast.**

Note: Estimated costs do not include packaging, transportation, or profile fees.

Transportation Costs

Transportation fees are calculated as cents per pound per mile. They vary according to (1) the number of drums removed from the site, and (2) the distance from your location to the location of the high-temperature incinerator, chemical or hazardous waste landfill, or recycler.

Transporters may need to be registered or licensed to move hazardous wastes in certain states. Documentation of the movement of hazardous waste may be required even if a state does not regulate disposal or require the use of a licensed transporter.

Profile Fees

Operators of the high-temperature incinerator or chemical or hazardous waste landfill may charge a profile fee to document incoming hazardous waste. Profile fees vary depending on the volume of waste materials generated.

- Profile fees range from $0 to $300 per delivery.
- Fees may be waived if a certain volume or frequency of deliveries is assured or a working relationship has been established with a waste management broker, lighting management company, or other contractor.

Record Keepingd

To track transported TSCA or hazardous waste, EPA requires generators to prepare a *Uniform Hazardous Waste Manifest*. The hazardous waste landfill, incinerator, or recycler that you use can provide this one-page form. The manifest identifies the type and quantity of waste, the generator, the transporter, and its ultimate destination.

The manifest must accompany the waste wherever it travels. Each handler of the waste must sign the manifest and keep one copy. When the waste reaches its destination, the owner of that facility returns a copy of the manifest to the generator to confirm that the waste arrived. If the waste does not arrive as scheduled, generators must immediately notify EPA or the authorized state environmental agency (see the last section), so that they can investigate and act appropriately.

In addition, require your contractor to provide you with documents verifying the disposal method, whether the PCBs are incinerated at high-temperatures or disposed in a chemical or hazardous waste landfill.

DEHP-CONTAINING BALLASTSd

Di (2-ethylhexyl) phathatlate (DEHP) is a substance that was used to replace PCBs in certain ballast capacitors beginning in 1979. DEHP in its pure form is listed as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). However, once it has been used in a lighting ballast, *it is no longer hazardous* as defined by RCRA. (See 40 CFR 261.33, Part 261 Appendix VII, Section 268.34, and Section 268.43.)

DEHP is regulated under CERCLA—the Superfund law. The "Reportable Quantity" (RQ) of DEHP under CERCLA is 100 pounds. (See 40 CFR, Section 302.4.) This means that if you are disposing of 100 pounds or more of the material in a 24 hour period (approximately 1,600 fluorescent lighting ballasts), you are required to notify the National Resource Center at (800) 424-8802. It also means that parties involved with the disposal of DEHP ballasts may be held liable under Superfund if clean up of the DEHP is required.

DEHP has been found in ballasts designed for the following lighting fixtures: four-foot fluorescent fixtures manufactured between 1979 and 1985; eight-foot fluorescent fixtures manufactured between 1979 and 1991; and high-intensity discharge (HID) fixtures manufactured between 1979 and 1991. Some ballasts manufactured during these periods may contain dry capacitors or substances other than DEHP. To make sure your ballasts do not contain DEHP, contact the manufacturer or send the capacitor to a laboratory for testing.

MERCURY-CONTAININGd LAMPSd

Fluorescent and high-intensity discharge (HID) lamps contain a small quantity of mercury that can be harmful to the environment and to human health when improperly managed. Mercury is regulated under RCRA, which is administered by the US Environmental Protection Agency. Under current Federal law, mercury-containing lamps — such as fluorescent and HID lamps — may be hazardous waste. In addition, incandescent and HID lamps may contain small quantities of lead that can also be potentially harmful to human health and the environment. To prevent these toxic materials from contaminating the environment, dispose of used lamps responsibly.

Federal Regulationsd

Resource Conservation and Recovery Act (RCRA)

RCRA requires generators of solid wastes containing toxic constituents (such as mercury) to determine whether or not the waste is hazardous by using generator knowledge or testing representative samples of that waste. According to RCRA, generators of used fluorescent and HID lamps are responsible for determining whether their lamp wastes are hazardous. *If you do not test used fluorescent and HID lamps and prove them non-hazardous, assume they are hazardous waste and dispose them accordingly.*

Generator Knowledge

To use generator knowledge in making a hazardous waste determination, the generator must have information on possible hazardous constituents and their quantities in the waste. Sometimes manufacturers generate solid waste as part of their manufacturing process, and can use process knowledge to determine whether the waste exhibits a characteristic of hazardous waste. However, with expired lamp wastes, the generator has little process knowledge on which to make a hazardous waste determination (since the generator is not the manufacturer). The generator could base a determination on data obtained from the manufacturer. Alternately, refer to EPA's study entitled "Analytical Results of Mercury in Fluorescent Lamps" (dated 5/15/92, available in EPA's RCRA docket).

Testing Lamps To Determine If They Are Hazardous Waste

The Toxicity Characteristic Leaching Procedure (TCLP) identifies whether a waste is toxic and must be managed as hazardous waste. The test attempts to replicate the conditions in a municipal landfill to detect the mercury concentration of water that would leach from the landfill. If the mercury concentration exceeds 0.2 milligrams per liter, the lamp fails the toxicity test and is managed as hazardous waste.

When mercury-containing lamps are tested using the TCLP, the test results can vary considerably, depending on the lamp manufacturer, the age of the lamp, and the laboratory procedures used. These lamps often fail the TCLP. If you do not use the TCLP to verify that your lamps are non-hazardous, you should (1) assume that they are hazardous waste, and (2) manage them as hazardous waste. Contact your state hazardous waste agency for information on laboratories in your state that conduct the TCLP test. The cost to test one lamp is approximately $140. However, due to variability in TCLP testing for lamps, EPA recommends that a large representative sample be tested.

For more information on RCRA regulations and waste identification, storage, transportation, and disposal, contact the RCRA hotline at 1-800-424-9346 (in the District of Columbia call 703-412-9810).

Conditionally Exempt Small Quantity Generators

A conditionally exempt small quantity generator, as defined under RCRA, is a generator who disposes 100 kg or less of hazardous waste per month. Generators must add the weight of all the hazardous waste (lamps plus other hazardous wastes) that their business generates during a month. For lamp disposal, this quantity of waste includes the mercury in the lamp along with the glass, phosphors, and other materials (the weight of the entire lamp).

Conditionally exempt small quantity generators are excused from RCRA identification, storage, treatment and disposal regulations. To qualify as a conditionally exempt small quantity generator (if the only hazardous waste is mercury-containing lamps), a generator must dispose of fewer than 300-350 four-foot T12 fluorescent lamps or 400-450 four-foot T8 fluorescent lamps per month, depending upon the approximate weight of each lamp. EPA encourages all users of fluorescent and HID lamps to dispose of mercury-containing lamps responsibly to limit the release of mercury into the environment.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA also regulates the disposal of mercury-containing lamps. The law requires building owners and waste generators to notify the National Response Center at (800) 424-8802 under certain conditions. For example, they must notify if they dispose of a pound or more of mercury (roughly equivalent to 11,000 four-foot T12 fluorescent lamps) in a 24-hour period. All generators of mercury-containing lamp waste (large, small, and conditionally exempt small generators) could be held liable in any subsequent Superfund cleanup at a land disposal site, incinerator, storage site, or recycling or other treatment facility.

State Regulationsd

Some states have adopted lamp disposal regulations that are more stringent than current Federal requirements, while other states have added mercury-containing lamps to their universal waste rule (see below). Check the table on the following page for a listing of state regulations, and contact your regional EPA office or state agency to confirm the most current rules and information on fluorescent and HID lamp waste management in your state.

Under the universal waste rule, storage, handling, and transportation practices are streamlined. Although lamps may be identified as a universal waste under state law, they are still considered hazardous waste and must be recycled or properly disposed in a chemical or hazardous waste landfill. Please note that although a state may have previously adopted the universal waste rule for batteries, pesticides and thermostats, this rule does not automatically apply to mercury-containing lamps. Mercury-containing lamps may be added to the state's list of universal wastes only after the state has adopted a special petitioning process, has obtained authorization to implement the RCRA toxicity characteristic rule, and petitions have been granted by the state (40 CFR 273). In states that do not adopt the universal waste rule for mercury-containing lamps, the disposal of such lamps would remain subject to current RCRA hazardous waste regulations.

Low-Mercury Lampsd

Recently, low-mercury fluorescent and HID lamps have been introduced. Although these lamps contain much less mercury than conventional lamps, they may still be hazardous waste. To determine if they are hazardous waste, the lamps must be tested using the TCLP, or the generator can apply "knowledge of the hazard characteristic of the waste in light of the materials or the process used" (40 CFR 262.11(c)(2)). However,

STATE REGULATIONS REGARDING MERCURY-CONTAINING LAMP DISPOSAL

AL	Lamps failing TCLP test are handled as hazardous waste.
AZ	All spent lamps should be managed in accordance with EPA Universal Waste Rule (40 CFR 273).
CA	Over 25 lamps per 24-hour period must be disposed of as hazardous waste.
CO	Lamps exhibiting a characteristic of a hazardous waste would be expected to be managed in accordance with the Colorado Hazardous Waste Act and implementing regulations. Non-hazardous lamps can be disposed in a solid waste landfill with prior approval from the solid waste landfill operator.
CT	Mercury-containing lamps are subject to Federal (RCRA) regulations through TCLP testing, and if they fail the TCLP test, must be treated as a hazardous waste.
DE	Lamps exceeding TCLP regulatory limits are fully regulated as hazardous waste pursuant to the *Delaware Regulations Governing Hazardous Waste*. Transportation must be conducted by a Delaware permitted hazardous waste transporter.
FL	Lamps may not be disposed in any municipal waste combustor. Generators of > 10 lamps/month must arrange for disposal in permitted lined landfills or recycling at mercury reclamation facilities. Lamps that are recycled are subject to streamlined, universal-waste regulations (Chapter 62-737, FAC).
HI	Follow Federal (RCRA) regulations. Recommend recycling.
IA	Lamps failing TCLP test are considered hazardous waste. Recycling recommended. EPA RCRA transportation requirements apply.
ID	Follow Federal (RCRA) regulations. Conditionally-exempt generators may dispose of mercury-containing lamps in a municipal landfill with prior approval from the landfill operator.
IL	Lamps exhibiting the toxicity characteristic are subject to hazardous waste management. Mercury-containing lamps have been added to the list of Universal Wastes.
IN	Subject to RCRA through TCLP testing and may be regulated as hazardous waste under 329 IAC 3.1. Mercury-containing lamps have been added to the list of Universal Wastes in Indiana.
KS	Follow State guidance policy.
KY	Spent lamps are regulated as a Universal Waste under 401 KAR Chapter 43.
LA	Fluorescent lamps containing mercury can be recycled as a Universal Waste under LAC.33V. Chapter 38. If disposed, it is a solid wasted and it must be determined if it is hazardous as specified by LAC 33:V.1103.
MA	Regulated under the Universal Waste Rule.
MD	Lamps exhibiting the toxicity characteristic subject to hazardous waste regulations. Persons who generate 100 kg or more of hazardous waste or who accumulate 100 kg or more of hazardous waste at any time (all hazardous waste, not just lamps) are fully regulated hazardous waste generators.
ME	Lamps that are unbroken, managed according to Maine's current policy, and recycled do not need to be handled as hazardous waste. If the lamps are broken or not managed according to Maine's policy they must be handled as hazardous waste.
MI	Lamps may be managed as Universal Waste.
MN	Mercury containing lamps must be stored according to Minnesota Pollution Control Agency (MPCA) guidelines and shipped to an existing recycling facility in accordance with MPCA requirements. Illegal to place lamps into a solid waste landfill.
MO	All spent lamps should be managed as Universal Waste.
NC	Lamps that are intact and destined for recycling can be managed as Universal Waste. If < 220 lbs per month of lamps is generated, a facility can send their lamps to a landfill in NC without lab data upon the landfill's approval. If > 220 lbs per month, lab data must be submitted to a lined landfill indicating that they are non-hazardous prior to them accepting the lamps.
ND	Follow Federal (RCRA) regulations. Encourage recycling.
NE	Mercury-containing lamps can be recycled or disposed of as Universal Waste (NDEQ Title 128, Chapter 25). Mercury-containing lamps not managed as Universal Waste that fail a TCLP for mercury must be managed as hazardous waste. CESQG lamps can go to a regulated landfill in 43 lb. per day quantities.
NH	Hazardous fluorescent lamps that are NOT designated for recycling or which are broken are subject to NH hazardous waste rules.
NM	Follow Federal (RCRA) regulations. Recommend Recycling.
NY	Mercury-containing lamps must comply with the hazardous waste management regulations (6NYCRR Parts 370-374 and 376) if they fail TCLP test for any hazardous constituent.
OH	Lamps designated for recycling are NOT considered hazardous waste, and are not subject to Ohio hazardous waste regulations.
OR	Lamps may be managed as Universal Waste.
PA	Handling, storage and shipment requirements are relaxed when lamps are sent to approved recycling facilities.
RI	Handle and ship lamps that are determined to be hazardous in accordance with all applicable hazardous waste requirements.
SC	Disposal is regulated by SCHWMR-R.61-79 and SCHWMR-R.61-107. Intact fluorescent lamps destined for recycling that are properly packaged and are not speculatively accumulated can be handled as non-hazardous.
SD	Follow Federal (RCRA) regulations. Recommend Recycling.
TN	Lamps designated for recycling are not considered hazardous waste and are not subject to Tennessee hazardous waste regulations. Tube crushers must meet state regulations. State approval is required for disposal of non-hazardous lamps and hazardous waste from small-quantity generators in solid waste (Subtitle D) landfills.
UT	Lamps may be managed as Universal Waste. Follow Utah Administrative Code R315-16, Standards for Universal Waste Management.
VT	Intact lamps may be managed as Universal Waste. Follow Vermont Hazardous Waste Management Regulations - 1998 Revision, Subchapter 9, Universal Waste Management Standards.
WA	Recommends recycling. Follow Chapter 173-351 WAC for disposal in a municipal solid waste landfill. Fluorescent lamps may not be sent to a municipal waste incinerator or industrial landfill.
WI	Hazardous waste lamps and bulbs (including bulbs with high lead concentrations) may not be placed in a solid waste landfill. Lamps and bulbs that are recycled are subject to reduced hazardous waste management requirements as Special Wastes.
WV	Follow EPA Region 3 recommendations. Adopted the Universal Waste Rule. Can only be managed as a non-hazardous waste if determined to be below TCLP level.
WY	Recommend recycling and compliance with State Universal Waste Rule, Chapter 14 Wyoming State Hazardous Waste Rules and Regulations.
Wash.DC	Fluorescent lamps that are not designated for recycling or that are broken are subject to District of Columbia Hazardous Waste Management Regulations (20DCMR, Chapters 40-54).

States not listed follow Federal (RCRA) Regulations.

most states require the lamps to be tested (using TCLP) by the generator to determine if the lamps are non-hazardous. Check with your regional EPA office or state agency to confirm the most current rules and information on the disposal requirements of these new low-mercury lamps.

Disposal of Used Fluorescentd and HID Lampsd

The following sections outline the storage, packing, transportation and disposal options for used mercury-containing lamps discarded as hazardous waste.

Used lamps that test hazardous or are determined hazardous by the generator must be disposed of at a hazardous waste landfill or sent to a lamp recycling facility. *Mercury-containing lamps should never be incinerated*. Most municipal incinerators and solid waste combustors lack the necessary control technologies to effectively remove mercury from the flue gas before it is released into the atmosphere.

Hazardous Waste Landfill

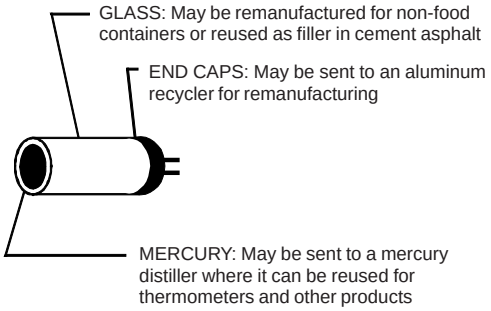
A hazardous waste landfill — also known as a RCRA Subtitle C facility — is a landfill that is permitted under Subtitle C of RCRA and is engineered to contain hazardous waste. Incoming wastes are manifested by the facility and some incoming wastes are subject to treatment standards.

Recycling Fluorescent and HID Lamps

Any lamp may be recycled at permitted or licensed recycling facilities, regardless of whether the lamp tests hazardous. However, for lamps that are hazardous waste, generators must follow generation, transport, and storage requirements under RCRA Subtitle C. Recycling separates the toxic substances (such as mercury) from the glass, aluminum, and other lamp components, and all materials may be re-used in manufacturing other products. Some lamp recycling companies recycle HID lamps as well as fluorescent lamps. A list of companies that provide lamp recycling services is included in the last section.

Lamp Disposal Costs

The costs for lamp disposal by recycling or hazardous waste landfill can vary considerably. Prices vary according to the following.



- quantity of waste generated
- location of disposal site
- proximity to a permitted hazardous waste landfill or recycling facility
- state and local taxes

Negotiate with hazardous waste brokers, transporters, waste management companies, and disposal sites to obtain lowest fees.

Recycling Costs

Recycling costs for fluorescent lamps are typically calculated by linear foot. HID lamp recycling costs are typically quoted on a per-lamp basis.

- fluorescent recycling costs range from $0.06/ft to $0.15/ft
- average cost is $0.10/ft
- approximately $0.40 per F40 lamp
- HID recycling costs range from $1.25/lamp to $4.50/lamp
- average cost is $2.50/lamp

Note: Estimated costs do not include packaging, transportation, or profile fees.

Chemical or Hazardous Waste Landfill Costs

Disposal costs for fluorescent lamps at a hazardous waste landfill range from 25-50 cents per 4-foot tube, not including costs for packaging, transportation, or profile fees.

Packing Lamps for Disposald

To prevent used fluorescent and HID lamps from breaking, lamps should be properly packed for storage and transportation. When lamps are removed and replaced with new lamps (e.g., during group relamping), the used lamps should be packed in the cardboard boxes that contained the replacement lamps. The boxes containing the hazardous waste must be properly labeled. Pre-printed labels or rubber stamps that meet Department of Transportation regulations are recommended for high-volume disposal.

Storing Lamps for Disposald

RCRA sets storage requirements for generators depending on how much hazardous waste they dispose each month.

- Small quantity generators dispose 100 to 1,000 kg of hazardous waste per month (which roughly corresponds to 350 to 3,600 four foot lamps), and can store hazardous waste up to 180 days.
- Large quantity generators dispose over 1,000 kg of hazardous waste per month (more than 3,600 four foot lamps), and can store hazardous waste up to 90 days.
- Conditionally exempt small quantity generators dispose 100 kg or less of hazardous waste per month and are exempt from RCRA storage requirements.

In addition to proper packing, care should be taken when stacking the boxes of used lamps for storage to avoid crushing the bottom boxes under the weight of the boxes on top. If you work with a contractor to maintain your lighting system, you may want to specify a safe storage arrangement in your contract. This approach ensures that your used lamps are not accidentally broken or crushed before they are sent to a disposal facility.

Some organizations crush their used lamps before disposal. This option should be pursued with care. The crushing equipment should have the approval of state and local authorities, and crushing methods should be evaluated *carefully*. The lamp should be crushed entirely *inside the drum or storage unit so that no mercury vapor enters the atmosphere*. There should also be adequate ventilation in the space where the crushing occurs. Under current EPA hazardous waste regulations, crushing lamps before sending them to a hazardous waste landfill may be considered treatment. Therefore, a RCRA treatment permit may be required.

Transportationd

Registered haulers and other transporters of hazardous waste calculate transportation fees as cents per pound per mile. The costs will vary according to the number of lamps, drums, or other containers to be removed from the site and the distance from your location to the location of the hazardous waste landfill or recycling facility.

Profile Feesd

Operators of chemical or hazardous waste landfills may charge a profile fee to document incoming waste. Profile fees vary depending on the volume of waste materials generated and may be waived if a certain volume or frequency of deliveries is assured. Establishing a working relationship with a lighting management company or lighting maintenance contractor who assists with the maintenance of your lighting system can reduce your disposal costs.

Record Keepingd

To track transported waste, EPA requires generators to prepare a *Uniform Hazardous Waste Manifest*. This one-page form can be provided by the recycler or hazardous waste landfill where you dispose of your used fluorescent or HID lamps. The manifest identifies the type and quantity of waste, the generator, the transporter, and the facility to which the waste is being shipped. The manifest must accompany the waste wherever it travels. Each handler of the waste must sign the manifest and keep one copy. When the waste reaches its destination, the owner of that facility returns a copy of the manifest to the generator to confirm that the waste arrived. If the waste does not arrive as scheduled, generators must immediately notify EPA or the authorized state environmental agency (see the last section), so that they can investigate and take appropriate action.

In addition, require your contractor to provide you with documentation verifying that the lamps were properly recycled or disposed in a hazardous waste landfill.

Municipal Solid Waste Landfilld

Lamp wastes generated in small quantities (see "Conditionally Exempt Small Quantity Generators" in the previous section) and used fluorescent and HID lamps that *do not test hazardous* under RCRA may be disposed in a properly managed municipal solid waste landfill (RCRA Subtitle D facility). The municipal landfill may impose restrictions or regulate incoming wastes in

accordance with local rules or company guidelines. Disposal costs for lamps at a Subtitle D municipal solid waste landfill are approximately 2-3 cents per 4-foot lamp.

Generators may be legitimately concerned about potential future Superfund liability in connection with this disposal method. All generators of mercury-containing lamp waste, regardless of size, could be held liable in any subsequent Superfund cleanup at a municipal solid waste landfill.

EVALUATING DISPOSALd OPTIONSd

Liability Issuesd

Under CERCLA, owners and operators of facilities and persons disposing hazardous substances may be held liable for response costs, if there is a release or threat of a release of a hazardous substance into the environment. Liability under CERCLA is broad and potentially costly, and can apply retroactively. All generators may incur Superfund liability for disposing mercury-containing lamps or PCB-containing ballasts in a dumpster, local landfill, or recycling, storage, or treatment facility. *Disposal of mercury wastes or PCBs in an environmentally sound manner, however, will help to minimize the potential for environmental contamination and thus also minimize the potential for liability.*

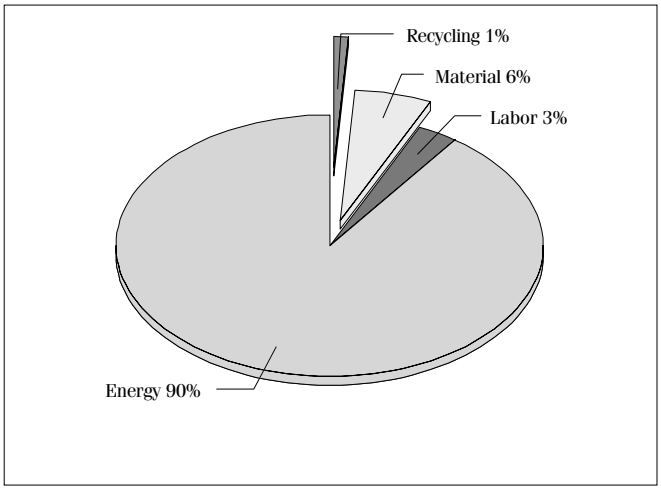
Impact of Lamp Disposal Costd on Profitabilityd

The overall impact of lamp disposal on the profitability of typical Green Lights lighting upgrade projects is minimal. The example below shows the impact of various lamp recycling costs on the internal rate of return (IRR) and the net present value (NPV) of a typical lighting upgrade project. The assumed project consists of upgrading a 4-lamp standard fluorescent system that uses magnetic ballasts and 40-watt lamps with a 4-lamp T8/electronic system and occupancy sensors. Without considering the cost of lamp disposal, the IRR and NPV were calculated at 47.1% and $52,242, respectively. Note that even when assuming lamp disposal costs of $1.50 per lamp — three times the average recycling cost — the IRR and NPV values decreased only slightly to 44.8% and $51,642, respectively. These results were obtained using the Green Lights analysis tool *ProjectKalc*.

Disposal Costs (per lamp)		
Lamp Disposal Cost	**IRR**	**NPV**
No fee	47.1%	$52,242
$0.50	46.3%	$52,042
$1.00	45.5%	$51,842
$1.50	44.8%	$51,642
$2.00	44.1%	$51,442
$2.50	43.4%	$51,242
$3.00	42.7%	$51,042
$3.50	42.1%	$50,842

ProjectKalc Assumptions

63% energy savings
Before: 2x4 4-lamp fixture, 40W T12 lamps, standard ballasts
After: 2x4 4-lamp fixture, 32W T8 lamps, electronic ballasts, occupancy sensors, 25% operating hour reduction



FLUORESCENT LAMP LIFE-CYCLE COST

he total cost of disposing of a lamp as a hazardous waste either by recycling or using a hazardous waste landfill can be put into perspective in three additional ways.
First, the cost of operating a lamp (including ballast losses) for its 20,000-hour life is $64 at the national average electric rate of 7 cents per kilowatt-hour. The 50-cent disposal cost is quite modest in comparison.

Second, replacing an old fixture with a new one usually costs about $100-$150, including installation. Disposing of an old fixture's lamps will cost approximately $2, depending on market conditions and disposal services purchased. If the new fixture uses half the electricity of the old fixture (as is typical with Green Lights upgrades), then the electric bill savings will pay for the cost of disposing of the old lamps after 310 hours of operation — about one month for most businesses. Essentially, lamp disposal will extend the payback of a project by approximately one month.

Third, as shown in the pie chart, the cost of disposing of a lamp as hazardous waste either by recycling or using a hazardous waste landfill represents only a small fraction of the total life-cycle operating costs of a lighting system. If operating a 2-lamp T8/electronic system, disposal as a hazardous waste represents only about 1 percent of total life-cycle operating costs.

- T8 lamps contain about 15 mg of mercury compared to 20-30 mg for T12 lamps (low-mercury T8 lamps contain <10mg)
  - so less mercury is disposed of during relamping
- T8 lamps are more energy efficient than T12 lamps
  - so less mercury is emitted from fossil-fueled generating plants*

*(average emission is 0.04 mg/kWh)

Mercury Emissions and the Environmentd

The largest man-made sources of mercury in the atmosphere are fossil fuel combustion (58% of total) and municipal solid waste incineration (37% of total). When the mercury in a fossil fuel is heated in a combustor, it turns into a vapor. In vapor form, mercury is difficult to remove from the flue gas and easily escapes into the atmosphere. When moisture vapor in the atmosphere turns to rain, mercury returns to the earth and is deposited in streams, lakes, and other waterways. The mercury that is released into the atmosphere by burning fossil fuels can be substantially minimized using efficient lighting technologies.

On average, fossil-fueled power plants emit 0.04 milligrams of mercury per kilowatt-hour sold. By *maximizing* the efficiency of your lighting system, you can *minimize* mercury emissions from the power plants that provide your electricity.

The amount of mercury emitted into the atmosphere through solid waste incineration and resource recovery facilities (which burn solid waste to produce energy) can be minimized if you adopt a sound lamp disposal practice.

WORKING WITHd CONTRACTORSd

Your lighting upgrade project specification should include provisions for proper handling and safe disposal of lamps, ballasts, and other hazardous materials that may be associated with the project. Here are some general guidelines.

- ☞ Investigate your disposal options thoroughly.
- ☞ Do not expect your contractor to be well-versed in all disposal requirements and options.
- ☞ Ask your lighting or electrical contractor to provide disposal services (either directly or through a sub-contractor) as part of their contract.
- ☞ Be specific in your disposal requests (e.g., request high-temperature incineration of PCB-containing ballasts at an EPA-approved incinerator).
- ☞ Ask for certifications, licenses, and references from all subcontractors providing waste disposal services.

DEFINITIONSd

CERCLA
The Comprehensive Emergency Response, Compensation and Liability Act of 1980. CERCLA — referred to also as "Superfund" — established cleanup and emergency response guidelines for releases of hazardous substances into the environment. A release of a hazardous substance in an amount equal to or greater than its "reportable quantity" (one pound for mercury and PCBs) in a 24-hour period triggers CERCLA notification requirements. CERCLA applies to any size generator.

Chemical Waste Landfill
A TSCA permitted landfill that accepts hazardous substances and extremely hazardous waste. These facilities must meet different engineering requirements than RCRA Subtitle C (hazardous waste) landfills.

Conditionally Exempt Small Quantity Generator (CESQG)
A generator who generates 100 kilograms or less a month of a hazardous waste. Under RCRA, small

quantity generators are exempt from RCRA regulations for the transportation, storage, treatment, and disposal of that hazardous waste.

Hazardous Waste Landfill
See Subtitle C landfill.

RCRA
The Resource Conservation and Recovery Act which regulates the management of solid (hazardous and non-hazardous) wastes. Under RCRA, generators of solid wastes are responsible for determining whether the solid wastes are hazardous and following RCRA transportation, storage, treatment, and disposal requirements for those wastes.

RCRA Subtitle C Landfill
A landfill containing hazardous wastes that is permitted under Subtitle C of RCRA. Land disposal of hazardous wastes is restricted to permitted RCRA Subtitle C disposal facilities.

RCRA Subtitle D Landfill
A municipal solid waste landfill containing non-hazardous wastes permitted under Subtitle D of RCRA.

TSCA
The Toxic Substances Control Act of 1976 which regulates the handling, storage, transportation and disposal of polychlorinated biphenyls (PCBs).

INFORMATION RESOURCESd

EPA Regional Officesd

REGION I (ME, VT, NH, MA, CT, RI)
Environmental Protection Agency
1 Congress St.
10th Floor
Boston, MA 02203
(617) 565-3420

REGION II (NY, NJ, PUERTO RICO, VIRGIN ISLANDS)
Environmental Protection Agency
290 Broadway
New York, NY 10007-1866
(212) 637-3000

REGION III (PA, WV, VA, MD, DE, WASHINGTON DC)
Environmental Protection Agency
841 Chestnut Building
Philadelphia, PA 19107
(215) 566-5000

REGION IV (TN, KY, NC, SC, GA, AL, MS, FL)
Environmental Protection Agency
61 Forsyth St., SW
Atlanta, GA 30303
(404) 562-9900

REGION V (IL, WI, IN, MI, MN, OH)
Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3507
(312) 353-2000

REGION VI (NM, TX, OK, AR, LA)
Environmental Protection Agency
"Fountain Place"
12th Floor/Suite 1200
1445 Ross Avenue
Dallas, TX 75202-2733
(214) 665-6444

REGION VII (NE, KS, MO, IA)
Environmental Protection Agency
726 Minnesota Avenue
Kansas City, KS 66101
(913) 551-7000

REGION VIII (MT, WY, ND, SD, UT, CO)
Environmental Protection Agency
Suite 500
999 18th Street
Denver, CO 80202
(303) 236-3636

REGION IX (CA, NV, AZ, HI, AMERICAN SAMOA, GUAM)
Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105
(415) 744-1305

REGION X (WA, OR, ID, AK)
Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101
(206) 553-4973

State Solid and Hazardousd Waste Agenciesd

ALABAMA
Clete Stallworth
Department of Environmental Management
Land Division — Solid/Hazardous Waste
1751 Federal Drive
Montgomery, AL 36130
(334) 271-7761/7735
(334) 279-3053

ALASKA
Steve Willingham
Manager, Solid Waste Program
State of Alaska
Department of Environmental Conservation
410 Willoughby Avenue
Juneau, Alaska 99801-1795
(907) 465-5158

ARIZONA
Anthony Leverock
Arizona Department of Environmental Quality
Hazardous Waste Permits Unit
3033 North Central Avenue
Phoenix, AZ 85012
(602) 207-4160

ARKANSAS
Bob Finn
Department of Pollution Control and Ecology
Hazardous Waste Division
PO Box 8913
Little Rock, AR 72219-8913
(501) 758-0745

CALIFORNIA
Mardis Coers
Department of Toxic Substances Control
PO Box 806
Sacramento, CA 95812-0806
(916) 322-0712

COLORADO
Scott Klarich
Environmental Compliance Officer
Monitoring and Enforcement Section
Hazardous Materials and Waste Management Division
Colorado Department of Health and Environment
Mail Code: HMWMD-HWC-B2
4300 Cherry Creek Drive South
Denver, CO 80222-1530
(303) 692-3369

CONNECTICUT
Mark Parker
Department of Environmental Protection
Waste Management Bureau
79 Elm Street
Hartford, CT 06106
(860) 424-3372

DELAWARE
Karen J'Anthony
Department of Natural Resources and Environmental Control
Division of Environmental Control
Solid Waste/Hazardous Waste Section
Edward Tatnall Building
PO Box 1401
Dover, DE 19901
(302) 739-4403
(302) 739-3689

DISTRICT OF COLUMBIA
Department of Consumer and Regulatory Affairs
Environmental Regulation Administration
Pesticides, Hazardous Waste and Underground Storage Tank Division
Hazardous Waste Management Branch
(Hazardous Waste Disposal)
2100 Martin Luther King, Jr. Ave. SE,
Suite 203
Washington, DC 20020
(202) 404-1167

Department of Public Works
Public Space Maintenance Administration
Bureau of Sanitation Services
(Solid Waste Disposal/Recycling)
2750 South Capitol St., SE
(202) 767-8512

FLORIDA
John Price
Bureau of Solid and Hazardous Waste
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
(850) 488-0300

GEORGIA
Vern George
Environmental Protection Agency
Toxics Branch
345 Courtland St., NW
Atlanta, GA 30334
(404) 562-9900

John Williams
Department of Natural Resources
Environmental Protection Division
Land Protection Branch
205 Butler Street, SE
Suite 1154
Atlanta, GA 30334
(404) 656-2833

HAWAII
Paul Kalai Waa
State of Hawaii
Department of Health
Environmental Management Division
Clean Air Branch
Asbestos Abatement Office
PO Box 3378
Honolulu, HI 96801-3378
(808) 586-8144

IDAHO
Mike Gregory
Division of Environmental Quality
Division of Environment
Bureau of Hazardous Materials
450 W. State Street
Boise, ID 83720
(208) 373-0494

ILLINOIS
Edwin Bakowski
State of Illinois
Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62794-9276
(217) 524-3300

INDIANA
Robert Snodgrass
Solid Waste Permit Section
105 South Meridian Street
Indianapolis, IN 46206-6015
(317) 635-2491

IOWA
Lavoy Haage
Department of Natural Resources
Solid Waste Section
Land Quality Bureau
Wallace State Office Building
900 East Grand Avenue
Des Moines, IA 50319
(515) 281-4968

KANSAS
Ron Smith
Department of Health and Environment
Solid Waste Management Division
Forbes AFB Bldg. No. 740
Topeka, KS 66620
(913) 296-1500

KENTUCKY
Abbie Myer
Department for Environmental Protection
Division of Waste Management
Ft. Boone Plaza
14 Reilly Road
Frankfort, KY 40601
(502) 564-6716 x242

LOUISIANA
Rosselle Foote
Department of Environmental Quality
Office of Solid and Hazardous Waste
Solid Waste Division
PO Box 44307
Baton Rouge, LA 70804
(504) 765-0355
(504) 765-0246

MAINE
Cherrie Plummer
Department of Environmental Protection
Bureau of Oil & Hazardous Materials Control
State House Station 17
August, ME 04333
(207) 287-2651

MARYLAND
Ed Hammerburg
Department of Environment
Toxic Operations Program
2500 Boening Highway
Baltimore, MD 21224
(410) 631-3345

MASSACHUSETTS
Dikran Kaligian
Office of Hazardous Waste
Enforcement Division
1 Winter Street
Boston, MA 02108
(617) 556-1022

MICHIGAN
Tish May
Department of Natural Resources
Hazardous Waste Division
PO Box 30241
Lansing, MI 48909
(517) 373-2730
(517) 373-4630

MINNESOTA
Nancy Ellefson or Bob Cross
Minnesota Pollution Control Agency
Solid or Hazardous Waste Division
520 Lafayette Road North
St. Paul, MN 55155
1-800-657-3864
(651) 297-7560
(612) 296-6300

MISSISSIPPI
David Lee
Department of Environmental Quality
Office of Pollution Control
PO Box 10358
Jackson, MS 39209
(601) 961-5171

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Department of Natural Resources
Division of Environmental Quality
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Jefferson State Office Building

205 Jefferson Street
PO Box 176
Missouri Boulevard
Jefferson City, MO 65102
(573) 751-3176

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Don Vidrine
Department of Health and Environmental Sciences
Environmental Sciences Division
Solid and Hazardous Waste Bureau
PO Box 200901
Helena, MT 59620-0901
(406) 444-1430

NEBRASKA
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PO Box 94877
State Office Building
Lincoln, NE 68509
(402) 471-8308
(402) 471-2186

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333 West Nye Lane
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Air Resources Division/Toxics Management Bureau
64 N. Main St., Caller Box 2033
Concord, NH 03302-2033
(603) 271-1370

Department of Environmental Services
Waste Management Division/Compliance Bureau
6 Hazen Drive
Concord, NH 03301
(603) 271-2942

NEW JERSEY
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NJ Department of Environmental
Protection and Energy
Hazardous Waste Regulation Program
401 East State Street
CN 421
Trenton, NJ 08625
(609) 984-6650

NJ Department of Environmental Protection and Energy
Solid Waste Management Division
840 Bear Tavern Road
CN 44
Trenton, NJ 08625
(609) 984-6650

NEW MEXICO
John Gimkowych
New Mexico Environmental Department
Harold Runnels Building
PO Box 26110
Santa Fe, New Mexico 87502

Hazardous and Radioactive Materials Bureau
(505) 827-1508

Solid Waste Bureau
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811 S.W. 6th Avenue
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Environmental Quality Board
Solid and Hazardous Waste Bureau
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Santurce, PR 00910

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Bureau of Solid and Hazardous Waste
2600 Bull Street
Columbia, SC 29201
(803) 896-4126
(803) 896-4174

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Department of Water and Natural Resources
Environmental Health Division
Joe Foss Building
Pierre, SD 57501
(605) 773-3153

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Department of Environment and Conservation
Division of Solid Waste Management
5th Floor, L&C Tower
401 Church Street
Nashville, TN 37243-1535
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(615) 532-0780

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Sonia Ralls
Texas Water Commission
PO Box 13087
1700 North Congress Avenue
Austin, TX 78711-3087
(512) 463-7830 (Fax)
(512) 463-8176

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Department of Environmental Quality
Division of Solid and Hazardous Waste
PO Box 144880
Salt Lake City, Utah 84114-4880

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Lynn Metcalf,
Department of Environmental Conservation
Hazardous Materials Management Division
103 South Main Street
Waterbury, Vermont 05671-0404
(802) 241-3888

VIRGINIA
Robert Lincoln, Waste Division
Virginia Department of Environmental Quality
Special Solid Waste Program
P.O. Box 10009
Richmond, VA 22240
(804) 698-4000

WASHINGTON
Stacie Singleton
Department of Ecology
Solid and Hazardous Waste Program
PO Box 47600
Olympia, WA 98504-7600
1-800-633-7585

WEST VIRGINIA
Tom Fisher
WV Division of Environmental Protection
Office of Waste Management
1356 Hansford Street
Charleston, WV 25301
(304) 558-5989
(304) 558-5929

WISCONSIN
Tim Mulholland
Department of Natural Resources
Bureau of Solid Waste Management
101 South Webster Street
Madison, WI 53707
(608) 266-2111
(608) 266-1327

WYOMING
Tim Link
Department of Environmental Quality
Solid and Hazardous Waste Division
122 West 25th Street
Cheyenne, WY 82002
(307) 777-7752

TSCA, RCRA, and CERCLAd Information Phone Linesd

Toxic Substances Control Act (TSCA)
Assistance Information Hotline
(202) 554-1404

RCRA/CERCLA Hotline
(800) 424-9346
in the Washington, DC Metro Area
(703) 412-9810

CERCLA National Response Center
(NRC) Hotline
(800) 424-8802

EPA-Approved Disposal Locationsd

Commercially permitted PCB INCINERATORS

Aptus, Inc.
PO Box 1328
Coffeyville, KS 67337
(316) 251-6380

Aptus, Inc.
P.O. Box 27448
Salt Lake City, UT 84127
11600 N. Aptus Road
Argonite, UT 84029
(801) 531-4200
Chemical Waste Management
PO Box 2563
Port Arthur, TX 77643
(409) 736-2821

Rollins
PO Box 609
Deer Park, TX 77536
(713) 930-2300

Weston
One Weston Way
West Chester, PA 19380
(215) 692-3030

Commercially permitted HAZARDOUS WASTE LANDFILLS

Chemical Waste Management
Call 1-800-843-3604 for
information on CWM disposal
facilities nation-wide.

Envirosafe Services Inc. of Idaho
PO Box 16217
Boise, ID 83715-6217
(800) 274-1516

US Ecology, Inc.
Box 578
Beatty, NV 89003
(702) 553-2203

US Pollution Control, Inc.
Grayback Mountain
8960N Hwy 40
Lake Point, UT 84074
(801) 595-3900

Waste Control Specialists
P.O. Box 1937
Pasadena, TX 77501
(713) 944-5900

THIS IS NOT A COMPLETE LIST OF COMPANIES WHO PROVIDE DISPOSAL SERVICES THROUGHOUT THE UNITED STATES. COMPANIES LISTED IN THIS SECTION ARE NOT ENDORSED BY THE EPA OR THE ENERGY STAR BUILDINGS AND GREEN LIGHTS PARTNERSHIP.

GREEN LIGHTS®d

A Bright Investment in the Environment

Green Lights, one of several ENERGY STAR programs, is sponsored by the US Environmental Protection Agency (EPA) and encourages major US corporations and other organizations to install energy-efficient lighting technologies.

Organizations that make the commitment to Green Lights will profit by lowering their electricity bills, improving lighting quality, and increasing worker productivity. They will also reduce the air pollution caused by electricity generation.

For more information, contact the Green Lights program office.

Green Lights Program
US EPA
401 M Street, SW (6202J)
Washington, DC 20460

ENERGY STAR Hotline

1-888-STAR-YES (1-888-782-7937)
Fax: (202) 775-6680

Green Lights Homepage

www.epa.gov/greenlights/

ENERGY STAR Homepage

www.epa.gov/energystar/

Lighting Waste Disposal is one of a series of documents known collectively as the *Lighting Upgrade Manual*. Other documents in the Manual are Listed below.

LIGHTING UPGRADE MANUAL

Planning

- *Green Lights Program*
- *Implementation Planning Guidebook*
- *Financial Considerations*
- *Lighting Waste Disposal*
- *Progress Reporting*
- *Communicating Green Lights Success*

Technical

- *Lighting Fundamentals*
- *Lighting Upgrade Technologies*
- *Lighting Maintenance*
- *Lighting Evaluations*
- *The Lighting Survey*

Appendices

- *Upgrading Tenant Spaces*
- *Green Lights for Federal Participants*
- *Requesting Proposals*

☞ To order other documents or appendices in this series, contact the ENERGY STAR Hotline at 1-888-STAR-YES. Look in the ENERGY STAR *Update* newsletter for announcements of new publications.

EPA Green Lights
an ENERGY STAR program

TSCA Disposal Requirements for Fluorescent Light Ballasts

PCB Capacitor	PCB Potting Material	Labeling, Transportation and Manifesting for Disposal	Disposal Reference in §761	Disposal Options
"No PCBs" label		Not regulated under TSCA	N/A	Not regulated under TSCA
None	< 50 ppm	Not regulated under TSCA	N/A	Not regulated under TSCA
Intact and non-leaking or none	≥ 50 ppm	Is a PCB bulk product waste. No labeling is required. Manifesting is required for disposal in accordance with §761.62(a); is not required under §761.62(b); may be required under §761.62(c).	.50(b)(2)(ii) .62(a)-(c)	TSCA Incinerator, TSCA/RCRA Landfill, Alternate Destruction Method, Decontamination (§761.65(d) storage approval may be required), Coordinated approval, State approved landfill (leach test required), Risk-based approval
Intact and non-leaking	< 50 ppm	No labeling or manifesting required	.50(b)(2)(i) .60(b)(2)(ii)	As municipal solid waste 40 CFR 761 subpart D options
Leaking	< 50 ppm or ≥ 50 ppm	Disposal as PCB bulk product waste. No labeling is required. Manifesting is required for disposal in accordance with §761.62(a); may be required under §761.62(c).	.62(a) or (c)	TSCA Incinerator TSCA/RCRA Landfill Alternate Destruction Method Decontamination (§761.65(d) storage approval may be required) Coordinated approval Risk-based approval

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 29 1992

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Use of Alternative Secondary Containment Measures at Facilities Regulated under the Oil Pollution Prevention Regulation (40 CFR Part 112)

FROM: Don R. Clay
Assistant Administrator

TO: Director, Environmental Services Division
Regions I, VI, VII
Director, Emergency and Remedial Response Division
Region II
Director, Hazardous Waste Management Division
Regions III, IX
Director, Waste Management Division
Regions IV, V, VIII
Director, Hazardous Waste Division
Region X

PURPOSE

This memorandum addresses the U.S. Environmental Protection Agency's (EPA) interpretation of the term "secondary containment" as it is used in section 112.7(c) of the Oil Pollution Prevention regulation (40 CFR Part 112), also known as the Spill Prevention, Control and Countermeasures (SPCC) regulation. It also addresses technologies that may be used to provide secondary containment for smaller, shop-fabricated aboveground storage tanks (ASTs) consistent with 40 CFR Part 112.7(c).

BACKGROUND

Since 1973, the SPCC regulation has included the following provision addressing secondary containment and the allowance for equivalent preventive systems. Section 112.7(c) states:

> Appropriate containment and/or diversionary structures or equipment to prevent discharged oil from reaching a navigable water course should be provided. One of the following preventive systems or its equivalent should be

used as a minimum: (1) Onshore facilities: (i) Dikes, berms or retaining walls sufficiently impervious to contain spilled oil; (ii) Curbing; (iii) Culverting, gutters or other drainage systems; (iv) Weirs, booms or other barriers; (v) Spill diversion ponds; (vi) Retention ponds; (vii) Sorbent materials.

The SPCC regulation implements Section 311(j)(1)(C) of the Clean Water Act (CWA) for non-transportation-related facilities. In 1988, the Agency published regulations at 40 CFR Part 280 for underground storage tanks (USTs) implementing the requirements of Subtitle I of the Resource Conservation and Recovery Act. An apparent result of the implementation of the UST regulation is a trend of facilities replacing USTs with ASTs.

In response to this trend, tank manufacturers have developed various new designs for shop-fabricated AST systems. Alternative AST systems for which we have information generally do not exceed 12,000 gallons capacity. Some of these new designs include a steel or reinforced concrete secondary shell fully encasing a storage tank; others include an attached, shop-fabricated containment dike. Many other system designs may also be available. Typically, these alternative AST system designs provide containment for the entire capacity of the inner tank for spills resulting from leaks or ruptures of the inner tank.

In 1988, EPA noted in its Oil SPCC Program Task Force Report that the Agency has limited inspection resources to implement the SPCC program. Less than 1,000 of the estimated half million SPCC-regulated facilities are inspected by EPA annually. Moreover, section 311 of the CWA does not permit EPA to delegate this program to the States. The Task Force, therefore, recommended that EPA attempt to target these very limited resources to inspecting the highest-risk facilities. In general, we believe that facilities using smaller-volume AST systems generally pose less risk than larger field-erected tanks and tank farms of large uncontrolled spills reaching navigable waters, especially if these facilities are not located near sensitive ecosystems or water supply intakes.

The traditional method of providing secondary containment for ASTs has been to construct dikes, berms, retaining walls and/or diversion ponds to collect oil once it spills. Based on the experience of EPA Regional personnel implementing the SPCC regulation since 1973, those traditional means of secondary containment are very effective and reliable methods of protecting the surface waters from oil spills from ASTs. However, the SPCC regulation is a performance-based regulation that permits facility owners or operators to substitute alternative forms of spill containment if they provide protection against discharges to navigable waters substantially equivalent to that provided by the systems listed in section 112.7(c).

Consistent with section 112.1(e) of the SPCC regulation, this memorandum does not supersede the authority of "existing laws, regulations, rules, standards, policies and procedures pertaining to safety standards, fire prevention and pollution rules," including fire codes or other standards for good engineering practice that may apply to alternative AST systems.

On October 22, 1991, EPA proposed revisions to the SPCC regulation. The proposed revisions do not affect the provisions of section 112.7(c) that describe alternative systems that are substantially equivalent to those specifically listed in paragraphs (c)(1)(i) through (c)(1)(vii).

OBJECTIVE

This memorandum should allow EPA Regional personnel to provide consistent interpretation of the secondary containment provisions of section 112.7(c) of the SPCC regulation to facilities with generally smaller shop-fabricated ASTs. Alternative AST systems, including equipment and procedures to prevent reasonably expected discharges, should satisfy the secondary containment provisions of the SPCC regulation under most site-specific conditions.

DISCUSSION

As smaller shop-fabricated ASTs are increasingly appearing in the market, we have observed a number of innovative technologies to reduce the risks of both leaks and spills. Moreover, these smaller shop-fabricated tanks do not pose the same risk of large uncontrolled oil spills to navigable waters as the larger field-erected tanks. Therefore, we believe that there should be many situations in which protection of navigable waters substantially equivalent to that provided by the secondary containment systems listed in section 112.7(c) could be provided by alternative AST systems that have capacities generally less than 12,000 gallons and are installed and operated with protective measures other than secondary containment dikes. For example, some State programs provide an exemption from State spill prevention requirements for ASTs with similar capacities. However, in certain situations, these alternative AST systems might appropriately not be presumed to comply with the provisions of section 112.7(c). An example of this type of situation is facilities containing four or more ASTs or ASTs with combined capacity greater than 40,000 gallons, where a number of larger tanks are connected by manifolds or other piping arrangements

that would permit a volume of oil greater than the capacity of one tank to be spilled as a result of a single system failure.[1]

The owner or operator of any facility subject to the SPCC regulation, including facilities using alternative AST systems, must adhere to all applicable provisions of the SPCC regulation. The owner or operator of each regulated facility must develop a site-specific SPCC Plan that must be certified by a Registered Professional Engineer as required by section 112.3 of the regulation. Pursuant to the requirement of section 112.7 that the SPCC Plan shall "include a discussion of the facility's conformance with the appropriate guidelines listed," a complete SPCC Plan for any facility using alternative AST systems should include a discussion of why the facility is considered to be in conformance with section 112.7(c).

In evaluating these shop-fabricated AST systems, EPA's Office of Solid Waste and Emergency Response (OSWER) has looked at requirements the Agency has established for tanks in situations where traditional secondary containment systems cannot be provided (e.g., USTs covered by 40 CFR Part 280). Additionally, OSWER has evaluated relevant State and local government requirements. OSWER also has considered factors related to alternative AST systems, including tank size, typical pumping rates used to fill and empty them, and the lower risk of large, uncontrolled oil spills from facilities using such AST systems, based on tank size, design, and pumping rates. We believe that for these smaller shop-fabricated ASTs some alternative AST systems that include adequate technical spill and leak prevention options such as overfill alarms, flow shutoff or restrictor devices, and constant monitoring of product transfers generally would allow owners and operators of facilities to provide protection of navigable waters substantially equivalent to that provided by secondary containment as defined in 40 CFR Part 112.7(c). For example, small double walled ASTs, when used with equipment and procedures described in this guidance, generally would provide substantially equivalent protection of navigable waters under section 112.7(c) of the SPCC regulation when the inner tank is an Underwriters' Laboratory-listed steel tank, the outer wall is constructed in accordance with nationally accepted industry standards (e.g., those codified by the American Petroleum Institute, the Steel Tank Institute, and American Concrete Institute), the tank has overfill prevention measures that include an overfill alarm and an automatic flow restrictor

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[1] This is based on similar capacities in proposed National Fire Protection Association standards and consideration of the risks to public health or welfare or the environment of spills of potentially larger size.

or flow shut-off,[2] and all product transfers are constantly monitored.[3]

CONCLUSION

When the only significant source of potential oil spills to navigable waters of the United States from a facility is from alternative ASTs as described in this memorandum, an SPCC Plan that is certified by a Registered Professional Engineer and that requires equipment and operating practices in accordance with good engineering practice and the principle of substantial equivalence as described above should be presumed to achieve the protection of navigable waters substantially equivalent to that provided by the preventive systems specified in 40 CFR Part 112.7(c).

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[2] Consistent with the performance standards for these devices as described in section 280.20(c) of EPA regulations for USTs at 40 CFR Part 280 and in an August 5, 1991, amendment, an automatic flow shut-off will shut off flow so that none of the fittings located on top of the tank are exposed to product as a result of overfilling, an automatic flow restrictor will restrict flow 30 minutes prior to overfill or when the tank is no more than 90 percent full, and a high level alarm will alert the operator one minute before overfilling or when the tank is no more than 90 percent full.

[3] Consistent with the performance standard for overfill control as described in section 280.30(a) of EPA regulations for USTs at 40 CFR Part 280, an owner/operator of the facility will ensure that the transfer operation is monitored constantly to prevent overfilling and spilling.