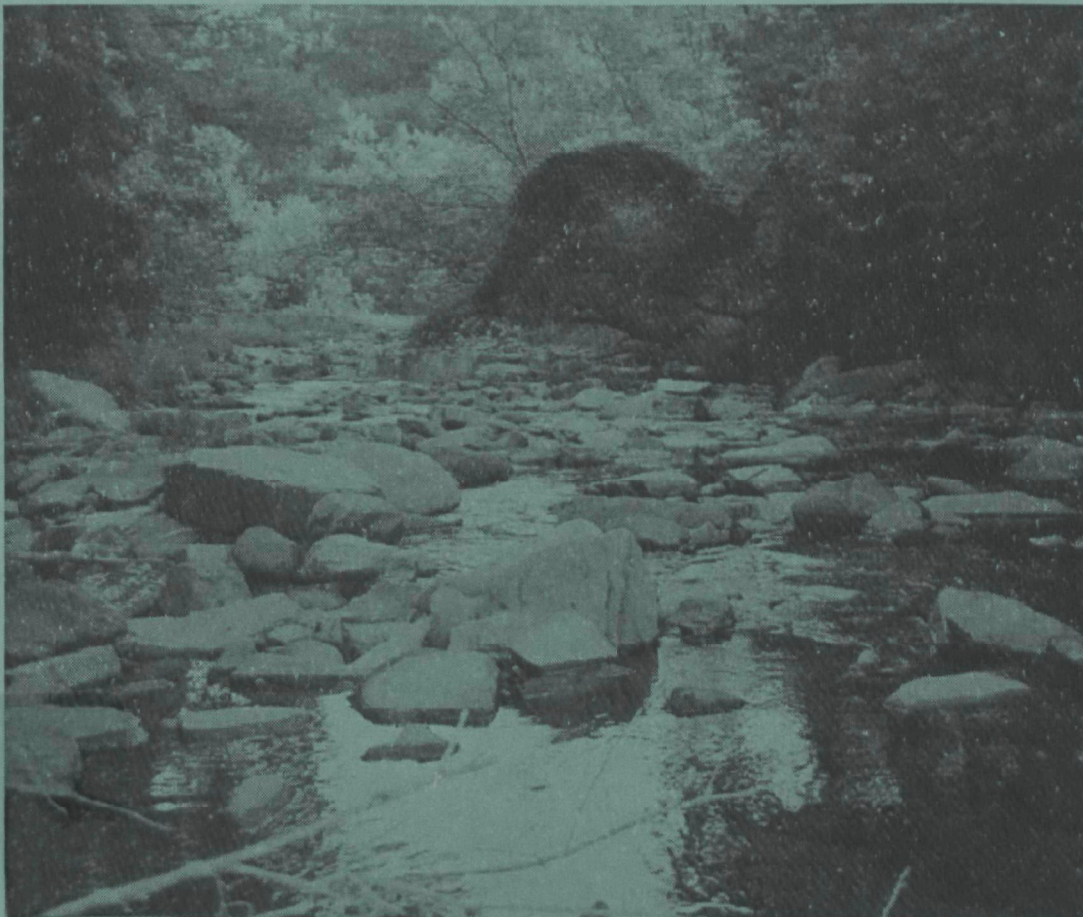


EPA FACILITIES MANUAL, VOLUME 4



**Safety, Health, and
Environmental Manual:**

**Environmental
Management Guidelines**



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 (SO₂), 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, SO₂, 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 [$\mu\text{g/L}$]) 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/cm² 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 possess, 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 statutes. 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

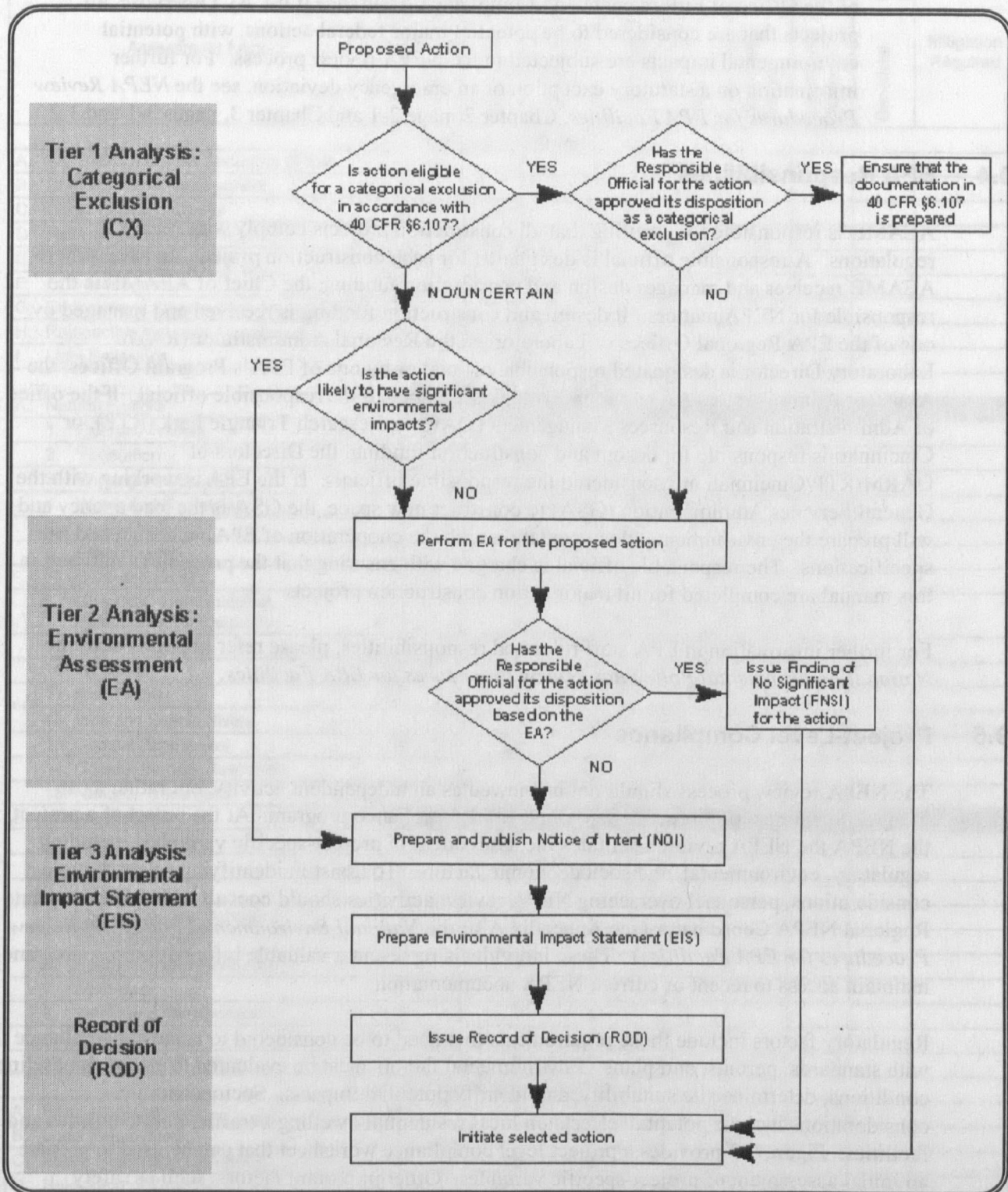
NEPA ensures that environmental impacts and associated public concerns are considered in decision of Federal projects. EPA and other Federal agencies follow a three-tiered procedures review process when an action that could affect the environment is proposed. This chapter focuses on the overall NEPA 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 <i>Federal Register</i> 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 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 be considered in the design and assessment of major actions.

Figure 9-3 Project Level Compliance Worksheet

[illegible]

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, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> U.S. Fish and Wildlife Service National Marine Fisheries Service 	None
Executive Order 12898 – Environmental Justice	<ul style="list-style-type: none"> Requires Federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations. 	<ul style="list-style-type: none"> Each Federal agency must prepare its own implementing procedures 	None
Coastal Zone Management Act, 16 U.S.C. Section 1451, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> U.S. Fish and Wildlife Service 	U.S. Department of Interior Coastal Barrier Act Advisory Guidelines
The Wilderness Act, 16 U.S.C. 1131, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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, <i>et seq.</i>	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Soil Conservation Service 	7 CFR 658

LEGISLATION/ EXECUTIVE ORDER	DESCRIPTION AND INTENT	ADMINISTERING AGENCIES	IMPLEMENTING REGULATIONS
Executive Order 11990 – Protection of Wetlands	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Each Federal agency must prepare its own implementing procedures 	40 CFR Part 6, Appendix A
Executive Order 11988 – Floodplain Management	<ul style="list-style-type: none"> Requires Federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with occupancy and modification of floodplains. 	<ul style="list-style-type: none"> 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)*, EPA 100-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 570/9-89-001, 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
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Group V	Methyl chloroform
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Group VI	Methyl bromide
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Group VII	CHBr ₃
	CHF ₂ Br (HBFC-2201)
	CH ₂ FBr
	C ₂ H ₂ FBr ₃
	C ₂ H ₂ F ₂ Br ₂
	C ₂ H ₂ F ₃ Br
	C ₂ H ₂ F ₄ Br
	C ₂ H ₂ F ₅ Br
	C ₂ H ₂ F ₆ Br
	C ₂ H ₂ F ₇ Br
	C ₂ H ₂ F ₈ Br
	C ₂ H ₂ F ₉ Br

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
NO _x	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

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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*.

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