

# **Practical Introduction to Environmental Law and Regulatory Compliance in Texas**

**By**

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***Caveat:* This primer can barely scratch the surface of this massive, ever-growing corpus of law. Therefore, rather than attempt a comprehensive synopsis of the substance of environmental law, it serves more as our guided tour to give you a sense of the layout and architecture of the law and to provide you with some details.**

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# 1. INTRODUCTION TO ENVIRONMENTAL LAWS AND REGULATIONS

## a. DEFINING ENVIRONMENTAL LAW

- i. History teaches us that the natural development of our land and resources has been a contentious undertaking. Until recently, the issues that today make up the corpus of “environmental law” were not to be found in environmental cases, legislative journals or in environmental law treatises. Instead, they were found under the rubrics of property, constitutional law, contract and the common law.
- ii. Today, environmental law consists of a complex and interlocking body of treaties, conventions, statutes, regulations, and common law that attempt to work together in unison to regulate how we (individuals, governmental entities and businesses) interact with the rest of the biophysical or natural environment.
  - 1) Its goal is to reduce the negative impacts of our activities on the environment and each other. It attempts to accomplish this goal by controlling current polluting activities, remediating past pollution, and conserving and managing our resources. Laws regarding resource conservation and management provide guidelines and limitations on the disturbance and use of those resources such as timber and wildlife and often focus on sensitive ecological environments. These two types of laws – preventing and remediating pollution, and managing resources – often work in harmony. For example, laws governing water pollution in lakes and rivers may also conserve the recreational value of such water bodies.
  - 2) Towards this goal, the United States Congress passed a number of landmark environmental regulatory regimes to address pollution in specific media such as air and water (whether surface water, groundwater or oceans). The legislatures of all fifty states followed suit by passing innumerable comparable sets of laws and many local municipalities have their own laws and ordinances addressing and regulating local pollution issues.
- iii. Environmental laws are generally intended to protect and preserve both the natural environment and human health. Resource conservation and management laws are an attempt by Congress and the applicable regulatory agencies to balance the benefits received through preservation with the benefits resulting from the economic exploitation of our natural resources. The limitations and expenses that such laws impose on commerce coupled with the often unquantifiable benefits resulting from environmental protection continue to generate significant controversy.
- iv. As a consequence of often conflicting and competing goal and interests, the federal and state judiciaries play an important role in the development of environmental law in the United States. The decisions of the Supreme Court in cases such as *Calvert Cliffs Coordinating Committee v. U.S. Atomic Energy Commission* (broadly reading the procedural requirements of the National

Environmental Policy Act), *Tennessee Valley Authority v. Hill* (broadly reading the Endangered Species Act), and, much more recently, *Massachusetts v. Environmental Protection Agency* (requiring EPA to reconsider regulation of greenhouse gases under the Clean Air Act) have had policy impacts far beyond the facts of the particular case.

- 1) “We conclude, then, that Section 102 of NEPA mandates a particular sort of careful and informed decision-making process and creates judicially enforceable duties. The reviewing courts probably cannot reverse a substantive decision on its merits, under Section 101, unless it be shown that the actual balance of costs and benefits that was struck was arbitrary or clearly gave insufficient weight to environmental values. But if the decision was reached procedurally without individualized consideration and balancing of environmental factors—conducted fully and in good faith—it is the responsibility of the courts to reverse. *Calvert Cliffs Coordinating Committee v. U.S. Atomic Energy Commission*, 449 F.2d 1109, 1115 (D.C. Cir. 1971).
  - 2) “It may seem curious to some that the survival of a relatively small number of three-inch fish among all the countless millions of species extant would require the permanent halting of a virtually completed dam for which Congress has expended more than \$100 million.... We conclude, however, that the explicit provisions of the Endangered Act require precisely that result.” *TVA v. Hill*, 437 U.S. 153, 172-73 (1978).
  - 3) “While the Congresses that drafted §202(a)(1) might not have appreciated the possibility that burning fossil fuels could lead to global warming, they did understand that without regulatory flexibility, changing circumstances and scientific developments would soon render the Clean Air Act obsolete. The broad language of §202(a)(1) reflects an intentional effort to confer the flexibility necessary to forestall such obsolescence. See *Pennsylvania Dept. of Corrections v. Yeskey*, 524 U.S. 206, 212 (1998) (“[T]he fact that a statute can be applied in situations not expressly anticipated by Congress does not demonstrate ambiguity. It demonstrates breadth” (internal quotation marks omitted)). Because greenhouse gases fit well within the Clean Air Act’s capacious definition of “air pollutant,” we hold that EPA has the statutory authority to regulate the emission of such gases from new motor vehicles.” *Massachusetts v. EPA*, 549 U.S. 497, 532 (2007).
- v. To appreciate the breadth and scope of the corpus of environmental law consider that there is over 50 applicable federal laws, countless state laws, over 40,000 published court decisions (22,000 from federal courts and 18,000 from *state* courts), over 90,000 state environmental administrative decisions, over 10,000 decisions from EPA’s environmental appeals board, and a bewildering amount of agency regulations, “policy memoranda,” guidelines and interpretative documents.

**b. SOURCES OF ENVIRONMENTAL LAW**

- i. The United States Constitution;
- ii. State Constitutions;
- iii. Federal and state statutes and local ordinances;
  - 1) Environmental statutes generally empower the EPA to develop and promulgate regulations.
- iv. Regulations promulgated by federal, state, and local regulatory agencies;
  - 1) President can also delegate authority to the EPA to promulgate regulations through an executive order.
  - 2) The rule-making process involves proposing regulations in the Federal Register; providing the opportunity for public comment; and publishing the final regulations in the Federal Register with them having the force and effect of law after the effective date.
  - 3) The preamble is very important to understanding the interpretation of environmental regulations (only found in the Federal Register).
  - 4) Final regulations are combined into the Code of Federal Regulations (CFR) and published annually (not the preamble).
    - A) The 2009 edition of title 40 of the CFR, which comprises most federal environmental regulations, contains 32 volumes, total more than 10,000 pages.
  - 5) The EPA also issues various interpretive policy memorandums and guidance documents that are vital to understanding the interpretation and implementation of environmental regulations.
    - A) Guidance document are not enforceable.
    - B) Policy memorandums are enforceable
    - C) Court decisions interpreting environmental laws and regulations; and
    - D) Common law.

**2. FEDERAL MATERIALS**

- a. **MAJOR FEDERAL STATUTES** - many laws that make up the federal environmental law field. These laws fall into **THREE** main categories:

- i. The four major pollution control laws
  - 1) Clean Air Act (CAA)
  - 2) Clean Water Act (CWA)
  - 3) Resource Conservation and Recovery Act (RCRA)
  - 4) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
- ii. Laws that prevent pollution
  - 1) Toxic Substances Control Act (TSCA)
  - 2) Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)
  - 3) Oil Pollution Act (OPA)
  - 4) Safe Drinking Water Act (SDWA)
  - 5) Rivers and Harbors Act (RHA)
- iii. Laws that protect public resources
  - 1) National Environmental Policy Act (NEPA)
  - 2) Endangered Species Act (ESA)
  - 3) Marine Mammal Protection Act (MMPA)
  - 4) Emergency Planning and Community Right-to-Know Act (EPCRA)
- b. **PREEMPTION:** Many federal environmental laws pre-empt state and common laws. The doctrine of pre-emption has too many subtleties and depends too much on the precise wording and effect of statutory provisions to remit an exhaustive discussion in this primer, But:
  - i. unless the statute expressly preserves state common law or leaves gaps to be filled by federal common law, the courts will likely find that the federal statutory provisions define the scope of the responsibilities of private parties.
    - 1) *See e.g., International Paper Co. v. Oeullette*, 107, S.Ct. 805 (1987) (CWA permit provisions pre-empt state common law claim for damages where source complied with permit);
  - ii. Some or all provisions of statutes may pre-empt efforts of state and local authorities to directly regulate matter already regulated by federal law.

- 1) *See e.g., Rollins Environmental Services, Inc. v. Parish of St. James*, 775 F.2d 627 (5<sup>th</sup> Cir. 1985) (TSCA regulation of PCBs pre-empts local ordinances banning PCB disposal).
  - iii. Often EPA and states have concurrent jurisdiction over routine matters of air and water pollution. Therefore, compliance with state requirements does not preclude federal enforcement if federal requirements are not satisfied. Nor does compliance with federal law suffice if state standards are more stringent.
- c. **THE PRIMARY FEDERAL STATUTES:** A few of the most important laws are summarized below. These AND other important federal environmental laws can be accessed from EPA's web site: <http://www.epa.gov/lawsregs/laws/index.html>.
- i. **Clean Air Act (CAA) (42 U.S.C. §§ 7401 *et seq.*) (1970):** The result of eleven separate Acts of Congress, the CAA is the longest and most complex statutory and regulatory scheme for any of the environmental laws in the United States.
    - 1) It regulates air emissions from area, stationary, and mobile sources.
    - 2) TITLE 1: Provisions for Attainment and Maintenance of National Ambient Air Quality Standards (NAAQS).
      - A) *Section 108* requires EPA to identify "air pollutants" anticipated to endanger public health or welfare and to establish quality criteria.
      - B) *Section 109* requires EPA to establish (NAAQS) for the following six criteria pollutants that Congress considered harmful to public health and the environment.
        - i) Carbon monoxide (CO)
          - CO is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. Vehicle exhaust contributes about 56 percent of all CO emissions nationwide.
          - It can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. It is poisonous even to healthy people at high levels in the air; can affect people with heart disease; and can affect the central nervous system.
        - ii) Particulate matter (PM)
          - PM is a complex mixture of extremely small particles and liquid droplets.
          - The size of particles is directly linked to their potential for causing health problems. The CAA regulates particles that are 10 micrometers

in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects.

iii) sulfur dioxide (SO<sub>2</sub>)

- The largest sources of SO<sub>2</sub> emissions are from fossil fuel combustion at power plants (73%) and other industrial facilities (20%).
- Current scientific evidence links short-term exposures to SO<sub>2</sub>, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms. SO<sub>x</sub> can react with other compounds in the atmosphere to form small particles that penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and can aggravate existing heart disease

iv) nitrogen dioxide (NO<sub>2</sub>)

- NO<sub>2</sub> forms quickly from emissions from cars, trucks and buses, power plants, and off-road equipment.
- In addition to contributing to the formation of ground-level ozone, and fine particle pollution, NO<sub>2</sub> is linked with a number of adverse effects on the respiratory system.

v) Lead

- The major sources of lead emissions have historically been motor vehicles (such as cars and trucks that burned leaded gasoline) and industrial sources (smelters).
- Once taken into the body, lead is distributed by blood and accumulates in the bones. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system. Current concern about lead are exposure that can cause neurological effects in children. Infants and young children are especially sensitive to even low levels of lead, which may contribute to behavioral problems, learning deficits and lowered IQ.

vi) ozone (the indicator of urban smog)

- Ozone is a gas composed of three oxygen atoms. It is not usually emitted directly into the air, but at ground-level is created by a

chemical reaction between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOC) in the presence of sunlight.

- Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. Ground-level ozone also can reduce lung function and inflame the linings of the lungs.
  - C) *Section 110* requires states to develop and submit to EPA for approval State Implementation Plans (SIPs) specifying how it plans to achieve air quality standards consistent with the NAAQS.
  - D) *Section 111* requires EPA uniform technology-based standards for major new stationary sources of air pollution – New Source Performance Standards
  - E) *Section 112* mandates the use of technology-based standards to reduce listed hazardous air emissions from major sources in designated industrial categories – Air Toxics control
  - F) Part C (*Sections 160-169A*) specifies the requirements for the Prevention of Significant Deterioration of air quality (PSD program) for areas with air quality that exceeds the NAAQSs.
  - G) Part D (*Sections 171-178*) specifies the requirements for areas that fail to meet the NAAQSs (Nonattainment areas).
- 3) TITLE II (*Sections 202-216*) requires EPA to establish uniform emissions standards for automobiles and light trucks that manufacturers must meet by strict deadlines – Automotive Standards and Alternative Fuels
- 4) TITLE III
- A) *Section 304* authorizes citizen suits against violators of emission standards and against the EPA administrator for failure to perform nondiscretionary duties.
  - B) *Section 307* authorizes judicial review of nationally applicable EPA actions exclusively in the US Court of Appeals for the District of Columbia.
- 5) TITLE IV (*Sections 401-416*) creates the Acid Rain program by allowing the marketing of allowances for SO<sub>2</sub> emissions from power plants and major industrial sources to reduce acid precipitation.
- 6) Title V (*Sections 501-507*) requires permits for all major industrial sources with state administration and federal oversight – the Permit Program.

- 7) Title VI (*Sections 601-617*) establishes the stratospheric ozone program for controlling substances that contribute to its depletion.
- ii. **Clean Water Act (33 U.S.C. §§ 1251 *et seq.*) (1977).** This 1977 amendment to the Federal Water Pollution Control Act of 1972, sets the basic structure for regulating discharges of pollutants into waters of the United States.
- 1) While the CWA concentrates its focus on pollution from point sources, section 101(a)(7) articulates a goal of developing and implementing “programs for the control of nonpoint sources of pollution.”
  - 2) Title III
    - A) *Section 301* prohibits “the discharge of any pollutant” except those made in compliance with the terms of the Act, including the permit requirement of *Section 402*. It imposes multi-tiered effluent limitations on existing sources whose stringency and timing depend on the nature of the pollutant discharged and whether the outfall is directed to a water body or a publically owned treatment works (POTW).
    - B) *Section 302* authorizes the imposition of more stringent effluent limitations when necessary to prevent interference with the attainment or maintenance of desired water quality – Water quality Standards.
    - C) *Section 303* requires states to adopt and review triennially water quality criteria and standards subject to EPA approval and to identify areas where effluent limitation are insufficient to achieve those standards – Effluent limitation guidelines.
    - D) *Section 304* requires EPA to adopt water quality criteria and guidelines for effluent limitations, pretreatment programs, and the administration of the NPDES program.
    - E) *Section 306* requires EPA to promulgate new source performance standards (NSPS) reflecting best available control technology (BACT).
    - F) *Section 307* requires the discharge of toxic pollutants to meet effluent limits reflecting best available technology economically achievable. Requires EPA to establish pretreatment standards to prevent discharges from interfering with POTWs.
    - G) *Section 309* authorizes compliance orders and administrative, civil and criminal penalties for violation of the CWA.
  - 3) Title IV

- A) *Section 402* establishes the national permit program, the pollution discharge elimination system (NPDES).
  - B) *Section 404* requires a permit from the Army Corp of Engineers for the disposal of dredged or fill material into navigable waters with the concurrence of EPA unless associated with “normal” farming.
- 4) Title VI
- A) *Section 505* authorizes citizen suits against any person who violate an effluent standard or order, or against the EPA administrator for failure to perform nondiscretionary duties.
- iii. **Resource Conservation and Recovery Act (RCRA)** (42 U.S.C. §§ 6901-6992k) (1976). RCRA governs hazardous substances and toxic waste. It requires the EPA to promulgate standards that apply to generators and transporters of hazardous waste and owners and operators of facilities which treat, store and dispose of such waste. RCRA was significantly amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA).
- 1) Subtitle C: Hazardous Waste Management (Sections 30001-3020)
    - A) *Section 3001. Identification and listing of hazardous wastes*: requires EPA to develop criteria for determining what is a hazardous waste and to list those wastes.
    - B) *Section 3002. Regulation of generators of hazardous wastes*: requires EPA to establish recordkeeping requirements and a manifest system to track shipments of hazardous waste from the point of generation.
    - C) *Section 3003. Regulation of transporters of hazardous wastes*: requires transporters of hazardous waste to use the manifest system.
    - D) *Section 3004. Regulation of facilities that treat, store, or dispose of hazardous wastes (TSDs)*: requires EPA to set standards for TSDs to ensure the safe handling of hazardous wastes, prohibits unauthorized land disposal of hazardous wastes, establishes minimum technology standards for certain facilities and requires corrective actions for all releases of hazardous wastes.
    - E) *Section 3005. Permit requirements for TSDs*: requires TSDs to obtain a permit from EPA.
  - 2) Various enforcement provisions
    - A) *Section 3008* provides federal enforcement authorities including administrative, civil and criminal penalties.

- B) *Section 7002* authorizes citizen suits against any person who violates RCRA regulations or permits, against anyone who has contributed or is contributing to the past or present handling of any solid or hazardous waste that may present an imminent and substantial endangerment to health or the environment, and against the EPA administrator for failure to perform nondiscretionary duties.
- C) *Section 7003* authorizes EPA to restrain anyone who has contributed or is contributing to the past or present handling of any solid or hazardous waste that may present an imminent and substantial endangerment to health or the environment.

3) Subtitle I: Regulation of Underground Storage Tanks

iv. **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)** (42 U.S.C. §§ 9601 *et. seq.*) (1980). CERCLA, also called “Superfund”, was originally enacted in 1980 to address the threats to human health and the environment from abandoned hazardous waste disposal sites. CERCLA is commonly known as “Superfund” because it established the Hazardous Substance Superfund for response action and provides for federal and state sharing of response costs. CERCLA was substantially modified by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

1) Principle Provisions

- A) *Section 101* – important definitions are found in this section and elsewhere in the Code of Federal Regulation (CFR)
  - i) Hazardous Substance – §101(14)
    - (1) EPA lists more than 700 substances as hazardous
  - ii) Hazardous Waste – see 40 CFR §261.3
  - iii) Toxic Pollutant – see CWA § 1317
  - iv) Hazardous Air Pollutant
  - v) The “Petroleum Exclusion”
  - vi) Potentially Responsible Party -- §107(a)
    - (1) current and past owners and operators, arrangers of disposal and transporters
  - vii) Release – §101(22)

- (1) just about anything
- viii) Facility – §101(9)
  - (1) very broad
- ix) Removal and remedial actions
- x) Innocent landowner
- xi) Joint and several liability
- xii) Contribution
- xiii) Natural Resource damages
- xiv) National Contingency Plan – §101(31)
  - (1) 40 CFR § 300.61
- xv) Reporting requirements – 40 CFR 302.4-.7
- B) *Section 103* requires reporting of releases of hazardous substances to the National Response Center – Notification requirements.
- C) *Section 105* requires the establishment of a National Priorities List (NPL) of facilities presenting the greatest danger to health, welfare, of the environment based on a hazard ranking system (HRS) and requires revision of the National Contingency Plan (NCP).
- D) *Section 106* authorizes EPA to issue administrative order requiring the abatement of actual or potential releases that may create imminent and substantial endangerment to health, welfare, of the environment – Abatement actions.
- E) *Section 107* imposes liability on potentially responsible parties (PRPs) for:
  - i) costs of removal or remedial action incurred by the federal government not inconsistent with the NCP,
  - ii) any other necessary costs of response incurred by any person consistent with the NCP,
  - iii) damages or injury to natural resources, and
  - iv) costs of health assessments.
- F) *Section 113* allows PRPs to bring civil actions for contribution.

G) *Section 121* establishes cleanup standard preferences.

H) *Section 122* sets standards for settlements with PRPs.

- 2) **Superfund Amendments and Reauthorization Act (SARA) (42 U.S.C. §§ 9601 *et seq.*) (1986).** SARA significantly amended CERCLA. SARA emphasized the importance of finding permanent remedies for cleaning up hazardous waste sites, increased State involvement in Superfund activities, focused on human health problems associated with hazardous waste, and encouraged citizen participation in hazardous waste cleanup decisions. SARA also directed the EPA to revise the **Hazard Ranking System (HRS)** ([http://www.epa.gov/superfund/programs/npl\\_hrs/hrsint.htm](http://www.epa.gov/superfund/programs/npl_hrs/hrsint.htm)) to ensure that the relative degree of risk to human health and the environment posed by uncontrolled hazardous waste sites was taken into account when deciding which sites were placed on the National Priorities List (NPL) (<http://www.epa.gov/superfund/sites/npl/npl.htm>).

d. **OTHER IMPORTANT FEDERAL Environmental LAWS**

i. Laws that prevent pollution

- 1) **Toxic Substances Control Act (TSCA) (15 U.S.C. §§ 2601 *et seq.*) (1976).** TSCA gives the EPA the ability to track the 75,000 industrial chemicals currently produced or imported into the United States. Existing chemicals are listed on the **TSCA Chemical Substance Inventory:** (<http://www.epa.gov/oppt/newchems/pubs/invntory.htm>).
- 2) **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. §§ 136-136y) (1972).** FIFRA provides the basis for regulation, sale, distribution and use of pesticides in the U.S. FIFRA authorizes EPA to review and register pesticides for specified uses. EPA also has the authority to suspend or cancel the registration of a pesticide if subsequent information shows that continued use would pose unreasonable risks. Some key elements of FIFRA include:
- A) product licensing statute; pesticide products must obtain an EPA registration before manufacture, transport, and sale
  - B) registration based on a risk/benefit standard
  - C) strong authority to require data--authority to issue Data Call-ins
  - D) ability to regulate pesticide use through labeling, packaging, composition, and disposal
  - E) emergency exemption authority--permits approval of unregistered uses of registered products on a time limited basis

F) ability to suspend or cancel a product's registration: appeals process, adjudicatory functions, etc.

- 3) **Oil Pollution Act (OPA) (33 U.S.C. §2702 *et seq.*) (1990).** OPA streamlined and strengthened EPA's ability to prevent and respond to catastrophic oil spills. A trust fund financed by a tax on oil is available to clean up spills when the responsible party is incapable or unwilling to do so. The OPA requires oil storage facilities and vessels to submit to the Federal government plans detailing how they will respond to large discharges. EPA has published regulations for aboveground storage facilities; the Coast Guard has done so for oil tankers. The OPA also requires the development of Area Contingency Plans to prepare and plan for oil spill response on a regional scale.
- 4) **Safe Drinking Water Act (SDWA) (42 USC §300f *et seq.*) (1974).** SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made contaminants that may be found in drinking water. US EPA, states, and water systems then work together to make sure that these standards are met.
- 5) **Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 U.S.C. 403) (1899)** states that the creation of any obstruction not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States is hereby prohibited; and it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States, outside established harbor lines, or where no harbor lines have been established, except on plans recommended by the Chief of Engineers and authorized by the Secretary of War; and it shall not be lawful to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of, any port, roadstead, haven, harbor, canal, lake, harbor of refuge, or enclosure within the limits of any breakwater, or of the channel of any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of War prior to beginning the same.

ii. Laws that protect public resources

- 1) **National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. §§ 4321-4370).** "NEPA is the basic national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy." The most important provision in NEPA is § 102(c) (at 83 Stat. 853) which requires federal agencies to document their consideration of environmental factors by writing environmental impact statements (EIS) during their decision-making processes.

- 2) **Endangered Species Act (ESA) (7 U.S.C. § 136 & 16 U.S.C. §§ 1531 *et seq.*) (1973).** The ESA was enacted to conserve threatened and endangered plants and animals as well as their habitats. In order to receive protection, a plant or animal species must be placed on the federal list of endangered and threatened wildlife and plants (<http://www.fws.gov/endangered/wildlife.html>), maintained by the U.S. Fish and Wildlife Service.
- 3) **Marine Mammal Protection Act (MMPA) (16 U.S.C. § 1361 *et seq.*) (1972).** MMPA established a Federal responsibility to conserve marine mammals with management vested in the Department of Interior for sea otter, walrus, polar bear, dugong, and manatee. The Department of Commerce is responsible for cetaceans and pinnipeds, other than the walrus. It exempted Indians, Aleut, and Eskimos (who dwell on the coast of the North Pacific Ocean) from the moratorium on taking provided that taking was conducted for the sake of subsistence or for the purpose of creating and selling authentic native articles of handicraft and clothing. In addition, the law stipulated conditions under which the Secretaries of Commerce and Interior could issue permits to take marine mammals for the sake of public display and scientific research.
- 4) **Emergency Planning and Community Right-to-Know Act (EPCRA) 42 U.S.C. §11001 *et seq.* (1986).** EPCRA is designed to help local communities protect public health, safety, and the environment from chemical hazards by requiring each state to appoint a State Emergency Response Commission (SERC). The SERCs are required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee (LEPC) for each district.
  - A) *Section 304.* Emergency Notification Facilities must immediately report accidental releases of EHS chemicals and “hazardous substances” in quantities greater than corresponding Reportable Quantities (RQs) defined under CERCLA to state and local officials. Information about accidental chemical releases must be available to the public.
  - B) *Sections 311 and 312.* Requires facilities manufacturing, processing, or storing designated hazardous chemicals to make Material Safety Data Sheets (MSDSs) describing the properties and health effects of these chemicals available to state and local officials and local fire departments. Facilities must also report, to state and local officials and local fire departments, inventories of all on-site chemicals for which MSDSs exist. Information about chemical inventories at facilities and MSDSs must be available to the public.
  - C) *Section 313.* Requires facilities to complete and submit a Toxic Chemical Release Inventory Form annually for each of the more than 600 Toxic

Release Inventory (TRI) chemicals that are manufactured or otherwise used above the applicable threshold quantities.

D) *Section 322*. Facilities are allowed to withhold the specific chemical identity from the reports filed under sections 303, 311, 312 and 313 of EPCRA if the facilities submit a claim with substantiation to EPA.

iii. Common law theories of liability

- 1) Public nuisance
- 2) Private nuisance
- 3) Trespass
- 4) Negligence
- 5) Strict Liability for ultra-hazardous or abnormally dangerous activity
- 6) Negligent entrustment
- 7) Vicarious liability
- 8) CERCLA is different
  - A) Eliminate causation
  - B) No-fault liability
  - C) Few Defenses
  - D) Broadens class of potential defendants

e. **RULES AND REGULATIONS**

- i. Environmental statutes generally grant power to administrative agencies, such as the EPA, to propose and promulgate regulations. These regulations have the force and effect of law.
  - 1) Environmental law is often characterized by legal disputes between private parties and government agencies rather than between private parties. As a result, regulations promulgated by the EPA and state agencies are fundamentally important sources of environmental law.
  - 2) Regulations explain how various environmental statutes are interpreted and enforced.

- ii. The vast majority of federal regulations governing environmental law issues are found in Title 40 (Protection of Environment) of the *Code of Federal Regulations (C.F.R.)*.
  - 1) Relevant regulations are also found in Titles 5, 10, 15, 18, 26, 33 and 50. The current print version of the CFR is located in the Federal Alcove; previous editions are located on Level 1 in Law Documents (AE 2.106/3).
  - 2) The CFR may be found online in PDF at GPO Access (<http://www.gpoaccess.gov/cfr/index.html>), 1996-current edition; and HeinOnline (<http://library.duke.edu/metasearch/db/id/DUK00693>), 1938-previous edition.
- iii. The *Federal Register* is the official daily publication for Rules, Proposed Rules, and Notices of federal agencies and organizations. In addition to the regular print and electronic sources for the *Federal Register*, there are specialized sources for environmental materials.
  - 1) The EPA provides a database with the full text of all *Federal Register* documents issued by EPA, and selected documents issued by other departments and agencies back to October, 1994 (<http://www.epa.gov/fedrgstr/>). Historical editions of the *Federal Register* can be found in HeinOnline (<http://library.duke.edu/metasearch/db/id/DUK00693>), 1936-present.
- iv. Many of the regulations promulgated by the EPA and other federal agencies first begin as proposed regulations, and interested members of the public can comment on the proposed regulations in a process known as “informal” rulemaking or “notice and comment” rulemaking. (<http://www.epa.gov/regulations/>).
  - 1) The EPA’s Dockets, **Electronic Dockets, and Information Centers** provide information about the rulemaking process. A docket is established each time a rulemaking process is announced.
  - 2) A docket is assigned a tracking number and contains Federal Register documents, supporting documents and public comments. Information about Dockets is available at: (<http://www.epa.gov/epahome/dockets.htm>).

### 3. ENVIRONMENTAL PROTECTION AGENCY (EPA)

- a. The EPA (<http://www.epa.gov/>) was created in 1970 as an independent agency by PRESIDENTIAL Executive Order 11472 (<http://www.archives.gov/federal-register/codification/executive-order/11472.html>). It is the primary enforcer of all federal environmental laws. The major laws that form the legal basis for the EPA’s regulatory power can be found at the EPA’s site (<http://www.epa.gov/lawsregs/laws/index.html>).

- i. EPA provides online access to many of its technical and public information documents (<http://www.epa.gov/epahome/publications.htm>). The **National Service Center for Environmental Publications (NSCEP/NEPIS)** (<http://www.epa.gov/ncepihom/>), which is a central repository for all EPA documents, contains more than 28,000 titles in both print and electronic format. The **Envirofacts Data Warehouse** (<http://www.epa.gov/enviro/>) provides the public with direct access to EPA data.
- b. **PARTS OF EPA**
- i. The **Environmental Appeals Board** (<http://www.epa.gov/eab/>) is the final agency decision-maker on administrative appeals under all major environmental statutes that EPA administers. Many of the Environmental Appeals Board's formal written opinions are available online through this site.
  - ii. The EPA's **Office of Administrative Law Judges (OALJ)** (<http://www.epa.gov/oalj/>) is an independent office in the Office of the Administrator of the EPA. Administrative Law Judges (ALJ) conduct hearings and render decisions in proceedings between the EPA and persons, businesses, and government entities that are regulated under environmental laws. All decisions issued by an ALJ are subject to review by the Environmental Appeals Board (EAB). Decisions and orders of the ALJ (1989-present) are available at: (<http://www.epa.gov/oalj/orders.htm>).

#### 4. **Other Federal Agencies that have some environmental law responsibilities.**

- a. The **ENVIRONMENT AND NATURAL RESOURCES DIVISION** (<http://www.usdoj.gov/enrd/>), which is part of the Department of Justice, calls itself the nation's environmental **LAWYER**. It is divided into nine litigating sections.
  - i. The **Environmental Enforcement Section** brings civil enforcement cases on behalf of its client agencies, primarily the EPA. These cases seek control of pollution and cleanup of hazardous waste sites across the country.
  - ii. The **Environmental Crimes Section** is responsible for prosecuting individuals and industries which have violated federal environmental statutes.
- b. The **COUNCIL ON ENVIRONMENTAL QUALITY (CEQ)** (<http://www.whitehouse.gov/ceq/>) was established by Congress within the Executive Office of the President AS part of the National Environmental Policy Act of 1969 (NEPA).
  - i. NEPA assigns CEQ the task of ensuring that federal agencies meet their obligations under the Act and plays a central role in the Environmental Impact Statement (EIS) process. The CEQ also assists and advises the President. While the CEQ does not have authority to enforce its regulations, courts often grant considerable deference to its guidelines.

- c. The **AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR)** (<http://www.atsdr.cdc.gov>) is an agency of the U.S. Department of Health and Human Services and is the principal federal public health agency involved with hazardous waste issues.
  - i. It is the lead agency which implements the health-related provisions of CERCLA, and it is charged under the Superfund Act to assess the presence and nature of health hazards at specific Superfund sites.
  - ii. ATSDR also assists the EPA in determining which substances should be regulated and the levels at which substances may pose a threat to human health.
    - 1) The ATSDR's **Hazardous Substance Release/Health Effects Database (HazDat)** (<http://www.atsdr.cdc.gov/hazdat.html>) is a scientific and administrative database which provides access to information on the release of hazardous substances from Superfund sites or from emergency events.
- d. The **UNITED STATES DEPARTMENT OF THE INTERIOR** (<http://www.doi.gov/>) is the nation's principal conservation agency, and maintains most of our nationally owned public lands and natural resources.
  - i. Established in 1849, the Department of the Interior is comprised of a number of bureaus and offices including the Bureau of Indian Affairs, the Bureau of Land Management, the Bureau of Reclamation, the Fish and Wildlife Service, the U.S. Geological Survey, the Minerals Management Service.

## 5. **Texas Environmental Law**

- a. **REGULATORY AGENCIES** – Various governmental agencies are responsible for establishing and implementing environmental law in Texas.
  - i. Central among these is the **Texas Commission on Environmental Quality (TCEQ)** f/k/a Natural Resource Conservation Commission (TNRCC).
    - 1) The TCEQ was formed in 1993 by a merger of the Texas Water Commission and the Texas Air Control Board. In this merger the Department of Health also transferred responsibility of regulating municipal solid waste, water hygiene, and radioactive waste disposal to the new agency.
    - 2) The TCEQ has authority for various permitting functions, handling applications for water use and storage, and creating local districts for the conservation and use of the state's water. It also carries out the regulatory functions of the federally mandated programs.
- b. The **Texas Water Development Board** is responsible for water-supply planning and water financing.

- i. Other activities include development and maintenance of the state water plan, administering the Texas Development Fund and Water Assistance Fund, operating the Texas Natural Resources Information System, and coordinating the state's plans with federal agencies developing federal water projects in Texas.
  - ii. The **General Land Office** administers all state-owned land programs and is responsible for coastal zone management. The Governor's Budget and Planning Office serves as a clearinghouse for the distribution of federally required environmental assessments and impact statements to the applicable state agencies.
- c. **CATEGORIES OF Environmental CONCERN**

i. Water Quality

- 1) Businesses are responsible for the effect their operations may have on water quality. Texas' water protection programs are carried out by various divisions within the TCEQ.
  - A) The state has three categories of water quality designations: contact and non-contact recreation, domestic water supply, and aquatic life.
  - B) The domestic water supply and aquatic life designations especially affect businesses. The state imposes limitations on concentrations of heavy metals, pesticides, and toxic and chemical materials with regard to water with these quality designations.
- 2) The TCEQ assumed an aggressive enforcement stance to encourage uniform compliance by those holding wastewater discharge permits.
  - A) Penalties of up to \$10,000 per day may be assessed and individuals not complying with the permit requirements for an extended period face mandatory enforcement hearings before the TCEQ.
  - B) In addition, administrative penalties may be assessed.
- 3) National Pollution Discharge Elimination System (NPDES) permits are required of anyone who intends to emit any pollutant into state surface waters, including noncontact cooling water and air conditioning or heat-pump water.
  - A) EPA authorized TCEQ to administer NPDES permitting program for facilities within TCEQ's jurisdiction in 1998. However, in certain circumstances, exclusive authority to issue NPDES permits revert back to EPA under CWA §402(d).
  - B) The state tries to keep duplication of requirements to a minimum. Holders of water discharge permits must periodically report their compliance with the terms of the permits, including flow measurements and sample

analysis results. Companies producing leather, glass, asbestos, rubber, and timber products are subject to additional EPA water discharge requirements.

ii. Air Pollution

- 1) In Texas, federally established air quality standards by the Clean Air Act are enforced by the TNRCC.
- 2) As required by the EPA, the TCEQ reports an air pollution standards index (PSI) for cities with 200,000 or more residents. The index is based on measured levels of the 6 criteria pollutants, and--during summer--mold and pollen. In other areas, levels may be estimated through computer modeling. The levels are a major factor in the State Implementation Plan (SIP) that the TCEQ must file with the EPA to demonstrate attainment of federal air quality standards. Attainment or non-attainment affects the issuance of permits to businesses that emit pollutants.
- 3) In Texas, businesses are liable for air pollutants such as odors, dust created by business operations and carried by the winds, and smoke caused by open burning.
  - A) Every business must notify the TCEQ immediately of any releases to the air that might endanger human health, damage property, or create a public nuisance, and the business must take any steps necessary to prevent such releases.
  - B) Businesses that should be particularly aware of air quality rules include grain elevators, concrete plants, sand and gravel operations, and building demolition companies, as well as those that use boilers, incinerators, generators, and solvent-borne coatings.

iii. Hazardous Waste

- 1) Texas has led the nation in the generation of hazardous waste due to the fact that it produces over half of the country's petrochemicals and has 20 percent of its refining capacity. It also has been a net importer of hazardous waste.
- 2) Regulation of Hazardous Wastes
  - A) The TCEQ is the regulating authority for hazardous waste. It regularly updates its rules to incorporate changes in EPA programs.
  - B) Generators and transporters of hazardous waste, as well as operators of treatment, storage, and disposal facilities, must comply with all applicable rules, including general rules not yet incorporated into state rules.

- C) Every industry that generates waste is required to determine whether its waste is hazardous either by locating the waste on a list of hazardous substances or by conducting tests.
- D) Each transporter of hazardous waste must have an EPA identification number and be registered to haul hazardous waste in the destination state.
- E) Generators also are required to have EPA identification numbers and licenses (renewable annually), and must submit annual disclosure statements.
- F) Every generator must name an emergency coordinator who is on call for disasters. They also must post emergency notification information and locations of emergency control equipment and alarms. If a spill occurs, the emergency coordinator or person in control must contain it and clean it up, and call the State Emergency Response Commission or the TNRCC.

iv. Employee Right-To-Know

- 1) The Act is administered by the Texas Board of Health.

v. Community Right-To-Know

- 1) In Texas, the agency that collects the information is the State Emergency Response Commission in the TCEQ. In addition to inventories, employers are required to report estimates of maximum combined quantities of hazardous substances and the name of a responsible person who is always on call in case of emergency. Filing fees are determined by a formula based on the number of chemicals reported.
  - A) Since the TCEQ is part of the SERC, reporting a spill to the State's spill reporting hot line, 1-800-832-8224, constitutes reporting to the SERC

vi. Solid Waste

- 1) Management of solid waste is shared by the TCEQ and Texas municipalities. Industries that use landfills, or otherwise dispose of wastes on-site are not required to obtain permits. However, they must register their activities with the TCEQ. Companies also may use municipal landfills but only with approval of the applicable governmental office.
- 2) Commercial off-site industrial waste disposal facilities must have permits.
- 3) Texas law prohibits placing tires, lead-acid batteries, used motor oil, and other such items in landfills. A business concerned with the rules and regulations at a particular facility should contact the operator of the facility.

vii. Special Categories of Environmental Concern

- 1) Infectious Waste -- Infectious waste includes laboratory waste, blood and blood products, certain bodily fluids, research animal waste, and sharp instruments such as needles and scalpel blades.
  - A) In Texas, medical waste management is the responsibility of the Municipal Solid Waste Division of TCEQ, which provides rules for labeling and packaging of waste by hospitals and clinics. It also requires that commercial transporters of medical waste be licensed. Because the regulations governing infectious waste are quite technical, generators should seek expert advice to devise procedures for collection, storage, marking, transportation, and disposal of infectious waste.
- 2) Storage Tanks
  - A) In 1989, the Petroleum Storage Tank Division of the TCEQ was created to register tanks, license storage tank installers, provide technical support and enforcement, and provide corrective functions. The Division also oversees Texas' Petroleum Storage Tank Remediation Fund.
- 3) Recycling
  - A) The Texas Legislature enacted extensive recycling regulations in 1991. The TCEQ, along with the General Land Office, the General Services Commission, and the Texas Department of Commerce, provide support for and coordinate the recycling activities in Texas, and pursue an economic development strategy that includes development of recycling industries and markets.
  - B) The legislature also has set up programs for recycling newsprint, lead-acid batteries, tires, and other products.

d. **CURRENT IMPORTANT TEXAS ISSUES**

i. Air Permitting

- 1) In June 2010, EPA rejected one of the Texas' key environmental permitting processes – the flexible air permit system – thereby invalidating the air quality permits of 122 plants across Texas, requiring the facilities to apply for new permits.
  - A) EPA Regional Administrator Al Armendariz said none of the facilities will be required to shut down while obtaining a new operating permit. He said some permits can be upgraded administratively, but others will require a review process that may result in having to install more modern clean air technology.

- B) Industry representatives fear that a lengthy process will result in most of the permits not being issued until new EPA greenhouse gas regulations become effective in January. If the permitting is slowed down, it will be a “backdoor” method of bringing the greenhouse gas rules into play.
  - C) The Texas flexible permit system was adopted in 1995 to allow facilities greater latitude in controlling air emissions as a facility. One portion of a facility could pollute more than another so long as the overall emissions from the plant did not violate federal air standards.
- ii. Barnett Shale gas operations
- 1) EPA and TCEQ have been performing health-effects analysis of Barnett Shale air.
    - A) The analysis, written May 25 and released June 4, is the fifth such analysis released by the Texas Commission on Environmental Quality since October. It examines new findings by inspectors and the long-term risks those toxic compounds could present.
  - 2) Inspectors have been testing emissions at several natural gas production sites since last fall — and released their initial results in 300-page report in January.
  - 3) Benzene is the chemical of concern
    - A) The toxicology division at TCEQ set a threshold for long-term, or lifetime, exposure in Texas at 1.4 ppb for benzene. The EPA does not require states to do as Texas and others have, setting a long-term threshold for airborne toxic compounds such as benzene.

# Glossary

The following glossary and the acronym list may help you understand the terminology employed in environmental regulation. They are adapted from various EPA lists of environmental terms and acronyms. The definitions are intended to acquaint you with the basic concepts; they do not represent legal definitions of the terms.

**Abatement.** Reducing the degree of intensity of, or eliminating, pollution.

**Acid deposition.** A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources; and then deposited on Earth in either a wet or dry form. The wet forms, popularly called "acid rain," can fall as rain, snow, or fog. The dry forms are acidic gases or particulates.

**Acid rain.** See Acid deposition.

**Active ingredient.** In any pesticide product, the component that kills, or otherwise controls, target pests. Pesticides are regulated primarily on the basis of their active ingredients.

**Acute toxicity.** The ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Also, any severe poisonous effect resulting from a single short-term exposure to a toxic substance.

**Administrative order.** A legal document signed by EPA directing an individual, business, or other entity to, take corrective action or refrain from an activity. It describes the violations and actions to be taken and can be enforced in court. Such orders may be issued, for example, as a result of an administrative complaint whereby the respondent is ordered to pay a penalty for violations of a statute.

**Administrative order on consent.** A legal agreement signed by EPA and an individual, business, or other entity through which the violator agrees to pay for correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

**Advanced waste water treatment.** Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients such as phosphorus and nitrogen and a high percentage of suspended solids.

**Advisory.** A nonregulatory document that communicates risk information to persons who may have to make risk management decisions.

**Airborne particulates.** Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. The chemical composition of particulates varies widely depending on location and time of year. Airborne particulates include: windblown, dust, emissions from industrial processes, smoke from the burning of wood and coal, and the exhaust of motor vehicles.

**Air quality criteria.** The levels of pollution and lengths of exposure above which adverse health and welfare effects may occur.

**Air quality standards.** The level of pollutants prescribed by regulations that may not be exceeded during a specified time in a defined area.

**Ambient air quality standards.** See Criteria pollutants; National ambient air quality standards.

**Anthropogenic.** Caused by or relating to the impact of human activity on the environment.

**Anti-degradation clause.** The part of federal air quality and water quality requirements prohibiting deterioration where pollution levels are above the legal limit.

**Aquifer.** An underground geological formation, or group of formations, containing usable amounts of groundwater that can supply wells and springs.

**Area source.** Any stationary source of hazardous air pollution that is not a major source. Such sources, which do not include motor vehicles, are to be regulated under sections 112(k) and 112(d) of the Clean Air Act.

**Asbestos.** A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. EPA has banned or severely restricted its use in manufacturing and construction.

**Asbestosis.** A disease associated with chronic exposure to and inhalation of asbestos fibers. The disease makes breathing progressively more difficult and can -lead to death.

**Ash.** The mineral content of a product remaining after complete combustion.

**Assimilation.** The ability of a body of water to purify itself of pollutants.

**Attainment area.** An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a nonattainment area for others.

**Background level.** In air pollution control, the concentration of air pollutants in a definite area during a fixed period of time prior to the starting up of or the stoppage of a source of emission under control. In toxic substances monitoring, the average presence in the environment, originally referring to naturally occurring phenomena.

**Banking.** A system for recording qualified air emissions reductions for later use in bubble, offset, or netting transactions.

**BEN.** EPA's computer model for analyzing a violator's economic gain from not complying with the law.

**Benthic organism (Benthos).** A form of aquatic plant or animal life that is found on or near the bottom of a stream, lake, or ocean.

**Benthic region.** The bottom layer of a body of water.

**Best available control technology (BACT).** An emission limitation based on the maximum degree of emission reduction (considering energy, environmental, and economic impacts and other costs) achievable through application of production processes and available methods, systems, and techniques. In no event does BACT permit emissions in excess of those allowed under any applicable Clean Air Act provisions. Use of the BACT concept is allowable on a case-by-case basis for major new or modified emissions sources in attainment areas, and it applies to each regulated pollutant.

**Bioaccumulative.** Characterized by an increase in concentration of a substance in living organisms (that are very slowly metabolized or excreted) as they breathe contaminated air, drink contaminated water, or eat contaminated food.

**Bioassay.** The use of living organisms to measure the effect of a substance, factor, or condition by comparing before-and-after data. The term is often used to denote cancer bioassays.

**Biochemical oxygen demand (BOD).** A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. The greater the BOD, the greater the degree of pollution.

**Biodegradable.** Having the ability to break down or decompose rapidly under natural conditions and processes.

**Biological treatment.** A treatment technology that uses bacteria to consume waste. This treatment breaks down organic materials.

**Biomass.** All of the living material in a given 'area, often refers to vegetation. Also called "biota."

**Biomonitoring.** (1) The use of living organisms to test the suit-ability of effluent for discharge into receiving waters and to test the quality of such waters downstream from the discharge. (2) Analysis of blood, urine, tissues, and so on to measure chemical exposure in humans.

**Biosphere.** The portion of Earth and its atmosphere that can support life.

**Biotic community.** A naturally occurring assemblage of plants and animals that live in the same environment and are, mutually sustaining and independent.

**BOD5.** The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter.

**Bottle bill.** Proposed or enacted legislation that requires a returnable deposit on beverage containers and provides for redemption in retail stores or other places. Such legislation is designed to discourage use of throw-away containers.

**Bubble, The.** A system under which existing emissions sources can propose alternate means to comply with a set of emissions limitations. Under the bubble concept, sources can control more than they are required to at one emission point where control costs are relatively low in return for a comparable relaxation of controls at a second emission point where costs, are higher.

**Bubble policy.** See Emissions trading.

**Buffer strips.** Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields.

**Cancellation.** Refers to section 6(b) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which authorizes cancellation of a pesticide registration if unreasonable adverse effects to the environment and public health develop when a product is used according to widespread and commonly recognized practice or if its labeling or other material required to be submitted does not comply with FIFRA, provisions.

**Cap.** A layer of clay or other highly impermeable material installed over the top of a closed landfill to prevent entry of rainwater and minimize production of leachate.

**Carbon dioxide (CO<sub>2</sub>).** A colorless, odorless, nonpoisonous gas that results from fossil fuel combustion and is normally a part of the ambient air. Increasing levels of carbon dioxide in the atmosphere are contributing to the greenhouse effect.

**Carbon monoxide (CO).** A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

**Carcinogen.** Any substance that can cause or contribute to the production of cancer.

**Carcinogenic.** Cancer-producing.

**Carrying capacity.** (1) In recreation management, the amount of use a recreation area can sustain without deterioration of its quality. (2) In wildlife management, the maximum number of animals an area can support during a given period of the year.

**Catalytic converter.** An air pollution abatement device that removes pollutants from motor vehicle exhaust, either by oxidizing them into carbon dioxide and water or reducing them to nitrogen and oxygen.

**Categorical exclusion.** A class of actions that either individually or cumulatively would not have a significant effect on the human environment and therefore would not require preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act (NEPA).

**Categorical pretreatment standard.** A technology-based effluent limitation for an industrial facility that discharges into a municipal sewer system. Analogous in stringency to Best Available Technology (BAT) for direct dischargers.

**Characteristic.** Any one of the four categories used in defining hazardous waste: ignitability, corrosivity, reactivity, and toxicity.

**Chemical treatment.** Any one of a variety of technologies that use chemicals or a variety of chemical processes to treat waste.

**Chlorinated hydrocarbons.** These include a class of persistent, broad-spectrum insecticides that linger in the environment and accumulate in the food chain. Among them are DDT, aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, hexachloride, and toxaphene. Other examples include TCE, used as an industrial solvent.

**Chlorinated solvent.** An organic solvent containing chlorine atoms, for example, methylene chloride and 1,1,1-trichloromethane, which are used in aerosol spray containers and in traffic paint.

**Chlorination.** The application of chlorine to drinking water, sewage, or industrial waste to disinfect it or to oxidize undesirable compounds.

**Chlorofluorocarbons (CFCs).** A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, and insulation or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere they drift into the upper atmosphere, where their chlorine components destroy ozone.

**Chronic toxicity.** The capacity of a substance to cause long-term poisonous human health effects.

**Cleanup.** Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, or corrective action.

**Clear cut.** A forest management technique that involves harvesting all the trees in one area at one time. Under certain soil and slope conditions it can contribute sediment to water pollution.

**Closed-loop recycling.** Reclaiming or reusing wastewater for purposes other than drinking or cooking in an enclosed process.

**Coastal zone.** Lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or, inversely, whose uses and ecology are affected by the sea.

**Coefficient of haze.** A measurement of visibility interference in the atmosphere.

**Coliform index.** A rating of the purity of water based on a count of fecal bacteria.

**Combined sewers.** A sewer system that carries both sewage and storm water runoff. Normally its entire flow goes to a waste treatment plant, but during a heavy storm, the storm water volume may be so great as to cause overflows. When this happens untreated mixtures of storm water and sewage may flow into receiving waters. Storm water runoff may also carry toxic chemicals from industrial areas or streets into the sewer system.

**Comment period.** Time provided for the public to review and comment on a proposed EPA action or rulemaking after it is published in the Federal Register.

**Community water system.** A public water system that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

**Compliance schedule.** A negotiated agreement between a pollution source and a government agency that specifies dates and procedures by which a source will reduce emissions and thereby comply with a regulation.

**Conditional registration.** Under special circumstances, the Federal Insecticide, Fungicide, and Rodenticide Act permits registration of pesticide products that is "conditional" on the submission of additional data. These special circumstances include a finding by the EPA administrator that a new product or use of an existing pesticide will not significantly increase the risk of unreasonable adverse effects. A product containing a new (previously unregistered) active ingredient may be conditionally registered only if the administrator finds that such conditional registration is in the public interest, that a reasonable time for conducting the additional studies has not elapsed, and that the use of the pesticide for the period of conditional registration will not present an unreasonable risk.

**Consent decree.** A legal document, approved by a judge, that formalizes an agreement reached between EPA and potentially responsible parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with regulations where the PRP's failure to comply caused EPA to initiate regulatory enforcement actions. The consent decree describes the actions PRPs will take and may be subject to a public comment period.

**Conservation.** Avoiding waste of, and renewing when possible, human and natural resources; the protection, improvement, and use of natural resources according to principles that will assure their highest economic or social benefits.

**Contaminant.** Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

**Contingency plan.** A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accident that releases toxic chemicals, hazardous wastes, or radioactive materials that threaten human health or the environment.

**Conventional pollutants.** Statutorily listed pollutants that are understood well by scientists. These may be in the form of organic waste, sediment, acid, bacteria and viruses, nutrients, oil and grease, or heat.

**Corrosive.** A chemical agent that reacts with the surface of a material, causing it to deteriorate or wear away.

**Cost-effective alternative.** An alternative control or corrective method identified after analysis as being the best available in terms of reliability, permanence, and economic considerations. Such analysis does not require EPA to choose the least expensive alternative. For example, when selecting a method for cleaning up a site on the Superfund National Priorities List, the Agency balances costs with the long-term effectiveness of the various methods proposed.

**Cost recovery.** A legal process by which potentially responsible parties who contributed to contamination at a Superfund site can be required to reimburse the Trust Fund for money spent during any cleanup actions by the federal government.

**Criteria.** Descriptive factors taken into account by EPA in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels and to limit the number of violations per year. When issued by EPA, the criteria provide guidance to the states on how to establish their standards.

**Criteria pollutants.** Six air pollutants known to be hazardous to human health: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term derives from the requirement that EPA describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

**Curie.** A quantitative measure of radioactivity equal to  $3.7 \times 10^{10}$  disintegrations per second.

**Data call-in.** A part of the process of developing key required test data, especially on the long-term, chronic effects of existing pesticides, in advance of scheduled Registration Standard reviews. Data call-in is an adjunct of the Registration Standards program intended to expedite reregistration and involves the "calling in" of data from manufacturers.

**DDT.** The first chlorinated hydrocarbon insecticide (chemical name: dichloro-diphenyl-trichloroethane). It has a half-life of 15 years and can collect in fatty tissues of certain animals. EPA banned registration and interstate sale of DDT for virtually all but emergency uses in the United States in 1972 because of its persistence in the environment and accumulation in the food chain.

**Decomposition.** The breakdown of matter by bacteria and fungi. It changes the chemical makeup and physical appearance of materials.

**Degradation.** The process by which a chemical is reduced to a less complex form.

**Delegated state.** A state (or other government entity) that has applied for and received authority to administer, within its territory, its state regulatory program as the federal program required under a particular federal statute. As used in connection with the NPDES program, the term does not connote any, transfer of federal authority to a state.

**Delisting.** A decision to exclude a waste generated at a particular facility from listing as hazardous under RCRA subtitle C in response to a petition demonstrating that site-specific factors render the waste nonhazardous.

**Dermal toxicity.** The ability of a pesticide or toxic chemical to poison people or animals by contact with the skin.

**Designated pollutant.** An air pollutant that is neither a criteria nor a hazardous pollutant as described in the Clean Air Act but for which new sources performance standards exist. The Clean Air Act does require states to control: these pollutants, which include acid mist, total reduced sulfur (TRS), and fluorides.

**Designated uses.** Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act. Uses can include cold water fisheries, public water supply, and agriculture.

**Dilution ratio.** The relationship between the volume of water in a stream and the volume of incoming water. It affects the ability of the stream to assimilate waste.

**Dioxin.** Any of a family of compounds known chemically as dibenzo-p-dioxins. Concern about them arises from their potential toxicity and contamination of commercial products. One of the more toxic manmade chemicals known.

**Direct discharger.** A municipal or industrial facility that introduces pollution through a defined conveyance or system; a point source.

**Disposal.** Final placement or destruction of toxic, radioactive, or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through use of approved secure landfills, surface impoundments, land farming, deep well injection, ocean dumping, or incineration.

**Dissolved oxygen (DO).** The oxygen freely available in water. Dissolved oxygen is vital to fish and other aquatic life and for the prevention of odors. Traditionally, the level of dissolved oxygen has been accepted as the single most important indicator of a water body's ability to support desirable aquatic life. Secondary and advanced waste treatment are generally designed to protect DO in waste-receiving waters.

**Dissolved solids.** Disintegrated organic and inorganic material contained in water. Excessive amounts make water unfit to drink or use in industrial processes.

**Dredging.** Removal of mud from the bottom of water bodies using a scooping machine. This disturbs the ecosystem and causes silting that can kill aquatic life. Dredging of contaminated muds can expose aquatic life to heavy metals and other toxics. Dredging activities may be subject to regulation under section 404 of the Clean Water Act.

**Dump.** A site used to dispose of solid wastes without environmental controls.

**Ecological impact.** The effect that a manmade or natural activity has on living organisms and their nonliving (abiotic) environment.

**Ecology.** The relationship of living things to one another and their environment, or the study of such relationships.

**Ecosphere.** The "bio-bubble" that contains life on Earth, in surface waters, and in the air.

**Ecosystem.** The interacting system of a biological community and its nonliving environmental surroundings.

**Effluent.** Wastewater—treated or untreated—that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

**Effluent limitation.** Restrictions established by a state or EPA on quantities, rates, and concentrations in wastewater discharges.

**Electrostatic precipitator.** An air pollution control device that removes particles from the gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

**Eminent domain.** Government taking—or forced acquisition— of private land for public use, with compensation paid to the landowner.

**Emission.** Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

**Emission inventory.** A listing, by source, of the amount of air pollutants discharged into the atmosphere of a community. It is used to establish emission standards.

**Emission standard.** The maximum amount of air-polluting discharge legally allowed from a single source, mobile or stationary.

**Emissions trading.** An EPA policy that allows a plant complex with several facilities to decrease pollution from some facilities while increasing it from others, so long as total results are equal to or better than those required by previous limits. Facilities where this is done are treated as if they exist in a bubble in which total emissions

are averaged out. Complexes that reduce emissions substantially may "bank" their "credits" or sell them to other industries.

**Endangered species.** Animals, birds, fish, plants, or other living organisms threatened with extinction by manmade or natural changes in their environment. Requirements for declaring a species endangered are contained in the Endangered Species Act.

**Enforcement.** EPA, state, or local legal actions to obtain compliance with environmental laws, rules, regulations, or agreements or obtain penalties or criminal sanctions for violations. Enforcement procedures may vary depending on the specific requirements of different environmental laws and related implementing regulatory requirements.

**Enforcement decision document.** A document that provides an explanation to the public of EPA's selection of the cleanup alternative at enforcement sites on the National Priorities List. Similar to a Record of Decision.

**Environment.** The sum of all external conditions affecting the life, development, and survival of an organism.

**Environmental assessment.** A written environmental analysis that is prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require preparation of a more detailed environmental impact statement.

**Environmental audit.** (1) An independent assessment of the current status of a party's compliance with applicable-environmental requirements. (2) An independent evaluation of a party's environmental compliance policies, practices, and controls.

**Environmental impact statement.** A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision-making, it describes in detail the positive and negative effects of the undertaking and must include an analysis of alternative actions.

**EPA.** The U.S. Environmental Protection Agency, established in 1970 by executive order.

**Epidemiology.** The study of diseases as they affect populations, including the distribution of disease or other health-related states and events in human populations, the factors (e.g., age, sex, occupation, economic status) that influence this distribution, and the application of this study to the control of health problems.

**Erosion.** The wearing away of land surface by wind or water. Erosion occurs naturally owing to weather or runoff but can be intensified by land-clearing practices related to farming, residential or industrial development, road building, or timber-cutting.

**Estuary.** Regions of interaction between rivers and near shore ocean waters where tidal action and river flow create a mixing of fresh and salt water. These areas may include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife.

**Eutrophication.** The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication, the water body is choked by abundant plant life as the result of increased amounts of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

**Exceedance.** Violation of environmental protection standards by exceeding allowable limits or concentration levels.

**Exposure.** The amount of radiation or pollutant present in an environment that represents a potential health threat to the living organisms in that environment.

**Extremely hazardous substances.** Any of hundreds of chemicals identified by EPA on the basis of toxicity and listed under the Emergency Planning and Community Right-to-Know Act. The list is subject to revision.

**Fabric filter.** A cloth device that catches dust particles from industrial emissions.

**Feasibility study.** (1) Analysis of the practicability of a proposal. The feasibility study usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is under way; together, they are commonly referred to as the "RI/FS." The term can apply to a variety of proposed corrective

or regulatory actions. (2) In research, a small-scale investigation of a problem to ascertain whether or not a proposed research approach is likely to provide useful data.

**Filling.** Depositing dirt and mud or other materials into aquatic areas to create more dry land, usually for agricultural or commercial development purposes. Such activities often damage the ecology of the area.

**Filtration.** A treatment process, under the control of qualified operators, for removing solid (particulate) matter from water by passing the water through porous media such as sand or a manmade filter. The process is often used to remove particles that contain pathogenic organisms.

**Finding of no significant impact.** A document prepared by a federal agency that presents the reasons why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement. An FNSI is based on the results of an environmental assessment.

**First draw.** The water that immediately comes out when a tap is first opened. This water is likely to have the highest level of lead contamination from plumbing materials.

**Flue gas.** The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles, and many chemical pollutants.

**Flue gas desulfurization.** A technology that uses a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is currently the state-of-the-art technology in use in major SO<sub>2</sub> emitters, for example, power plants.

**Fluorocarbons (FCs).** Any of a number of organic compounds analogous to hydrocarbons in which one or more hydrogen atoms are replaced by fluorine. Once used in the United States as a propellant in aerosols, they are now primarily used in coolants and in some industrial processes. FCs, containing chlorine are called chlorofluorocarbons (CFCs). They are believed to be depleting the ozone layer in the stratosphere, thereby allowing more harmful radiation to reach the Earth's surface.

**Fly ash.** Noncombustible residual particles from the combustion process carried by flue gas.

**Food chain.** A sequence of organisms, each of which uses the next lower member of the sequence as a food source.

**Fresh water.** Water that generally contains less than 1,000 milligrams per liter of dissolved solids.

**Fuel economy standard.** The Corporate Average Fuel Economy Standard (CAFE), which imposes financial penalties on motor vehicle manufacturers whose vehicles fail to average certain levels of fuel economy (in miles per gallon).

**Fugitive emissions.** Emissions not caught by a capture system.

**Functional equivalent.** A term used to describe EPA's decision-making process and its relationship to the environmental review conducted under the National Environmental Policy Act. A review is considered functionally equivalent when it addresses the substantive components of a NEPA review.

**Fungicide.** A pesticide used to control, prevent, or destroy fungi.

**General permit.** A permit applicable to a class or category of dischargers.

**Generator.** A facility or mobile source that emits pollutants or releases hazardous wastes.

**Global climate change.** Changes in worldwide climate and weather patterns of anthropogenic origin. These include changes in precipitation patterns, storm activity, and soil moisture induced by global warming, which increases, the temperature of land masses more rapidly than oceans.

**Global warming.** An increase in worldwide temperature due to increased atmospheric concentrations of carbon dioxide and other gases that contribute to the greenhouse effect. Greenhouse effect. The build-up of carbon dioxide or other trace gases that allows light from the sun's rays to heat the Earth but prevents a counterbalancing loss of heat.

**Greenhouse gas.** A gas whose presence in the upper atmosphere contributes to the greenhouse effect by allowing visible light to pass through the atmosphere while preventing heat radiating back from the Earth from escaping. Greenhouse gases from anthropogenic sources include carbon dioxide, nitrous oxide, methane, and CFCs. There

also are even larger quantities of naturally occurring greenhouse gases, notably ozone and water vapor, whose concentrations may be affected by interactions with atmospheric pollutants.

**Ground water.** The supply of fresh water found beneath the Earth's surface, usually in aquifers, which is often used for supplying wells and springs. Because ground water is a major source of drinking water, there is growing concern over areas where leaching agricultural or industrial pollutants or substances from leaking underground storage tanks are contaminating ground water.

**Habitat.** The place where a population (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and nonliving.

**Hazard identification.** A determination of whether or not a sub-stance is capable of causing some form of adverse effect (e.g., determining if a substance is a carcinogen or reproductive toxin).

**Hazardous air pollutants.** Air pollutants that are not covered by ambient air quality standards but that present, or may present, a threat of adverse health or environmental effects. These include an initial list of 189 chemicals designated by Congress that is subject to revision by EPA.

**Hazardous substance.** Any material that poses a threat to human health or the environment. The term has a special meaning under CERCLA section 101(14), which broadly defines it to include any toxic water pollutant, hazardous waste, hazardous air pollutant, imminently hazardous chemical, or any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise emitted to the environment.

**Hazardous waste.** A by-product of society that can pose a sub-stantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special EPA lists.

**Hazard ranking system (HRS).** The principal screening tool used by EPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. The HRS calculates a score based on the potential for hazardous substances to cause harm to human health or the environment. This score is the primary factor in deciding if the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

**Heavy metals.** Metallic elements with high atomic weights, for example, mercury, chromium, cadmium, arsenic, and lead. They can damage living things at low concentrations and tend to accumulate in the food chain.

**Herbicide.** A chemical pesticide designed to control or destroy plants, weeds, or grasses.

**High-level radioactive waste.** Waste generated in the fuel of a nuclear reactor, found at nuclear reactors or nuclear fuel reprocessing plants. A serious threat to anyone who comes near the wastes without shielding.

**Holding pond.** A pond or reservoir, usually made of earth, built to store polluted runoff.

**Hydrocarbons (HC).** Chemical compounds that consist entirely of carbon and hydrogen.

**Hydrogeology.** The geology of ground water, with particular emphasis on the chemistry and movement of water. Hydrology. The science dealing with the properties, distribution, and circulation of water.

**Ignitable.** Capable of burning or causing a fire.

**Impoundment.** A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

**Incineration.** (1) Burning of certain types of solid, liquid, or gaseous materials. (2) A treatment technology involving destruction of waste by controlled burning at high temperatures, for example, burning sludge to remove the water and reduce the remaining residues to ash.

**Incinerator.** A furnace for burning wastes under controlled conditions.

**Indicator.** In biology, an organism, species, or community whose characteristics show the presence of specific environmental conditions.

**Indirect discharge.** Introduction of pollutants from a nondomestic source into a publicly owned waste treatment system. Indirect dischargers can be commercial or industrial facilities whose wastes go into the local sewers.

**Indoor air.** The air inside a habitable structure or conveyance. Indoor air pollution. Chemical, physical, or biological contaminants in indoor air.

**Inert ingredient.** Pesticide components such as solvents, carriers, and surfactants that are not active against target pests. Not all inert ingredients are innocuous.

**Injection well.** A well into which fluids are injected for purposes such as waste disposal, improving the recovery of crude oil, or solution mining.

**Injection zone.** A geological formation, group of formations, or part of a formation receiving fluids through a well. Inorganic chemicals. Chemical substances of mineral origin, not of basically carbon structure.

**Insecticide.** A pesticide compound specifically used to kill or control the growth of insects.

**Inspection and maintenance.** Activities to assure proper emissions-related operation of mobile sources of air pollutants, particularly automobile emissions controls. Also applies to wastewater treatment plants and other antipollution facilities and processes.

**Integrated pest management.** A mixture of pesticide-using and non-pesticide-using methods to control pests.

**Interceptor sewers.** Large sewer lines that, in a combined system, control the flow of the sewage to the treatment plant. In a storm, they allow some of the sewage to flow directly into a receiving stream, thus preventing an overload by a sudden surge of water into the sewers. They are also used in separate systems to collect the flows from main and trunk sewers and carry them to treatment points.

**Interim (permit) status.** The period during which treatment, storage, and disposal facilities coming under RCRA in 1980 were temporarily permitted to operate while awaiting denial or issuance of a permanent permit.

**Interstitial monitoring.** The continuous surveillance of the space between the walls of an underground storage tank.

**Inversion.** An atmospheric condition caused by a layer of warm air preventing the rise of cooling air trapped beneath it. This prevents the rise of pollutants that might otherwise be dispersed and can cause an air pollution episode.

**In vitro.** (1) "In glass"; a test-tube culture. (2) Any laboratory test using living cells taken from an organism.

**In vivo.** In the living body of a plant or animal. In vivo tests are those laboratory experiments carried out on whole animals or human volunteers.

**Ionizing radiation.** Radiation that can remove electrons from atoms, that is, alpha, beta, and gamma radiation.

**Isotope.** A variation of an element that has the same atomic number but a different weight because of its neutrons. Various isotopes of the same element may have different radioactive behaviors.

**Land farming (of waste).** A disposal process in which hazardous wastes are deposited on or in the soil in order to be naturally degraded by microbes.

**Landfills.** (1) Sanitary landfills are sites for the disposal of non-hazardous solid wastes that satisfy the criteria established by EPA under section 4004 of RCRA. Facilities that fail to meet these criteria are deemed "open dumps" under section 4004(14) of RCRA. (2) Land disposal sites for hazardous waste subject to regulation under RCRA subtitle C.

**LD 50/Lethal dose.** The dose of a toxicant that will kill 50 percent of test organisms within a designated period of time. The lower the LD 50, the more toxic the compound.

**LD 0.** The highest concentration of a toxic substance at which no test organisms die.

**LD LO.** The lowest concentration and dosage of a toxic substance that kills test organisms.

**Leachate.** A liquid that results from water's collecting contaminants as it trickles through wastes, agricultural pesticides, or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in the entry of hazardous substances into surface water, ground water, or soil.

**Leachate collection system.** A system that gathers leachate and pumps it to the surface for treatment.

**Leaching.** The process by which soluble constituents are dissolved and carried down through the soil by a percolating fluid.

**Lead (Pb).** A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted by federal regulations, but enormous quantities of it already released into the environment are causing significant problems.

**Level of concern.** The concentration in air of an extremely hazardous substance above which there may be serious immediate health effects to anyone exposed to it for short periods of time.

**Limestone scrubbing.** A process in which sulfur gases moving towards a smokestack are passed through a limestone and water solution to remove sulfur before it reaches the atmosphere.

**Liner.** (1) A relatively impermeable barrier designed to prevent leachate from leaking from a landfill. Liner materials include plastic and dense clay. (2) An insert or sleeve for sewer pipes to prevent leakage or infiltration.

**Listed waste.** Waste expressly listed as hazardous under subtitle C of RCRA because it is part of a waste stream that may pose a substantial threat to human health or the environment when managed improperly.

**Local emergency planning committee.** A committee appointed by the state emergency response commission, as required by section 301 of the Emergency Planning and Community Right-to-Know Act, to formulate a comprehensive emergency plan for its jurisdiction.

**Lowest achievable emission rate.** Under the Clean Air Act, this is the rate of emissions that reflects (a) the most stringent emission limitation contained in the implementation plan of any state for such source unless the owner or operator of the proposed source demonstrates such limitations are not achievable; or (b) the most stringent emissions limitation achieved in practice, whichever is more stringent. Application of this term does not permit a proposed new or modified source to emit pollutants in excess of existing new source standards.

**Low-level radioactive waste.** Radioactive wastes that are less hazardous than most of those generated by a nuclear reactor. These wastes usually are generated by hospitals, research laboratories, and certain industries.

**Major modification.** Any non-routine physical or operational change in a stationary source that will result in a significant net increase in emissions. Threshold levels of significance vary depending on the pollutant emitted. Such a change may subject the source to PSD or new source review requirements under the Clean Air Act.

**Major stationary source.** Any stationary source that emits or has the potential to emit certain threshold levels of emissions to which PSD and new source requirements of the Clean Air Act are applicable.

**Marsh.** A type of wetland that does not accumulate appreciable peat deposits and is dominated by herbaceous vegetation. Marshes may be either fresh or saltwater and tidal or nontidal.

**Material safety data sheet (MSDS).** A compilation of information required under the OSHA Hazard Communication Standard on the identity of hazardous chemicals, health and physical hazards, exposure limits, and precautions. Section 311 of the Emergency Planning and Community Right-to-Know Act requires facilities to submit MSDSs under certain circumstances.

**Maximum contaminant level.** The maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act.

**Maximum contaminant level goal.** The maximum level of a contaminant in water at which no known or anticipated adverse effects on health occur and which includes an adequate margin of safety.

**Media.** Specific environments—air, water, soil—that are the subject of regulatory concern and activities.

**Methane.** A greenhouse gas that is colorless, nonpoisonous, and flammable and is created by anaerobic, decomposition of organic compounds.

**Mitigation.** Measures taken to reduce adverse impacts on the environment.

**Mobile source.** A moving producer of air pollution. Refers mainly to vehicles used in transportation such as cars, trucks, motorcycles, and airplanes.

**Modeling.** An investigative technique using a mathematical or physical representation of a system, or theory that accounts for all or some of its known properties. Models are often used to test the effect of changes of system components on the overall performance of the system.

**Model plant.** A theoretical description of a typical plant used for developing economic, environmental, and energy impact analyses as support for regulations or regulatory guidelines. It may incorporate features of existing and future plants to estimate the cost of incorporating pollution control technology as the first step in exploring the economic impact of a potential standard.

**Monitoring.** Periodic or continuous surveillance or testing to determine the level of compliance with statutory requirements or pollutant levels in various media or in humans, animals, and other living things.

**Monitoring wells.** Wells drilled at a hazardous waste management facility or Superfund site to collect ground water samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants in the ground water beneath the site.

**Mutagen.** Any substance that can cause a change in genetic material.

**Mutate.** To bring about a change in the genetic constitution of a cell by altering its DNA structure. In turn, "mutagenesis" is any process by which cells are mutated.

**National Ambient Air Quality Standards.** Uniform, national air quality standards established by EPA that restrict ambient levels of certain pollutants to protect public health (primary standards) or public welfare (secondary standards).

**National Contingency Plan.** The federal plan that outlines procedures and standards for responding to releases of oil and hazardous substances including responses to sites designated for cleanup under the Superfund program.

**National Emissions Standards for Hazardous Air Pollutants.** National standards established by EPA that limit emissions of hazardous air pollutants.

**National Pollutant Discharge Elimination System.** The Clean Water Act's national permit program that regulates the discharge of pollutants into waters of the United States.

**National Priorities List.** EPA's list of the sites identified for possible long-term remedial action under CERCLA. Placement on the list is based primarily on the score a site receives from the Hazard Ranking System.

**National Response Center.** The federal operations center that receives notifications of all releases of oil and hazardous substances into the environment. The Center, open 24 hours a day, is operated by the U.S. Coast Guard, which evaluates all reports and notifies the appropriate agency.

**National Response Team.** Representatives of various federal agencies who, as a team, coordinate federal responses to nationally significant incidents of pollution and provide advice and technical assistance to the responding agency or agencies before and during a response action.

**Navigable waters.** Traditionally, waters sufficiently deep and wide for navigation but now including waters adjacent to or connected to waters navigable in fact.

**Netting.** Emission trading used to avoid PSD/NSR permit review requirements.

**New source.** Any stationary source built or modified after publication of final or proposed regulations that prescribe a standard of performance intended to apply to that type of emissions source.

**New Source Performance Standards.** Uniform national EPA air emissions and water effluent standards that limit the amount of pollution allowed from new sources or from existing sources that have been modified.

**Nitrate.** A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and that can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants and cows.

**Nitric oxide (NO).** A gas formed by combustion at a high temperature and under high pressure in an internal combustion engine. It changes into nitrogen dioxide in the ambient air and contributes to photochemical smog.

**Nitrogen dioxide (NO<sub>2</sub>).** The result of nitric oxide combining with oxygen in the atmosphere. A major component of photochemical smog.

**Nitrogen oxide (NO<sub>x</sub>).** A product of combustion by mobile and stationary sources and a major contributor to the formation of ozone in the troposphere and acid deposition.

**Nonattainment area.** A geographic area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

**Noncommunity water system.** A public water system that is not a community water system, for example, the water supply at a camp site or national park.

**Nonconventional pollutant.** Any pollutant that is not statutorily listed or that is poorly understood by the scientific community.

**Nonpoint source.** Pollution sources that are diffuse and do not have single point of origin or are not introduced into a receiving stream from a specific outlet. The pollutants are generally carried off the land by storm water runoff.

**Nutrient.** Any substance assimilated by living things that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

**Offsite facility.** A hazardous waste treatment, storage, or disposal area that is located at a place away from the generating site.

**Oil fingerprinting.** A method that identifies sources of oil and allows spills to be traced to their source.

**Oil spill.** An accidental or intentional discharge of oil that reaches bodies of water. Can be controlled by chemical dispersion, combustion, mechanical containment, or adsorption.

**Oncogenic.** Causing tumors, whether benign or malignant.

**Onsite facility.** A hazardous waste treatment, storage, or disposal area that is located on the generating site.

**Opacity.** A measure of the amount of light obscured by particulate pollution in the air; clear window glass has a zero opacity, a brick wall has 100 percent opacity. Opacity is used as an indicator of changes in performance of particulate matter pollution control systems.

**Open dump.** A site where solid waste is disposed that does not satisfy criteria established by EPA under section 4004 of RCRA.

**Operation and maintenance.** (1) Activities conducted at a site after a Superfund site action is completed to ensure that the action is effective and operating properly. (2) Actions taken after construction to assure that facilities constructed to treat waste water will be properly operated, maintained, and managed to achieve efficiency levels and prescribed effluent limitations in an optimal manner.

**Organic.** (1) Derived from or relating to living organisms. (2) In chemistry, any compound containing carbon.

**Organic chemicals and compounds.** Animal- or plant-produced substances containing mainly carbon, hydrogen, and oxygen.

**Organic matter.** Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

**Organism.** Any living thing.

**Organophosphates.** Pesticide chemicals that contain phosphorus; used to control insects. They are short-lived, but some can be toxic when first applied.

**Organotins.** Chemical compounds used in anti-foulant paints to protect the hulls of boats and ships, buoys, and dock pilings from marine organisms such as barnacles.

**Outfall.** The place where an effluent is discharged into receiving waters.

**Overburden.** The rock and soil cleared away before mining. Oxidant. A substance containing oxygen that reacts chemically in air to produce a new substance. Oxidants contribute greatly to photochemical smog.

**Ozone (Os).** A substance found in the stratosphere and the troposphere. In the stratosphere (the atmospheric layer beginning 7 to 10 miles above the Earth's surface) ozone is a form of oxygen found naturally that provides a

protective layer shielding the Earth from ultraviolet radiation. In the troposphere (the layer extending up 7 to 10 miles from the Earth's surface), ozone is a chemical oxidant and a major component of photochemical smog. Ozone can seriously affect the human respiratory system and is one of the most widespread of all the criteria pollutants. Ozone in the troposphere is produced through complex chemical reactions of: nitrogen oxides, which are among the primary pollutants emitted by combustion sources; hydrocarbons, released into the atmosphere through the combustion, handling, and processing of petroleum products; and sunlight.

**Ozone depletion.** Destruction of the stratospheric ozone layer that shields the Earth from ultraviolet radiation. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine-containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and catalytically destroy ozone molecules.

**Particulates.** Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions. Pathogenic. Capable of causing disease.

**Pathogens.** Microorganisms that can cause disease in other organisms or in humans, animals, and plants. They may be bacteria, viruses, or parasites and are found in sewage, in runoff from animal farms or rural areas populated with domestic or wild animals, and in water used for swimming. Fish and shellfish contaminated by pathogens, or, the contaminated water itself, can cause serious illness.

**PCBs.** A group of toxic, persistent chemicals (polychlorinated biphenyls) used in transformers and capacitors for insulating purposes and in gas pipeline systems as a lubricant. Further sale or use was banned by law: in 1979.

**Percolation.** The movement of water downward and radially through the subsurface soil layers, usually continuing down-ward to the ground water.

**Permit.** An authorization, license, or equivalent control document issued by EPA or an approved state agency to implement the requirements of an environmental regulation.

**Persistence.** Refers to the length of time a compound, once introduced into the environment, stays there. A compound may persist for less than a second or indefinitely.

**Pesticide.** Substance or mixture of substances intended for pre-venting, destroying, repelling, or mitigating any pest. Also, any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

**Pesticide tolerance.** The amount of pesticide residue allowed by law to remain in or on a harvested crop. EPA is supposed to set tolerances at levels well below the point at which the chemicals might be harmful to consumers.

**pH.** A measure of the acidity or alkalinity of a liquid or solid material.

**Phosphates.** Certain chemical compounds containing phosphorus.

**Phosphorus.** An essential chemical food element that can contribute to the eutrophication of lakes and other water bodies. Increased phosphorus levels result from discharge of phosphorus-containing materials into surface waters.

**Photochemical oxidants.** Air pollutants formed by the action of sunlight on oxides of nitrogen and hydrocarbons.

**Photochemical smog.** Air pollution caused by chemical reactions of various pollutants emitted from different sources.

**Physical and chemical treatment.** Processes generally used in large-scale wastewater treatment facilities. Physical processes may involve air-stripping or filtration. Chemical treatment includes coagulation, chlorination, and ozone addition. The term can also refer to treatment processes, treatment of toxic materials in surface waters and ground waters, oil spills, and some methods of dealing with hazardous materials on or in the ground.

**Plume.** (1) A visible or measurable discharge of a contaminant from a given point of origin. Can be visible or thermal in water or visible in the air as, for example, a plume of smoke. (2) The area of measurable and potentially harmful radiation leaking from a damaged reactor. (3) The distance from a toxic release considered dangerous for those exposed to the leaking fumes.

**Point source.** A stationary location or fixed facility from which pollutants are discharged or emitted. Also, any single identifiable source of pollution, for example, a pipe, ditch, ship, ore pit, or factory smokestack.

**Pollutant.** Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

**Pollution.** Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, and radiological integrity of water.

**Polyvinyl chloride (PVC).** A tough, environmentally indestructible plastic that releases hydrochloric acid when burned.

**Postclosure period.** The time period following the shutdown of a waste management or manufacturing facility. For monitoring purposes, this is often considered to be 30 years.

**Potentially Responsible Party.** Any individual or company—including an owner, operator, transporter, or generator—potentially liable under section 107 of CERCLA.

**ppb, ppm.** Parts per billion or parts per million, a way of expressing tiny concentrations of pollutants, in air, water, soil, human tissue, and food or other products.

**Precipitators.** Air pollution control devices that collect particles from an emission.

**Precursor.** In photochemical terminology, a compound such as a volatile organic compound (VOC) that "precedes" an oxidant. Precursors react in sunlight to form ozone or other photochemical oxidants.

**Preliminary assessment.** The process of collecting and reviewing available information about a known or suspected waste site or release.

**Pretreatment processes.** Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from nondomestic sources before they are discharged into publicly owned treatment works.

**Prevention of Significant Deterioration.** An EPA program in which state or federal permits are required that are intended to restrict emissions for new or modified sources in places where air quality is already better than required to meet primary and secondary ambient air quality standards.

**Primary waste treatment.** The first steps in wastewater treatment. Screens and sedimentation tanks are used to remove most materials that float or will settle. Primary treatment results in the removal of about 30 percent of carbonaceous biochemical oxygen demand from domestic sewage.

**Publicly owned treatment works.** A waste-treatment works owned by a state, unit of local government, or Indian tribe, usually designed to treat domestic wastewaters.

**Public water system.** A system that provides piped water for human consumption to at least 15 service connections or that regularly serves at least 25 individuals.

**Radiation.** Any form of energy propagated as rays, waves, or streams of energetic particles. The term is frequently used in relation to the emission of rays from the nucleus of an atom.

**Radiation standards.** Regulations that set maximum exposure limits for protection of the public from radioactive materials.

**Radioactive substances.** Substances that emit radiation.

**Radionuclide.** A radioactive element characterized according to its atomic mass and atomic number that can be manmade or naturally occurring. Radioisotopes can have a long life as soil or water pollutants and are believed to have potentially mutagenic effects on the human body.

**Radon.** A colorless, naturally occurring, radioactive, inert gaseous element formed by radioactive decay of radium atoms in soil or rocks.

**Raw sewage.** Untreated wastewater.

**Reasonably available control technology (RACT).** The lowest emissions limit that a particular source is capable of meeting by the application of control technology that is both reasonably available and technologically and

economically feasible. RACT is usually applied to existing sources in nonattainment areas, and in most cases is less stringent than new source performance standards.

**Receiving waters.** A river, lake, ocean, stream, or other water-course into which wastewater or treated effluent is discharged.

**Recharge.** The process by which water is added to a zone of saturation, usually by percolation from the soil surface, for example, the recharge of an aquifer.

**Recharge area.** A land area in which water reaches to the zone of saturation from surface infiltration, for example, an area where rainwater soaks through the earth to reach an aquifer.

**Recommended Maximum Contaminant Level.** The term formerly used for Maximum Contaminant Level Goal.

**Record of Decision.** A public document that explains which cleanup alternative(s) will be used at National Priorities List sites.

**Recycle-reuse.** The process of minimizing the generation of waste by recovering usable products that might otherwise become waste. Examples are the recycling of aluminum cans, waste paper, and bottles.

**Red border.** An EPA document that is undergoing final review before being submitted for final management decision.

**Registrant.** Any manufacturer or formulator who obtains registration for a pesticide active ingredient or product.

**Registration.** Formal listing with EPA of a new pesticide before it can be sold or distributed in intrastate or interstate commerce. The product must be registered under the Federal Insecticide, Fungicide, and Rodenticide Act.

**Remedial action.** The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

**Remedial design.** A stage of the Superfund cleanup process that follows the remedial investigation feasibility study and includes development of engineering drawings and specifications for a site cleanup.

**Remedial investigation.** An in-depth study designed to gather the data necessary to determine the nature and extent of contamination at a Superfund site; establish criteria for cleaning up the site; identify preliminary alternatives for remedial actions; and support the technical and cost analyses of the alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS."

**Remedial response.** A long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to public health.

**Removal actions.** Short-term immediate actions taken to address releases of hazardous substances that require expedited response.

**Reportable quantity (RQ).** The quantity of a hazardous substance that triggers reporting requirements under CERCLA. If a substance is released in amounts exceeding its RQ, the release must be reported to the National Response Center, the SERC, and community emergency coordinators for areas likely to be affected.

**Reregistration.** The reevaluation and relicensing of existing pesticides originally registered prior to the implementation of current scientific and regulatory standards. EPA reregisters pesticides through its Registration Standards Program.

**Resource recovery.** The process of obtaining matter or energy from materials formerly discarded.

**Response action.** A CERCLA-authorized action involving either a removal action or a remedial action response that may include but is not limited to: removing hazardous materials from a site to an EPA-approved hazardous waste facility for treatment, containment, or destruction; containing the waste safely on-site; destroying or treating the waste on-site; and identifying and removing the source of ground water contamination and halting further migration of contaminants.

**Restricted use.** When a pesticide is registered, some or all of its uses may be classified (under FIFRA regulations) for restricted use if the pesticide requires special handling because of its toxicity. Restricted-use pesticides may be applied only by trained, certified applicators or those under their direct supervision.

**Riparian rights.** Entitlement of a land owner to the water on or bordering his or her property, including the right to prevent diversion or misuse of upstream waters. Generally a matter of state law.

**Risk assessment.** The process of identifying and characterizing the nature and magnitude of the adverse effects of a substance or activity.

**Risk communication.** The exchange of information about health or environmental risks between risk assessors, risk managers, the general public, news media, interest groups, and so on.

**Risk management.** The process of evaluating alternative regulatory and nonregulatory responses to risk and selecting among them.

**Rodenticide.** A chemical or agent used to destroy rats or other rodent pests, or to prevent them from damaging food, crops, and so on.

**Runoff.** That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into the receiving waters.

**Salinity.** The degree of salt in water.

**Sanitary landfill.** See Landfills.

**Sanitary sewers.** Underground pipes that carry off only domestic or industrial waste, not storm water.

**Saturated zone.** A subsurface area in which all pores and cracks are filled with water under pressure equal to or greater than that of the atmosphere.

**Scrap.** Materials discarded from manufacturing operations that may be suitable for reprocessing.

**Scrubber.** An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

**Secondary treatment.** The second step in most publicly owned waste treatment systems, in which bacteria consume the organic parts of the waste. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. This treatment removes floating and settleable solids and about 90 percent of the oxygen-demanding substances and suspended solids. Disinfection is the final stage of secondary treatment.

**Sedimentation.** Letting solids settle out of wastewater by gravity during wastewater treatment.

**Sedimentation tanks.** Holding areas for wastewater where floating wastes are skimmed off and settled solids are removed for disposal.

**Sediments.** Soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers, and harbors, destroying fish-nesting areas and homes of water animals and clouding the water so that needed sunlight might not reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to be washed off the land after rainfalls.

**Septic tank.** An underground storage tank for wastes from a home having no sewer line to a treatment plant. The waste goes directly from the home to the tank, where the organic waste is decomposed by bacteria and the sludge settles to the bottom. The effluent flows out of the tank into the ground through drains; the sludge is pumped out periodically.

**Service connector.** The pipe that carries tap water from the public water main to a building.

**Settling tank.** A holding area for wastewater where heavier particles sink to the bottom for removal and disposal.

**Sewage.** The waste and wastewater produced by residential and commercial establishments and discharged into sewers.

**Sewage sludge.** Sludge produced at a publicly owned treatment works, the disposal of which is regulated under the Clean Water Act.

**Sewer.** A channel or conduit that carries wastewater or storm- water runoff from the source to a treatment plant or receiving stream. Sanitary sewers carry household, industrial, and commercial waste. Storm sewers carry runoff from rain or snow. Combined sewers are used for both purposes.

**Sewerage.** The entire system of sewage collection, treatment, and disposal.

**Significant deterioration.** Pollution resulting from a new source in previously "clean" areas.

**Silviculture.** Management of forest land for timber. Sometimes contributes to water pollution, as in clear-cutting.

**Site inspection.** The collection of information from a Superfund site to determine the extent and severity of hazards posed by the site. It follows and is more extensive than a preliminary, assessment. The purpose is to gather information necessary to score the site using the Hazard Ranking System, and to determine if the site presents an immediate threat that requires prompt removal action.

**Siting.** The process of choosing a location for a facility.

**Sludge.** A semisolid' residue from any of a number of air or water treatment processes. Sludge can be a hazardous waste.

**Slurry.** A watery mixture of insoluble matter that results from some pollution control techniques.

**Smelter.** A facility that melts or fuses ore, often with an accompanying chemical change, to separate the metal. Emissions are known to cause pollution. Smelting is the process involved.

**Smog.** Air pollution associated with oxidants.

**Sole source aquifer.** An aquifer that supplies 50 percent or more of the drinking water of an area.

**Solid waste.** Defined by RCRA to include "any garbage, refuse, sludge from a waste treatment plant, .water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous materials resulting from industrial, commercial, mining, and agricultural activities." EPA has had extreme difficulty in defining the boundaries of this definition, particularly when materials are reused in production processes.

**Solvent.** A substance (usually liquid) capable of dissolving or dispersing one or more other substances.

**Sorption.** The action of soaking up or attracting substances. A process used in many pollution control systems.

**Special Review.** Formerly known as Rebuttable Presumption Against Registration, this is the regulatory process through which existing pesticides suspected of posing unreasonable risks to human health, nontarget organisms, or the environment are referred for review by EPA. The review requires an intensive risk-benefit analysis with opportunity for public comment. If the risk of any, use of a pesticide is found to outweigh social and economic benefits, regulatory action— ranging from label revisions and use-restriction to cancellation or suspended registration—can be initiated.

**Species.** A reproductively isolated aggregate of interbreeding populations of organisms.

**Spoil.** Dirt or rock that has been removed from its original location, destroying the composition of the soil in the process, as with strip-mining or dredging.

**Stabilization.** Conversion of the active organic matter in sludge into inert, harmless material.

**Standards.** Prescriptive norms that govern action and actual limits on the amount of pollutants or emissions produced.. EPA, under most of its responsibilities, establishes minimum standards. States are allowed to be stricter.

**State emergency response commission.** The commission appointed by each state governor according to the requirements of the Emergency Planning and Community Right-to-Know Act. The SERCs designate emergency planning districts, appoint local emergency planning committees, and supervise and coordinate their activities.

**State implementation plans.** EPA-approved state plans for the establishment, regulation, and enforcement of air pollution standards.

**Stationary sources.** Fixed, nonmoving producers of pollution, mainly power plants and other facilities using industrial combustion processes.

**Storage.** Temporary holding of waste pending treatment or disposal. Storage places include containers, tanks, waste piles, and surface impoundments.

**Storm sewer.** A system of pipes (separate from sanitary sewers) that carry only water runoff from building and land surfaces.

**Stratosphere.** The portion of the atmosphere that is 10 to 25 miles above the Earth's surface.

**Strip-mining.** A process that uses machines to scrape soil or rock away from mineral deposits just under the Earth's surface.

**Sulfur dioxide (SO<sub>2</sub>).** A heavy, pungent, colorless, gaseous air pollutant formed primarily by the combustion of fossil plants.

**Sump.** A pit or tank that catches liquid runoff for drainage or disposal.

**Sump pump.** A mechanism for removing water or wastewater from a sump or wet well.

**Superfund.** A fund set up under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to help pay for cleanup of hazardous waste sites and for legal action to force those responsible for the sites to clean them up. Also sometimes used to refer to the program operated under the legislative authority of CERCLA that carries out EPA response activities.

**Surface impoundment.** Treatment, storage, or disposal of liquid hazardous wastes in ponds.

**Surface water.** All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, and so on) and all springs, wells, or other collectors that are directly influenced by surface water.

**Suspended solids.** Small particles of solid pollutants that float on the surface of, or are suspended in, sewage or other liquids. They resist removal by conventional means.

**Suspension.** The act of suspending the use of a pesticide when EPA deems it necessary to do so in order to prevent an imminent hazard resulting from continued use of the pesticide. An emergency suspension takes effect immediately; under an ordinary suspension a registrant can request a hearing before the suspension goes into effect. Such a hearing process might take six months.

**Swamp.** A type of wetland that is dominated by woody vegetation and does not accumulate appreciable peat deposits. Swamps may be fresh or salt water and tidal or nontidal.

**Synergism.** The cooperative interaction of two or more chemicals or other phenomena producing a greater total effect than the sum of their individual effects.

**Synthetic organic chemicals.** Manmade organic chemicals. Some SOCs are volatile; others tend to stay dissolved in water rather than evaporate out of it.

**Tailings.** Residue of raw materials or waste separated out during the processing of crops or mineral ores.

**Technology-based standards.** Effluent limitations applicable to direct and indirect sources that are developed on a category-by-category basis using statutory factors, not including water quality effects.

**Teratogen.** A substance that causes malformation or serious deviation from normal development of embryos and fetuses.

**Tertiary treatment.** Advanced cleaning of wastewater that goes beyond the secondary or biological stage. It removes nutrients such as phosphorus and nitrogen and most BOD and suspended solids.

**Thermal pollution.** Discharge of heated water from industrial processes that can affect the life processes of aquatic organisms.

**Threshold limit value.** This figure represents the air concentrations of, chemical substances to which it is believed that workers may be exposed on a daily basis without adverse effect.

**Threshold planning quantity.** A quantity designated for each chemical on the, list of extremely hazardous substances that triggers notification by facilities to the state emergency response commission that such facilities are subject to emergency planning under the Emergency Planning and Community Right-to-Know Act. ,

**Tidal marsh.** Low, flat marshlands traversed by channels and tidal hollows and subject to tidal inundation; normally, the only vegetation present is salt-tolerant bushes and grasses.

**Tolerances.** The permissible residue levels for pesticides in raw agricultural produce and processed foods. Whenever a pesticide is registered for use on a food or a feed crop, a tolerance (or exemption from the tolerance requirement) must be established. EPA establishes the tolerance levels, which are en-forced by the Food and Drug Administration and the Department of Agriculture.

**Topography.** The physical features of a surface area, including relative elevations and the position of natural and manmade features.

**Total suspended solids.** A measure of the suspended solids in wastewater, effluent, or water bodies, determined by using tests for "total suspended non-filterable solids."

**Toxic.** Harmful to living organisms.

**Toxic chemical release form.** An information form required to be submitted by facilities that manufacture, process, or use (in quantities above a specific amount) chemicals listed under the Emergency Planning and Community Right-to-Know Act.

**Toxicity.** The degree of danger posed by a substance to animal or plant life.

**Toxicology.** The science and study of poison control.

**Toxic pollutants.** Materials contaminating the environment that cause death, disease, or birth defects in organisms that ingest or absorb them. The quantities and length of exposure necessary to cause these effects can vary widely.

**Treatment, storage, and disposal facility.** The site where a hazardous substance is treated, stored, or disposed. TSD facilities are regulated by EPA and states under RCRA.

**Trichloroethylene (TCE).** A stable, low-boiling, colorless liquid, toxic by inhalation. TCE is used as a solvent and as a metal degreasing agent and in other industrial applications.

**Trihalomethane (THM).** One of a family of organic compounds, named as derivatives of methane. THMs are generally the by-product of chlorination of drinking water that contains organic material.

**Troposphere.** The lower atmosphere; the portion of the atmo-sphere between 7 and 10 miles from the Earth's surface where clouds are formed.

**Tundra.** A type of ecosystem dominated by lichens, mosses, grasses, and woody plants. Tundra is found at high latitudes (arctic tundra) and high altitudes (alpine tundra). Arctic tun-dra is underlain by permafrost and is usually very wet.

**Turbidity.** (1) Haziness in air caused by the presence of particles and pollutants. (2) A similar cloudy condition in water due to suspended silt or organic matter.

**Ultraviolet rays.** Radiation from the sun, which can be useful or potentially harmful. Ultraviolet rays from one part of the spectrum enhance plant life and are useful in some medical and dental procedures; ultraviolet rays from other parts of the spectrum to which humans are exposed (for example, while getting a sun tan) can cause skin cancer or other tissue damage. The ozone layer in the stratosphere provides a protective shield that limits the amount of ultraviolet rays that reach the Earth's surface.

**Underground Injection Control.** The program under the Safe Drinking Water Act that regulates the use of underground injection wells to pump fluids into the ground.

**Underground sources of drinking water.** As defined in the UIC program, this term refers to aquifers that are currently being used as a source of drinking water and those that are capable of supplying a public water system. They have a total dissolved solids content of 10,000 milligrams per liter or less, and are not "exempted aquifers."

**Underground storage tank.** A tank located totally or partially underground that is designed to hold gasoline or other petroleum products or chemical solutions.

**Unsaturated zone.** The area above the water table where the soil pores are not fully saturated, although some water may be present.

**Uranium.** A radioactive heavy metal element used in nuclear re-actors and the production of nuclear weapons. The term refers usually to U-238, the most abundant radium isotope, although a small percentage of naturally occurring uranium is U-235.

**Urban runoff.** Storm water from city streets and adjacent domestic or commercial properties that may carry pollutants of various kinds into the sewer systems or receiving /waters.

**Vaporization.** The change of a substance from a liquid to a gas.

**Variance.** Government permission for a delay or/exception in the application of a given law, ordinance, or regulation.

**Vector.** (1) An organism, often an insect or rodent, that carries disease. (2) An object that is used to transport genes into a host cell (vectors can be plasmids, viruses, or other bacteria). A gene is placed in the vector; the vector then "infects" the bacterium..

**Vinyl chloride.** A chemical compound, used in producing some plastics, that is believed to be carcinogenic.

**Virus.** The smallest form of microorganisms capable of causing disease.

**Volatile.** Capable of evaporating readily.

**Volatile organic compound.** Any organic compound that participates in atmospheric photochemical reactions except for those designated by the EPA administrator as having negligible photochemical reactivity.

**Waste load allocation.** The maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion being, or expected to be,. violated.

**Waste treatment plant.** A facility containing a series of tanks, screens, filters, and other processes by which pollutants are removed from water.

**Waste treatment stream.** The continuous movement of waste from generator to treater and disposer.

**Wastewater.** The spent or used water from individual homes, a community, a farm, or an industry that contains dissolved or suspended matter.

**Water pollution.** The presence in water of enough harmful or objectionable material to damage the water's quality.

**Water quality criteria.** Specific levels of water quality that, if reached, are expected to render a body of water suitable for its designated use. The criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

**Water quality standards.** State-adopted and EPA-approved ambient standards for water bodies. The standards cover the use of the water body and the water quality criteria that must be met to protect the designated use or uses.

**Watershed.** The land area that drains into a stream.

**Water table.** The level .of ground water.

**Well injection.** The subsurface emplacement of fluids in a well.

**Wetlands.** An area that is regularly saturated by surface or ground water and subsequently is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions. Examples include swamps, bogs, fens, marshes, and estuaries.

**Wildlife refuge.** An area designated for the protection of wild animals within which hunting and fishing are either prohibited or strictly controlled.

**Xenobiotic.** Term for non-naturally occurring manmade sub-stances found in the environment (i.e., synthetic material sol-vents, plastics).

## *List of Acronyms*

AA	Assistant Administrator or Associate Administrator
ACGIH	American Council of Government Industrial Hygienists
ACL	Alternate Concentration Limit
ADI	Acceptable Daily Intake
ADR	Alternative Dispute Resolution
AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AHERA	Asbestos Hazard Emergency Response Act
ALJ	Administrative Law Judge
ANPR	Advance Notice of Proposed Rulemaking
ANSI	American National Standards Institute
ANWR	Arctic National Wildlife Refuge
APA	Administrative Procedure Act
ARAR	Applicable or Relevant and Appropriate Standards, Limitations, Criteria, and Requirements
ATSDR	Agency for Toxic Substances and Disease Registry (HISS)
BACT	Best Available Control Technology
BADT	Best Available Demonstrated Technology
BART	Best Available Retrofit Technology
BAT	Best Available. Treatment
BATEA	Best Available Technology Economically Achievable
BCT	Best Control Technology or Best Conventional Pollutant Control Technology
BDAT	Best Demonstrated Achievable-Technology
BDT	Best Demonstrated Technology
BLM	Bureau of Land Management
BNA	Bureau of National Affairs
BOD	Biochemical Oxygen Demand
BPCT	Best Practicable Control Technology
BPCTCA	Best Practicable Control Technology Currently Available
BPJ	Best Professional Judgment
BPT	Best Practicable Technology, Best Practicable Control Technology, or Best Practicable Treatment
BTU	British Thermal Unit
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CAG	Carcinogenic Assessment Group
CAO	Corrective Action Order
CAP	Corrective Action Plan
CAS	Chemical Abstract Service
CASAC	Clean Air Scientific Advisory Committee

CBA	Cost-Benefit Analysis
CBF	Chesapeake Bay Foundation
CBO	Congressional Budget Office
CDC	Centers for Disease Control (HHS)
CEA	Council of Economic Advisors
CEMS	Continuous Emission Monitoring System
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
CM	Corrective Measure
CMA	Chemical Manufacturers Association
COD	Chemical Oxygen Demand
CPSA	Consumer Product Safety Act
CPSC	Consumer Product Safety Commission
CRS	Congressional Research Service
CSO	Combined Sewer Overflow
CWA	Clean Water Act, (also known as the FWPCA)
CZMA	Coastal Zone Management Act
DDT	Dichloro-diphenyl-trichloroethane
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DOL	Department of Labor
DOT	Department of Transportation DPA Deepwater Ports Act
DSAP	Data Self Auditing Program
EA	Environmental Assessment (NEPA)
EC	European Community (Common Market)
ECRA	Environment Cleanup Responsibility Act (New Jersey)
EDB	Ethylene Dibromide
EDF	Environmental Defense Fund
EEC	European Economic Commission
EHA	2-Ethylhexanoic Acid
EHS	Extremely Hazardous Substance
EI	Emissions Inventory
EIS	Environmental Impact Statement
ELI	Environmental Law Institute
ELR	Environmental Law Reporter
EO	Executive Order
EP	Extraction Procedure
EPA	U.S. Environmental Protection Agency
EPCRTKA	Emergency, Planning and Community Right-to-Know Act
ERC	Emissions Reduction Credit
ESA	Endangered Species Act
ESC	Endangered Species Committee
ETS	Emergency Temporary Standard
FACA	Federal Advisory Committee Act

FDA	Food and Drug Administration
FDF	Fundamentally Different Factors
FFDCA	Federal Food, Drug, and Cosmetic Act
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide. Act
FIP	Federal Implementation Plan
FLPMA	Federal Land Policy and Management Act
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact (NEPA),
FR	Federal Register
FSA	Food Security Act
FTC	Federal Trade Commission
FWPCA	Federal Water Pollution Control Act (also known CWA)
FANS	Fish and Wildlife Service (U.S.)
FY	Fiscal Year
GAO	General Accounting Office
GATT	General Agreement on Tariffs and Trade
GCEA	Global Commons Environment Assessment
GDP	Gross Domestic Product
HCP	Habitat Conservation Plan
HEPA	High-Efficiency Particulate Air
HEW	Health, Education, and Welfare (now HHS)
HHS	Department of Health and Human Services (formerly HEW)
HLRW	High-Level Radioactive Waste
HMTA	Hazardous Materials Transportation Act
HRS	Hazard Ranking System
HSWA	Hazardous and Solid Waste Amendments
HUD	Department of Housing and Urban Development
HWTC	Hazardous Waste Treatment Council
IARC	International Agency for Research on Cancer ICS Individual Control Strategy
IG	Inspector General
I/M	Inspection/Maintenance
IPM	Integrated Pest Management
ISC	Interagency Scientific. Committee
ITC	Interagency Testing Committee
ITO	International Trade Organization
LAER	Lowest Achievable Emission Rate
LC	Lethal Concentration
LEPC	Local Emergency Planning Committee
LERC	Local Emergency Response Committee
LLRWPA	Low Level Radioactive Waste Policy Act
LOEL	Lowest Observed Effect Level
LOIS	Loss of Interim Status (SDWA)
LTU	Land Treatment Unit
LUST	Leaking Underground Storage Tank(s)
MACT	Maximum Achievable Control Technology
MAER	Maximum Allowable Emission Rate
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal

MEPA	Michigan Environmental Protection Act
MICROMORT	A one-in-a-million chance of death from an environmental hazard
MIR	Maximum Individual Risk
MMPA	Marine Mammal Protection Act
MMT	Million Metric Tons
MOU	Memorandum of Understanding
MPRSA	Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act).
MSDS	Material Safety Data. Sheet
MSHA	Mine Safety and Health Administration (DOL)
MTBE	Methyl Tertiary Butyl Ether
MTD	Maximum Tolerated Dose
NAAQS	National Ambient Air Quality Standards program (CAA)
NAFTA	North American Free Trade Agreement
NAPAP	National Acid. Precipitation Assessment Program
NAS	National Academy of Sciences
NEAR	Non-Binding Allocation of Responsibility
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants (CAA)
NFMA	National Forests Management Act
NHANES	National Health and Nutrition Examination Study
NHATS	National Human Adipose Tissue Survey
NHTSA	National Highway Traffic Safety Administration (DOT)
NIEHS	National Institute of Environmental Health Sciences
NIH	National Institutes of Health
NIMBY	Not In My Backyard
NIOSH	National Institute of Occupational Safety and Health
NIPDWR	National Interim Primary Drinking Water Regulations
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration (DOG)
NOAEL	No Observed Adverse Effect Level
NPDES	National Pollutant Discharge Elimination System (CWA)
NPL	National Priority List (CERCLA)
NPS	National Park Service
NRC	National Research Council, National Response Center, or Nuclear Regulatory Commission
NRDC	Natural Resources Defense Council
NSF	National Science Foundation
NSO	Nonferrous Smelter Orders (CAA)
NSPS	New Source Performance Standards (CAA)
NSR	New Source Review
NSWMA	National Solid Wastes Management Association
NTP	National Toxicology Program
NWF	National Wildlife Federation
NWPA	Nuclear Waste Policy Act
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OECD	Organization for Economic Cooperation and Development
OIRA	Office of Information and Regulatory Affairs
OMB	Office of Management and Budget
OPA 90	Oil Pollution Prevention, Response, Liability, and Compensation Act
OPP	Office of Pesticide Programs
OSHA	Occupational Safety and Health Administration (DOL)

OSH Act	Occupational Safety and Health Act
OSM	Office of Surface Mining (DOI)
OSTP	Office of Science and Technology Policy (White House)
OTA	Office of Technology Assessment (Congress)
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbon
PCBs	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit
PIC	Prior Informed Consent
PM10	Particulate Matter (nominally 10mg and less)
PM15	Particulate Matter (nominally 15mg and less)
PMN	Premanufacture Notification (TSCA)
POM	Polycyclic Organic Matter
POTW	Publicly Owned Treatment Works
ppb	Parts per Billion
ppm	Parts per Million
PPPA	Poison Prevention Packaging Act
PRA	Paperwork Reduction Act
PRP	Potentially Responsible Party (CERCLA)
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
PVC	Polyvinyl Chloride
QA/QC	Quality Assistance/Quality Control
QOL	Quality of Life (Nixon Administration)
QRA	Quantitative Risk Assessment
RA	Regulatory Analysis, Remedial Action, or Risk Assessment
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RARG	Regulatory Analysis Review Group
RB	Red Border
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design (CERCLA)
R&D	Research and Development
RFA	Regulatory Flexibility Act
RFP	Reasonable Further Programs
RI	Remedial Investigation
RIA	Regulatory Impact Analysis
RI/FS	Remedial Information/Feasibility Study
RMCL	Recommended Maximum Contaminant Level (this phrase has been discontinued in favor of MCLG)
ROD	Record of Decision (CERCLA)
RPAR	Rebuttable Presumption Against Registration (FIFRA)
RQ	Reportable Quantities
SAB	Science Advisory Board (AO)
SAR	Structure Activity Relationship
SARA	Superfund Amendments and Reauthorization Act of 1986
SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SERC	State Emergency Planning Commission
SIC	Standard Industrial Classification

SIP	State Implementation Plan (CAA)
SMCRA	Surface Mining Control and Reclamation Act
SNARL	Suggested No Adverse Response Level
SNUR	Significant New Use Rule (TSCA)
SQG	Small Quantity Generator
STEL	Short-Term Exposure Limit
SWDA	Solid Waste Disposal Act
SWMU	Solid Waste Management Unit
TCDD	Dioxin (Tetrachlorodibenzo-p-dioxin)
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leachate Procedure
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TLV	Threshold Limit Value
TMDL	Total Maximum Daily Loading
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and Disposal Facility (RCRA)
TVA	Tennessee Valley Authority
UDMH	Unsymmetrical Dimethylhydrazine
UIC	Underground Injection Control
UMTRCA	Uranium Mill Tailings, Radiation Control Act
UN	United Nations
UNEP	United Nations Environment Programme
USC	United States Code
USCA	United States Code Annotated
UST	Underground Storage Tank
UV	Ultraviolet
VA	Veterans Administration
VOC	Volatile Organic Compound
WCED	World Commission on Environment and Development
WHO	World Health Organization
WIPP	Waste Isolation Pilot Plan
WLA/TMDL	Waste Load Allocation/Total Maximum Daily Load
WTA	Willingness to Accept
WTP	Willingness to Pay