



**Pollution Prevention and
Chemical Engineering**

NATIONAL POLLUTION PREVENTION CENTER FOR HIGHER EDUCATION

A Chemical Engineer's Guide to Environmental Law and Regulation

By Holly Lynch

Practicum submitted in partial fulfillment of the requirements for the degree of Master of Science. School of Natural Resources and Environment, University of Michigan, December 1994.

Practicum Committee: Assistant Research Scientist Gregory A. Keoleian, Professor Jonathan W. Bulkley, and Professor Robert H. Abrams.

Original produced on Hammermill Unity DP,
a 50% post-consumer/50% pre-consumer recycled paper
made from de-inked old newspapers and magazines.



**The National Pollution Prevention Center
for Higher Education**

University of Michigan, Dana Building
430 East University Ave.
Ann Arbor, MI 48109-1115

- Phone: 313-764-1412
- Fax: 313-647-5841
- E-mail: nppc@umich.edu

The mission of the NPPC is to promote sustainable development by educating students, faculty, and professionals about pollution prevention; create educational materials; provide tools and strategies for addressing relevant environmental problems; and establish a national network of pollution prevention educators. In addition to developing educational materials and conducting research, the NPPC also offers an internship program, professional education and training, and conferences.

Your Input is Welcome!

We are very interested in your feedback on these materials. Please take a moment to offer your comments and communicate them to us. Also contact us if you wish to receive a documents list, order any of our materials, collaborate on or review NPPC resources, or be listed in our *Directory of Pollution Prevention in Higher Education*.

We're Going Online!

The NPPC provides information on its programs and educational materials through the Internet's Worldwide Web; our URL is: <http://www.umich.edu/~nppcpub/>
Please contact us if you have comments about our online resources or suggestions for publicizing our educational materials through the Internet. Thank you!

ABSTRACT

This practicum is designed to provide chemical engineers with a general overview of the field of environmental law. It is structured in four parts. Part I discusses specific reasons why chemical engineers should understand environmental laws and regulations. Part II explains the roles of the three categories of governmental actors who define the field of environmental law: legislatures, administrative agencies, and courts. Part III discusses how the environmental law that emerges from these actors operating at the federal, state, and local levels interacts, and Part IV outlines the relevant statutory provisions of nine federal environmental statutes. The statutes that will be discussed in Part IV include the Toxic Substances Control Act; the Federal Insecticide, Rodenticide, and Fungicide Act; the Occupational Safety and Health Act; the Clean Air Act; the Clean Water Act; the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Emergency Planning and Community Right-to-Know Act; and the Pollution Prevention Act.

TABLE OF CONTENTS

INTRODUCTION: THE BIRTH OF THE CHEMICAL AGE AND THE GROWTH OF ENVIRONMENTAL LAW	1
PART I -- WHY CHEMICAL ENGINEERS SHOULD UNDERSTAND THE FIELD OF ENVIRONMENTAL LAW	3
A. ENVIRONMENTAL LAWS REQUIRE CHEMICAL ENGINEERS TO PERFORM AFFIRMATIVE DUTIES AND, IF THOSE AFFIRMATIVE DUTIES ARE NOT DISCHARGED, THEY AND THEIR EMPLOYERS MAY BE HELD CIVILLY AND/OR CRIMINALLY LIABLE.....	3
B. CHEMICAL ENGINEERS WHO UNDERSTAND THE ENVIRONMENTAL LAW FIELD WILL BE ABLE TO LOBBY FOR MORE EFFECTIVE ENVIRONMENTAL LAWS AND REGULATIONS IN THE FUTURE	7
C. CHEMICAL ENGINEERS MUST COMMUNICATE WITH ENVIRONMENTAL LAW PROFESSIONALS.....	8
PART II -- SOURCES OF ENVIRONMENTAL LAW: LEGISLATURES, ADMINISTRATIVE AGENCIES, AND COURTS	9
A. LEGISLATURES	10
B. ADMINISTRATIVE AGENCIES	10
C. COURTS.....	12
1. Role in Determining Coverage of Environmental Statutes	12
2. Role in Reviewing Administrative Rules and Decisions.....	13
3. Role in Developing the Common Law System	17
PART III -- THE LAYERS OF ENVIRONMENTAL LAW: HOW THEY INTERACT TO FORM A TANGLED WEB OF REGULATION	21
A. THE DOCTRINE OF PREEMPTION	23
B. THE DORMANT COMMERCE CLAUSE.....	25

PART IV — NINE FEDERAL ENVIRONMENTAL STATUTES THAT EVERY CHEMICAL ENGINEER SHOULD KNOW	28
A. THE MANUFACTURE OF CHEMICAL SUBSTANCES -- THE TOXIC SUBSTANCES CONTROL ACT	29
1. Existing Chemicals Testing	29
2. New Chemical Review.....	30
3. TSCA's Regulatory Controls.....	31
4. Information Gathering.....	32
5. Enforcement.....	32
B. THE MANUFACTURE/USE OF PESTICIDES -- THE FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT	34
1. Registration Requirements	34
2. Labeling.....	36
3. Reregistration	37
4. Protection of Trade Secrets	37
5. Enforcement.....	38
C. THE REGULATION OF CHEMICALS IN THE WORKPLACE -- THE OCCUPATIONAL SAFETY AND HEALTH ACT	39
1. Workplace Health and Safety Standards.....	39
2. Hazard Communication Standard	40
3. Recordkeeping/Inspection Requirements.....	41
4. Enforcement.....	42
D. AIR POLLUTANT EMISSIONS -- THE CLEAN AIR ACT	43
1. State Implementation Plans.....	44
2. New Source Performance Standards (NSPS).....	46
3. New Source Review	47
4. Hazardous Air Pollutants	49
5. Permits for Existing Sources.....	51
6. Enforcement.....	52
E. WATER POLLUTANT DISCHARGES -- THE CLEAN WATER ACT	54
1. The Control of Point Sources	55
2. Dredge and Fill Permits.....	58
3. Discharge of Oil/Hazardous Substances.....	58
4. Enforcement.....	59

F. DISPOSAL OF HAZARDOUS WASTES --	
THE RESOURCE CONSERVATION AND RECOVERY ACT	60
1. Identification/Listing of Hazardous Wastes.....	62
2. Generator Requirements	64
3. Transporter Requirements.....	65
4. Treatment, Storage, Disposal Requirements.....	65
5. Enforcement.....	68
G. CLEANUP OF ABANDONED AND INACTIVE HAZARDOUS WASTE SITES --	
THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION,	
AND LIABILITY ACT.....	70
1. EPA Response Authority.....	72
2. PRP Liability.....	74
3. Private Party Cleanups.....	76
4. Defenses.....	77
5. Release Reporting.....	78
6. Enforcement.....	79
H. RESPONDING TO CHEMICAL EMERGENCIES --	
THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT..	80
1. Emergency Planning	80
2. The Toxic Release Inventory (TRI).....	81
3. Enforcement.....	83
I. A PROACTIVE APPROACH TO REDUCING ENVIRONMENTAL BURDEN --	
THE POLLUTION PREVENTION ACT	84
CONCLUSION: POLLUTION PREVENTION – IT’S THE BEST POLICY	87
APPENDIX A -- AN INTRODUCTION TO THE LEGAL CITATION SYSTEM	90
FEDERAL STATUTES.....	90
STATE STATUTES.....	91
FEDERAL REGULATIONS.....	91
STATE REGULATIONS.....	91
FEDERAL CASE LAW	91
STATE CASE LAW	92

INTRODUCTION: THE BIRTH OF THE CHEMICAL AGE AND THE GROWTH OF ENVIRONMENTAL LAW

Environmental law emerged as a formal field of legal study in the 1970s. Before then, the field was limited, for the most part,¹ to common law causes of action.² Over the last 20 years, however, the environmental law field³ has burgeoned in response to the “chemical age” and the recognition that chemical releases into the environment can pose a threat to the public’s health and safety.⁴

Currently, the environmental law field consists of approximately 20 major federal statutes,⁵ hundreds of state statutes and local ordinances, thousands of

¹ Environmental statutes existed prior to the 1970s (e.g., the 1899 Refuse Act); however, the statutes were, for the most part, anti-litter ordinances that contained little, if any, “teeth” in terms of enforcement.

² A cause of action is an occurrence of facts for which the legal system provides redress. Common law causes of action will be discussed in depth in Part II; however, as an introductory matter, common law is made by judges as opposed to legislatures or administrative agencies.

³ The term “environmental law field” refers to the system of statutes, regulations, guidelines, and judicial determinations that are used to protect the environment and the public’s health and safety. T. Sullivan, *Basics of Environmental Law*, in *Environmental Law Handbook 1* (12th Ed. 1993).

⁴ For example, in 1980, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) was enacted to clean up abandoned and inactive hazardous waste sites in the aftermath of Love Canal -- a waste site located in upstate New York that resulted from a company’s improper disposal of chemical wastes. The Emergency Planning and Community Right-to-Know Act (EPCRTKA or EPCRA) was passed in 1986 to respond to a 1984 incident in Bhopal, India that killed 2200 people and injured many more when a Union Carbide facility released methyl isocyanate into the atmosphere.

⁵ The major federal environmental law statutes are: the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C.A. §§ 136 to 136y (West 1980 & Supp. 1994); the Multiple-Use Sustained-Yield Act, 16 U.S.C.A. §§ 528 to 531 (West 1985); the Toxic Substances Control Act, 15 U.S.C.A. §§ 2601 to 2671 (West 1982 & Supp. 1994); the Coastal Zone Management Act, 16 U.S.C.A. §§1451 to 1464 (West 1985 & Supp. 1994); the Endangered Species Act, 16 U.S.C.A. §§1531 to 1544 (West 1985 & Supp. 1994); the Surface Mining Control and Reclamation Act, 30 U.S.C.A. §§ 1201, 1202, 1211, 1221 to 1230a, 1231 to 1243, 1251 to 1279, 1281, 1291 to 1309, 1311 to 1316, 1321 to 1328 (West 1986 & Supp. 1994); the Federal Water Pollution Control Act “The Clean Water Act”, 33 U.S.C.A. §§1251 to 1387 (West 1986 & Supp. 1994); the Marine Protection, Research, and Sanctuaries Act, 33 U.S.C.A. §§ 1401 to 1445 (West 1986 & Supp. 1994); the Oil Pollution Act, 33 U.S.C.A. §§ 2701 to 2761 (West Supp. 1994); the Public Health Service Act (“the Safe Drinking Water Act”), 42 U.S.C.A. §§ 300f to 300j-26 (West 1991); the National Environmental Policy Act, 42 U.S.C.A. §§ 4321 to 4370b (West 1977 & Supp. 1994); The Solid Waste Disposal Act (including the Resource Conservation and Recovery Act), 42 U.S.C.A. §§ 6901 to 6992k (West 1983 & Supp. 1994); the Clean Air Act, 42 U.S.C.A. §§ 7401 to 7671q (West 1983 & Supp. 1994); the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C.A. §§ 9601 to 9675 (West 1983 & Supp. 1994); the Emergency Planning and Community Right-to-Know Act, 42 U.S.C.A. §§ 11001 to 11050 (West Supp. 1994);

federal and state regulations,⁶ and innumerable federal and state court cases and administrative adjudications. Together, these pieces compose a complex and confusing web of regulation that anyone who works with chemicals, most notably chemical engineers, should understand.

This guide is designed to provide chemical engineers with a general overview of the field of environmental law. It is structured in four parts. Part I discusses specific reasons why chemical engineers should understand environmental laws and regulations. Part II explains the roles of the three categories of governmental actors who define the field of environmental law: legislatures, administrative agencies, and courts. Part III discusses how the environmental law that emerges from these actors operating at the federal, state, and local levels interacts, and Part IV outlines the relevant statutory provisions of nine federal environmental statutes.

The statutes that will be discussed in Part IV include the Toxic Substance Control Act; the Federal Insecticide, Rodenticide, and Fungicide Act; the Occupational Safety and Health Act; the Clean Air Act; the Clean Water Act; the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Emergency Planning and Community Right-to-Know Act; and the Pollution Prevention Act. These statutes are the most important federal statutes for chemical engineers to understand because they represent the core of the federal scheme that regulates the manufacture, use, storage, discharge and disposal of chemicals into all environmental media -- air, water, and land.

This guide's primary focus is at the federal level and, in particular, on federal environmental statutes. This federal focus is valuable because the federal laws have national scope and, often, serve as models for state environmental statutes. However, when reading Part IV, remember that state statutes and local ordinances, federal and state regulations, and federal and state case law also contribute to the environmental law field.

the Pollution Prevention Act, 42 U.S.C.A. §§ 13101 to 13109 (West Supp. 1994); the Federal Land Policy and Management Act, 43 U.S.C.A. §§ 1701 to 1784 (West 1986 & Supp. 1994); and the Occupational Safety and Health Act, 29 U.S.C.A. § 651 to 678 (West 1985).

⁶ Federal regulations are compiled annually and published in the Code of Federal Regulation (CFR). Currently, the CFR contains over 196 paperback volumes containing more than 122,096 pages. The CFR contains 60 million words -- 70 times as many as the Bible and 60 times as many as the complete works of William Shakespeare! B. Schwartz, *Administrative Law*, §4.3, at 168 (3rd Ed. 1991).

PART I -- WHY CHEMICAL ENGINEERS SHOULD UNDERSTAND THE FIELD OF ENVIRONMENTAL LAW

Chemical engineers should understand the field of environmental laws for three reasons: (1) environmental laws require chemical engineers to perform affirmative duties and, if those duties are not performed, chemical engineers and the firms for which they work may be held civilly and/or criminally liable; (2) understanding how environmental laws and regulations are enacted, promulgated, and structured will allow chemical engineers to lobby for more effective laws and regulations in the future; and (3) in their increasingly regulated work environment, chemical engineers must communicate with environmental law professionals and knowledge of environmental laws and regulations will facilitate such communication.

A. ENVIRONMENTAL LAWS REQUIRE CHEMICAL ENGINEERS TO PERFORM AFFIRMATIVE DUTIES AND, IF THOSE AFFIRMATIVE DUTIES ARE NOT DISCHARGED, THEY AND THEIR EMPLOYERS MAY BE HELD CIVILLY AND/OR CRIMINALLY LIABLE

Environmental statutes require regulated entities to perform affirmative duties and chemical engineers may be the individuals who are responsible for performing those duties for their employers. For example, the Clean Water Act, requires any entity that discharges pollutants from a point source⁷ into the navigable waters of the United States to apply for a national pollutant discharge elimination system (NPDES) permit.⁸ In many firms, chemical engineers are the persons who are responsible for securing such permits.

The common law system of environmental law also establishes affirmative duties with which chemical engineers must comply. For example, the common law requires individuals to act reasonably when acting in ways that

⁷ A point source is defined as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft from which pollutants are or may be discharged." The term "does not include agricultural stormwater discharges and return flows from irrigated agriculture." CWA §502(14), 33 U.S.C.A. §1362(14) (West Supp. 1994).

⁸ CWA §402, 33 U.S.C.A. §1342 (West 1986 & Supp. 1994).

can harm others. If an individual does not act reasonably and his or her unreasonable actions cause another person harm, a common law action of "negligence" may be pursued by the injured party. Chemical engineers, therefore, must act reasonably when performing their professional duties.

If a chemical engineer does not perform the affirmative duties that are mandated by environmental statutes and the common law, the chemical engineer and his/her employer may be found civilly or criminally liable⁹ in a court of law.¹⁰ Actions may be brought by injured parties,¹¹ government officials, or private citizens¹² in certain cases. For example, an unpermitted discharge of pollutants from a point source into the navigable waters of the United States or an exceedance of an NPDES permit limit both constitute violations of the Clean Water Act. Similarly, if a chemical engineer does not act reasonably (*e.g.*, if he acts carelessly) and his action causes damage to another person or to his/her property, the chemical engineer may be liable for a common law violation.

Violations of environmental statutes and the common law trigger a variety of civil actions. For example, the CWA empowers the administrative agency that implements the Act¹³ to issue an order requiring a violator to comply with the Act¹⁴ or to commence a civil action in a federal district court

⁹ Liabilities are the negative consequences of failing to comply with laws and regulations. Liabilities can range from "traffic ticket"-type administrative fines to criminal prosecutions. J. Arbuckle, *Liabilities and Enforcement*, in *Environmental Law Handbook*, *supra* note 3, at 42.

¹⁰ Actions are brought in civil court by the harmed party (the "plaintiff"). Civil actions award monetary damages and sometimes provide nonmonetary remedies, such as injunctions -- judicial orders that prohibit the party that is allegedly harming the plaintiff (the "defendant") from inflicting further harm. Civil remedies seek to restore the plaintiff to a pre-damage condition and are termed "compensatory" damages. Actions are brought in criminal court by the prosecutor for the state or district where the crime occurred. Criminal remedies seek to punish the criminal actor or deter further criminal action and usually consist of monetary fines or jail time.

¹¹ Plaintiffs usually have to prove that they have suffered some physical injury to their person or property before they can bring a legal action; however, some actions can be brought even if no physical injury has occurred. The violation of a statute is often actionable even if no damage has resulted.

¹² Environmental statutes often contain "citizen suit" provisions which authorize private citizens to bring actions for enforcement. See, the Clean Air Act §304, 42 U.S.C.A. §7604 (West 1983 & Supp. 1994); the Clean Water Act §505, 33 U.S.C.A. §1365 (West 1986 & Supp. 1994); CERCLA §310, 42 U.S.C.A. §9659 (West Supp. 1994); and RCRA §7002, 42 U.S.C.A. §6972 (West 1983 & Supp. 1994).

¹³ The implementing agency can be either the United States Environmental Protection Agency or a state environmental agency in states that have authorized state programs. See CWA §402(b), 33 U.S.C.A. §1342(b) (West 1986 & Supp. 1994).

¹⁴ These orders are termed administrative "compliance orders." The determination of whether

for appropriate relief, including a temporary or permanent injunction (*i.e.*, shutting down a facility).¹⁵ Similarly, if a person is harmed by a chemical engineer's unreasonable actions (*i.e.*, negligence), the person can file a common law suit against the chemical engineer seeking money damages in a state court.¹⁶

The Clean Water Act also allows criminal penalties to be imposed, in addition to civil penalties, in certain cases.¹⁷ Similarly, the common law system allows punitive damages¹⁸ to be awarded in certain civil cases (*e.g.*, in trespass, nuisance, and toxic tort actions) if the facts suggest that the defendant acted with wilful misconduct (*e.g.*, an intent to cause the plaintiff harm) or with recklessness (*e.g.*, a disregard for human life).¹⁹ Criminal penalties and punitive damages are intended to deter non-compliance and punish defendants who act knowing that the action will, or is likely to, harm others.

Corporate officers may be held civilly and criminally liable under environmental statutes and common law causes of action for their own individual acts (*e.g.*, if they dump toxins or order others to do so in violation of a statute or if they breach a duty that is imposed by the common law, such as the duty to act reasonably) or for the actions of others that take place within their area of corporate responsibility. For example, if a violation occurs from an activity over which a corporate officer has managerial control, the officer may be held liable for failing to discover and correct the violation or for failing to provide adequate supervision that would have prevented it.

a violation has occurred is made by the agency -- not by a court. To counter any bias, most administrative remedies are reviewable in a court of law. Judicial review of administrative actions will be discussed in Part II.

¹⁵ CWA §309, 33 U.S.C.A. § 1319 (West 1986 & Supp. 1994).

¹⁶ The common law system is a state-based system of law. Each state has a different common law system, consisting of different cases and different precedent (prior judicial decisions). As a result, the facts that give rise to a nuisance action under one state's common law may not be sufficient to constitute a nuisance action under another state's common law. Federal courts do not have jurisdiction to hear common law claims unless a federal question is raised. Federal questions include cases between states (*e.g.*, New York v. Connecticut), constitutional questions (*e.g.*, interpretation of the First Amendment), and cases that arise from questions of federal law (*e.g.*, interpretation of federal statutes).

¹⁷ See Section IV for the enforcement provisions of the Clean Water Act.

¹⁸ Punitive damages do not serve a compensatory purpose (*i.e.*, they are not intended to restore a plaintiff to a pre-damage condition). Rather, they are intended to punish the defendant.

¹⁹ These common law actions are termed "intentional torts." The plaintiff does not have to prove, however, that the defendant had a subjective intent to harm the plaintiff in order to win at trial.

The common law system also holds employers liable for the actions of employees when the employees are acting within the scope of their employment. This is termed “vicarious” liability.²⁰ For example, if a chemical engineer is found to have acted negligently while performing his work duties, his employer will automatically be found negligent and liable for any harm that the employee’s negligence may have caused. Liability is imposed on the employer even if the employer can show that it acted reasonably.²¹

Vicarious liability usually results in the employer being sued because the employer often has “deeper pockets”²² than the employee. If a plaintiff wins at trial and an employer is forced to pay the plaintiff’s damages due to an employee’s actions, the employer has a right to sue the employee for indemnity (*i.e.*, to sue the employee for reimbursement of the cost of the plaintiff’s award); however, since the employee usually has limited assets, the employer’s indemnity right is often meaningless.

Failure to know what the law requires is not a defense in an environmental enforcement action. Understanding what the law requires will enable chemical engineers to attain and maintain environmental compliance and, as one commentator has noted, “aggressive compliance is the most effective protection.”²³

Chemical engineers are also expected to comply with ethical duties that are outlined in the 1977 version of the Canons of Ethics of the Engineers’ Council for Professional Development. A Fundamental Canon is that engineers “should hold paramount the safety, health, and welfare of the public in the

²⁰ Vicarious liability, also termed *respondet superior*, was based on the master-servant relationship where the master controlled the servant’s actions. In such cases, it made sense to hold the master responsible if the servant acted in ways that harmed others.

²¹ Because the defendant is liable regardless of his or her individual fault, this liability is termed “strict” liability. Vicarious liability is also joint and several. Joint and several liability is a legal construct that imposes liability on two or more individuals for the same injury. It is used in cases where it is extremely difficult to apportion liability among many potential defendants. Under joint and several liability, one defendant may be held liable for the entire costs of a legal action even though he/she may not have been responsible for the entire harm. The premise is that, in imposing joint liability upon several defendants, the defendants, who are presumed to have more information than the plaintiff, will come forward with information that will prove which actor is truly at fault. Joint and several liability is used to impose liability under some environmental statutes, most notably CERCLA (*see, infra*).

²² “Deep pockets” is a term that is informally used to describe a defendant who is financially sound -- and, therefore, able to pay a damage award.

²³ T. Sullivan, *supra* note 3, at 40.

performance of their professional duties.”²⁴ Compliance with environmental law requirements is consistent with that canon.

Although the breach of an ethical duty does not give rise to a cause of action that can be enforced by the courts (unlike violations of environmental statutes or the common law), the engineering profession is in the process of establishing a single code of ethics that will guide individual action and provide a basis for developing detailed guidelines for enforcement by the profession.²⁵

B. CHEMICAL ENGINEERS WHO UNDERSTAND THE ENVIRONMENTAL LAW FIELD WILL BE ABLE TO LOBBY FOR MORE EFFECTIVE ENVIRONMENTAL LAWS AND REGULATIONS IN THE FUTURE.

Regulated entities have traditionally perceived industrial growth and a clean environment as incompatible because compliance with environmental laws and regulations is often costly.²⁶ Their strategy, therefore, was to challenge environmental regulations in court and block environmental laws from being enacted.

Recently, however, regulated entities have realized that environmental laws and regulations are inevitable. Instead of trying to block their enactment and promulgation, regulated entities have begun to work with regulatory agencies to ensure that the most cost-effective and workable environmental laws and regulations are enacted and promulgated.²⁷

²⁴ E. Slowter and A. Oldenquist, *One Code of Ethics for All Engineers*, in *Chemical Engineering Progress* 24-30 (January 1981).

²⁵ *Id.*

²⁶ The majority of federal environmental laws set pollution discharge limits in specific environmental media and encourage companies to meet those limits through waste treatment. Traditionally, treatment and the subsequent disposal of waste by-products have increased companies' operating costs, thereby, reducing corporate profits. According to the Chemical Manufacturers Association, the chemical industry has spent nearly \$12 billion on pollution abatement and control since 1973. Chemical Manufacturers Association, *U.S. Chemical Industry Statistical Handbook* 3-4 (1990).

²⁷ Traditionally, regulations were developed by the EPA or state environmental agencies; however, once they were final, the regulations were often challenged in court by regulated entities, resulting in delay, lost resources, and often ineffective regulations. Lately, the EPA has solicited comments from regulated entities early in the regulatory process, enabling the

Chemical engineers are in a unique position to help craft more effective environmental laws and regulations. Chemical engineers can educate environmental policy makers about the best solutions in terms of pollution control and waste minimization. For example, chemical engineers are often the persons who design and operate the chemical processes that generate pollution. As a result, they are familiar with how the processes can be modified to control and/or minimize the pollution that is generated.

In addition, most environmental statutes, such as the Clean Water Act and the Clean Air Act, contain technology-based control mechanisms to achieve their goals. Chemical engineers have the technical expertise to determine whether the technologies on which these controls are based are cost-effective and/or feasible. Before chemical engineers can influence the development of environmental laws and regulations, however, they must understand the basic structure of the environmental law field.

C. CHEMICAL ENGINEERS MUST COMMUNICATE WITH ENVIRONMENTAL LAW PROFESSIONALS

Finally, chemical engineers need to understand the field of environmental law because their work and workplaces are increasingly subject to environmental mandates. Communication with environmental law professionals, therefore, is crucial to the operation of the facilities that chemical engineers design, build, operate, and manage.

Chemical engineers need to communicate with federal and state environmental agencies regarding permit applications and requirements; enforcement officials and environmental attorneys regarding possible violations and enforcement proceedings; the public regarding plant operations and possible public health risks; and private sector companies, such as environmental consultants, regarding matters such as environmental cleanups and audits. A basic understanding of the environmental law field has become a *de facto* job requirement for the modern-day chemical engineer.

entities that will be affected by the regulation to voice their concerns early on. This process is called a regulation negotiation ("reg-neg"). The benefits of the reg-neg process include fewer court challenges because regulated entities often have their concerns resolved and better regulations because regulated entities are involved in their development.

An awareness of environmental laws and their regulatory requirements will also help chemical engineers understand why environmental compliance is so costly for their employers. Hopefully, this awareness will encourage them to act proactively when designing chemical processes and operations so that less pollution will be generated in the future -- resulting in cost savings for their employers and a cleaner environment.

PART II -- SOURCES OF ENVIRONMENTAL LAW: LEGISLATURES, ADMINISTRATIVE AGENCIES, AND COURTS

Three types of governmental actors define the field of environmental law: legislatures, administrative agencies, and courts. Each governmental actor plays a specific role in the development of environmental law.

The United States Constitution delegates each governmental actor specific powers and requires them to exercise those powers separately from each other.²⁸ It has been stated that, “[A]s a general rule inherent in the American constitutional system . . . the legislature cannot exercise either executive or judicial power; the executive cannot exercise either legislative or judicial power; the judiciary cannot exercise either executive or legislative power.”²⁹

Administrative agencies seem to challenge this “separation of powers” doctrine because they have the power to promulgate regulations that have the force of law (*e.g.*, a legislative power) and they also have the power to decide disputes that arise within their jurisdictional areas (*e.g.*, a judicial power). They do not violate the separation of powers doctrine, however, because their legislative and judicial powers are subordinate to the powers that are delegated to legislatures and courts by their respective constitutions. In addition, there are mechanisms, such as judicial review,³⁰ that “check” agency exercises of legislative and judicial power.

²⁸ State constitutions are modeled on the U.S. Constitution and, likewise, delegate respective powers to their executive, legislative, and judicial branches.

²⁹ B. Schwartz, *supra* note 6, §2.1, at 43, quoting Springer v. Philippine Islands, 277 U.S. 189, 201 (1928).

³⁰ Judicial review is the basic remedy against illegal administrative action. A person aggrieved by an agency decision or other act may challenge its legality through the judicial system where courts determine whether the agency acted within its statutory grant of authority. B. Schwartz, *supra* note 6, §8.1, at 470. This will be discussed in more detail *infra*.

A. LEGISLATURES

In the federal system, the United States Constitution has empowered the United States Congress to enact federal laws; in the state system, each state constitution or charter has empowered its state legislature to enact state laws. The state legislatures, in turn, empower local governing bodies, such as city councils, to pass ordinances that protect the health and safety of their residents concerning areas like trash collection or zoning.³¹

When drafting laws, legislators can use specific or vague language depending upon the amount of flexibility that they want to build into the statutory provision. For example, when drafting a statutory provision concerning enforcement, legislators often use specific language because it enables them to spell out exactly what is prohibited by the statute and the sanctions that will result from any violation. However, when drafting statutory provisions concerning issues that are within an administrative agency's particular area of expertise, legislators customarily use vague language.³²

Legislators use vague language when drafting statutory provisions for specific reasons. Often, legislators do not have the time to think about the particulars of a specific statute's implementation or they do not have expertise to determine how the statute should be implemented. Sometimes, legislators want to avoid making politically unpopular choices. Vague drafting allows legislators to give administrative agencies the flexibility they need to implement the statute while enabling legislators to avoid any political heat that may be associated with a statute's implementation.

B. ADMINISTRATIVE AGENCIES

Administrative agencies are responsible for implementing of environmental statutes. Agencies can be created by each branch of government;³³

³¹ These local powers are termed "police powers."

³² A notable exception occurred during the Reagan Administration. Specific mandates were included in many environmental statutes enacted during that time because the EPA was failing to regulate effectively.

³³ Courts can establish "special masters", legislatures can establish investigatory offices such as the Congressional Budget Office, and chief executives (*e.g.*, the President) can establish councils, such as the Council of Economic Advisors, by executive order. In 1970, President Nixon established the United States Environmental Protection Agency (EPA) in order to consolidate federal programs for controlling air and water pollution, radiation, pesticides, and solid waste.

however, administrative agencies are usually created by statute. In such cases, their administrative powers are derived entirely from their enabling legislation.

Administrative agencies cannot exercise more power than that which they are delegated. The issue of legislative delegation to an administrative agency and whether that delegation was proper or whether that delegation was exceeded by the agency often provide the basis for a challenge to an administrative agency action.³⁴

Agencies give meaning to vague statutory provisions through a procedure known as rule making. Rule making consists of publishing proposed regulations in the Federal Register,³⁵ providing an opportunity for the public to comment on the proposed regulations, and publishing final regulations in the Federal Register which, when effective, have the force of law. Because administrative rules affect the rights and obligations of regulated entities, their promulgation is one of the most important tasks of administrative agencies.

For example, the EPA promulgated a rule in 1992 that clarified a provision in CERCLA that exempts “secured creditors” from liability for cleanup costs when they foreclose on a borrower’s contaminated property.³⁶ In promulgating this rule, EPA interpreted CERCLA’s liability provisions and concluded that Congress did not intend certain classes of lenders to be included in its liability scheme. This rule changed parties’ existing rights and obligations under CERCLA and created law just as CERCLA did when it was initially enacted.

Administrative agencies also have the authority to decide disputes that arise from exercises of their administrative powers. For example, if a state environmental agency denies a regulated entity’s application for an NPDES permit,³⁷ the entity has the right to appeal the denial to an administrative law judge.³⁸ Administrative law judges work for administrative agencies and they act exactly like judges. They hear testimony, examine evidence, and apply legal standards to factual scenarios in order to make determinations that settle disputes.

³⁴ This will be discussed *infra*.

³⁵ The Federal Register is the official publication in which rules and regulations, which are promulgated by federal administrative agencies, are published.

³⁶ This rule was later invalidated. *See, infra*.

³⁷ State agencies are generally the primary permitting and enforcing authorities for environmental statutes.

³⁸ Administrative law judges are also called “adjudicators.”

C. COURTS

Courts are the third type of governmental actor that defines the field of environmental law. Courts are responsible for resolving formal disputes among parties. Disputes can arise in a variety of ways. For example, when one individual harms the person or property of another, the harmed individual may demand compensation in a court of law. Similarly, when a person or entity violates a statute that was enacted to protect the public, the public may demand retribution.

When resolving specific disputes, courts examine the facts at issue and determine whether the law provides injured parties with a remedy. In making their determinations, judges are guided by statutes, administrative rules, and the determinations of judges who have ruled in prior similar cases (“precedents”). Judges use precedents to guide their application of general legal rules to the specific facts of each case. Their determination in each case is called the “holding.”

1. Role in Determining Coverage of Environmental Statutes

Disputes can arise over the coverage of an environmental statute. For example, a regulated entity can argue that it is not subject to a specific statutory provision. If an administrative agency tries to force the entity to comply, the entity can bring a lawsuit to conclusively determine whether it is subject to the provision.

Judges decide these disputes by determining what the legislators intended when they drafted the provision (termed its “statutory intent”). First, they examine the plain language of the provision. If the language is clear, the case is usually decided on that basis. However, judges often look at other clues in order to determine the legislators’ intent. Possible clues include the statute’s legislative history (*e.g.*, the recorded history of the statute’s enactment -- from drafting through enactment) and the overall effect of the statutory provision. They also look at similar provisions, which may be contained in other statutes, to determine how similar language has been interpreted by the courts.

For example, in an early CERCLA case, the defendant argued that Congress did not intend CERCLA to be applied retroactively (*i.e.*, that Congress did not intend CERCLA to hold parties liable for actions that were legal at the time they occurred). In rejecting the defendant’s argument, the United States

District Court of Appeals for the Eighth Circuit wrote: "Although CERCLA does not expressly provide for retroactivity, it is manifestly clear that Congress intended CERCLA to have retroactive effect. The language used in the key liability provision refers to actions and conditions in the past tense. Further, the statutory scheme is overwhelmingly remedial and retroactive."³⁹ In this case, the "plain language" of the provisions and the overall statutory scheme determined how the court interpreted the provision at issue.

Disputes can also arise over the constitutionality of environmental statutes. For example, when CERCLA was enacted, its retroactive application was challenged as an unconstitutional denial of due process of law.⁴⁰ In ruling that CERCLA was constitutional, the United States Court of Appeals for the Eighth Circuit examined prior case law on due process and stated the general rule: "Due process is satisfied 'simply by showing that the retroactive application of the legislation is itself justified by a rational legislative purpose.'"⁴¹ The court then looked at the facts at issue -- in this case, the legislative purpose of CERCLA. It wrote, "Cleaning up inactive and abandoned hazardous waste disposal sites is a legitimate legislative purpose, and Congress acted in a rational manner in imposing liability for the cost of cleaning up such sites upon those parties who created and profited from the sites and upon the chemical industry as a whole."⁴² Its holding that CERCLA's retroactive liability does not violate due process, therefore, was consistent with the general rule and the facts of the case.

2. Role in Reviewing Administrative Rules and Decisions

As mentioned above, administrative agencies develop and promulgate regulations in order to implement environmental statutes. Those regulations can be legally challenged by aggrieved parties in two ways: (1) substantively and (2) procedurally.

³⁹ United States v. Northeastern Pharmaceutical & Chemical Co., Inc., 810 F.2d 726, 732-733 (8th Cir. 1986) (cites omitted).

⁴⁰ Due process is required by the 5th Amendment of the United States Constitution. The Fifth Amendment of the United States Constitution states: No person shall be...deprived of life, liberty, or property, without due process of law...." U.S.C.A. Const. Amend, 5 (West 1987).

⁴¹ United States v. Northeastern Pharmaceutical & Chemical Co., Inc., 810 F.2d 726, 733 (8th Cir. 1986), *citing* Pension Benefit Guaranty Corp. v. R.A. Gray & Co., 467 U.S. 717, 730 (1984).

⁴² *Id.* at 734.

Substantively, a regulation can be attacked on the grounds that the agency did not have the power to develop and promulgate the regulation (this is termed an “*ultra vires*” challenge) or it can be attacked on the grounds that the rule was improperly promulgated (*e.g.*, the rule was within the agency’s delegated powers but it was not developed in accordance with the requirements of the Administrative Procedure Act). In both cases, the remedy is invalidation of the rule.⁴³

Judges determine *ultra vires* challenges by examining whether the power that was conferred upon the agency included the power to promulgate the challenged regulation. As a general rule, judges generously construe agency authority. Nevertheless, courts take *ultra vires* challenges seriously because *ultra vires* acts represent unlawful agency intrusions into the domain of legislatures, thereby, violating the separation of powers doctrine.

In a recent *ultra vires* challenge, the United States Court of Appeals for the D.C. Circuit vacated the EPA rule mentioned *supra* that protected lenders from CERCLA liability.⁴⁴ The court ruled that Congress had not empowered EPA to determine the reach of CERCLA’s liability scheme. It wrote, “[I]t cannot be argued that Congress intended EPA . . . to have authority to . . . define liability for a class of potential defendants. Congress . . . has designated the courts and not EPA as the adjudicator of the scope of CERCLA liability.”⁴⁵ Because EPA had acted beyond its statutorily delegated powers, the court invalidated the rule.

Regulations can also be challenged in court on procedural grounds. Federal administrative agencies must follow specific procedures, set forth in the Administrative Procedure Act (APA),⁴⁶ when promulgating regulations. For example, the APA requires all federal agencies to publish a notice of a proposed rule making in the Federal Register prior to promulgating a rule that will affect the rights of private parties. In addition, federal agencies must give the public an opportunity to comment on the proposed rule. If the

⁴³ Invalidation results in the judge “vacating” the rule and “remanding” it back to the agency. However, upon remand, the agency can promulgate the rule in a proper and, therefore, legal manner.

⁴⁴ Kelley v. Environmental Protection Agency, 15 F.3d 1100 (D.C. Cir. 1994).

⁴⁵ *Id.* at 1107-08.

⁴⁶ 5 U.S.C. 551 *et seq* (West 1977 & Supp. 1994). The Administrative Procedure Act (APA) sets forth rules that agencies must follow when implementing their administrative duties. Most states have used the APA as a model when drafting state administrative procedure acts.

APA's procedures are not followed, aggrieved parties can file a lawsuit challenging the rule.

In 1991, for example, the D.C. Circuit Court of Appeals invalidated the EPA's "mixture" rule⁴⁷ because the agency had failed to provide affected parties with notice of the proposed rule making.⁴⁸ The court ruled that the mixture rule was invalidly adopted and, therefore, had been ineffective since the date of its promulgation.

A party who is aggrieved by a final agency determination is entitled to have that determination reviewed in a court of law. This is termed judicial review. For example, if a regulated entity has its application for a Clean Water Act NPDES permit denied by a state environmental agency, the entity has the right to have the agency's decision reviewed in a court of law to ensure that the denial was proper. Before an aggrieved party can bring an action for judicial review, however, a number of requirements must first be met.

First, a party must have the right to seek judicial redress in a court of law. This is termed "standing." The doctrine of standing ensures that only parties who have a genuine interest in the case can bring a legal action for judicial relief. Standing conserves judicial resources and precludes frivolous claims.

The APA grants standing to persons who have suffered legal wrong because of agency action, or who have been adversely affected or aggrieved by an agency action within the meaning of a relevant statute.⁴⁹ Environmental statutes can also provide standing to certain individuals, such as through citizen suit provisions. In general, the standing requirement is met if the plaintiff has suffered an "injury in fact." Injury in fact is a legal term that means that the plaintiff has suffered some definable harm that is different from the harm suffered by the public at large.

In addition, parties must "exhaust" their administrative remedies before they can bring an action for judicial review. The doctrine of exhaustion requires parties to argue their case to an administrative law judge before a court can exercise jurisdiction over the case. The doctrine of exhaustion helps conserve judicial resources but, more importantly, it allows administrative

⁴⁷ The "mixture" rule required listed hazardous wastes to be regulated under the Resource Conservation and Recovery Act as hazardous wastes even when they were mixed with large quantities of nonhazardous wastes.

⁴⁸ Shell Oil Co. v. Environmental Protection Agency, 950 F.2d 741 (D.C. Cir. 1991).

⁴⁹ 5 U.S.C.A. §702 (West 1977).

agencies to get the “first shot” at deciding disputes concerning matters that are within their particular areas of expertise.

Courts do not take judicial review actions lightly. Judges are often reluctant to substitute their judgement for that of agencies because agencies are considered to be the “experts” on administrative matters. In addition, overturning agency decisions is politically sensitive because administrative agencies represent the executive branch which has been entrusted by the legislative branch to implement its enactments. Judicial decisions that overturn agency actions, therefore, potentially threaten the separation of powers doctrine. The general rule, therefore, is judicial deference to administrative agency decisions, which reduces the likelihood that courts will overturn agency decisions.⁵⁰

For example, the Oregon Supreme Court recently upheld a state environmental commission’s refusal to certify a hydroelectric facility because the facility would violate a state water temperature standard designed to protect trout.⁵¹ The court ruled that the commission acted within its discretion in rejecting the project based on the temperature standard even though the commission found that the project would not, on the whole, harm the trout population.

The City of Klamath Falls had argued that the state had to find that a temperature change would harm the trout population before rejecting the project based on the temperature standard. The city also argued that the state had the discretion under the regulation not to invoke the temperature standard where the change would not harm the fish. Finally, it argued that the commission did not provide a rational explanation for applying the temperature standard to the project.

⁵⁰ Courts limit their review of administrative agency actions in two ways: through their scope of review and their standard of review. The scope of review determines the amount of factual material that the court will review when making its determination. Normally, a reviewing court restricts its scope of review to the existing factual record (*i.e.*, the evidence and testimony presented in the administrative forum) and makes a determination as to whether the agency’s decision was proper given those facts. The standard of review determines the level of legal scrutiny the reviewing court will apply when reviewing an agency action. The “arbitrary and capricious” standard is the most common. Under this standard, a reviewing court must determine whether an agency action was based on a consideration of relevant factors or whether there has been a clear error in judgment. It is very difficult to overturn an agency action using this standard because the standard is one of reasonableness and, in making their determination, courts generally presume that the agency action was reasonable. B. Schwartz, *supra* note 6, §4.4, at 172

⁵¹ City of Klamath Falls v. Environmental Quality Commission, 870 P.2d 825 (1994).

In upholding the commission's action, the court deferred to its administrative finding. The court found that the state did not need to show an independent harm to the trout population because temperature changes over the prescribed limits were *per se*⁵² violations of state water quality standards. The court also found that the commission had the discretion to do more than the bare minimum requirement and err on the side of overprotecting the fish. Further, the court found that the agency's order provided a rational basis for application of the standard because the commission was certain that temperature changes would occur.

This case illustrates how courts defer to administrative determinations in judicial review actions. As long as the agency's decision is reasoned and within the statute, it will be fairly difficult to overturn on review.

3. Role in Developing the Common Law System

Courts are also responsible for deciding common law cases. The common law system is composed entirely of case law (as opposed to statutory provisions).⁵³ Each state has its own common law system,⁵⁴ consisting of decisions that are based upon the judicial determinations of previous cases (the prior determinations are called "precedents"). Judges use precedent to guide their decision making. A judge can make a decision that is inconsistent with the precedents of a given jurisdiction; however, they do so rarely because a sudden shift threatens public expectations about what is and is not legal.

The common law is organized around specific topics. Cases that deal with similar factual situations are grouped together. For example, a category of common law actions is called "torts." Torts are causes of action that provide a legal remedy to persons who are injured by other individuals' breaches of generalized legal duties (*e.g.*, the duty to act reasonably). The categorization of common law actions has facilitated the development of legal principles that

⁵² *Per se* violations consist of violations of statutes that were enacted to protect the public's health and safety. *Per se* violations are actionable even if no harm to persons or property occurs.

⁵³ As one commentator has noted, "[T]he common law is not the result of legislative enactment. Rather, its authority is derived solely from usages and customs which have been recognized, affirmed, and enforced by the courts through judicial decisions." T. Sullivan, *supra* note 3, at 6.

⁵⁴ Except Louisiana which has a legal system that is grounded in civil law. Civil law is derived from the French legal system, whereas common law's roots are English in origin. There is also a federal system of common law; however, it does not significantly affect the areas of law covered by this guide.

are specific to the facts that commonly occur within each category. This has provided consistency to the common law by helping ensure that cases that have similar facts are decided in similar ways.

Four common law causes of action predominately shape the environmental law field.⁵⁵ They are nuisance, trespass, strict liability, and negligence. All four causes of action are categorized as torts. To bring an action⁵⁶ under one of these legal theories, a plaintiff must allege that the defendant breached a duty imposed by the common law.

For example, to bring a negligence action, the plaintiff must allege that the defendant acted negligently (*i.e.*, that he or she breached the duty to act reasonably when acting in ways that could harm others).⁵⁷ To bring an action in nuisance, the plaintiff must allege that the defendant unreasonably interfered with the quiet enjoyment of his or her land.⁵⁸ To bring an action in trespass, the plaintiff must allege that the defendant physically invaded his or her real property (*i.e.*, land).⁵⁹ To bring an action in strict liability, the plaintiff must allege that the defendant operated an abnormally dangerous activity.⁶⁰

⁵⁵ Toxic torts is a new common law category that provides persons, who have suffered injury due to chemical exposure, with a cause of action. In such cases, the traditional elements of a common law tort (breach, causation, and damages) are hard to prove with certainty because the injury (*e.g.*, cancer) often occurs years, sometimes decades, after the exposure. Toxic tort precedents have developed that authorize relaxed burdens of proof due to the greater burdens that plaintiffs face when bringing such actions.

⁵⁶ "Bringing a cause of action" refers to the initial stages of a law suit, such as the filing of the complaint. The complaint is the legal document in which the plaintiff alleges all facts that she claims entitles her to legal redress.

⁵⁷ Negligence is one of the most common causes of action alleged because careless actions often result in harm. Negligence actions can be brought against defendants who carelessly handle chemicals or whose unreasonable actions result in a release of pollutants into the environment.

⁵⁸ For example, the discharge of soot, smoke, or dust, even vibrations, can disrupt a plaintiff's ability to enjoy his or her land.

⁵⁹ The common law also provides an action for trespass to personal property; however, this action is not relevant for the purposes of the guide. Trespass to land often occurs when contaminants cross property boundaries, such as through groundwater.

⁶⁰ "Abnormally dangerous activities" are activities that subject a large number of people to significant risk. When considering whether an activity is "abnormally dangerous," courts examine factors such as whether the activity poses a high degree of risk; the likelihood that the resultant harm, if any, will be great; the ability to eliminate risk, such as by exercising reasonable care; the extent to which the activity is common in the community; the appropriateness of the activity to the community; and the activity's value to the community. T. Sullivan, *supra* note 3, at 15. Traditionally, activities that have been found to be "abnormally dangerous" include blasting, impounding large amounts of water, and explosives. Recently, exposing individuals to toxic chemicals and/or substances has been added to the list of abnormally dangerous activities.

In addition to alleging that the defendant breached a specific duty imposed by the common law, the plaintiff must also allege that he or she was damaged and that the defendant's breach caused the damage. The plaintiff's attorney must prove to a judge or a jury⁶¹ that all of the relevant facts alleged in the complaint occurred (or likely occurred) in order to win at trial.⁶²

In order to defeat the plaintiff's claim, the defendant's attorney must prove that the alleged facts did not occur or, if they did, they do not provide an actionable claim. For example, the defendant may have a defense⁶³ to the plaintiff's cause of action which could prevent the plaintiff from winning at trial.

Lawyers research case law and use their precedents to convince the judge or jury to rule in their favor. To illustrate how judges use precedents to decide common law cases, consider Boomer v. Atlantic Cement Company,⁶⁴ one of the common law's most famous nuisance decisions. In Boomer,⁶⁵ the plaintiffs alleged that the defendant's operation of its cement plant, which discharged dust onto their property, was a nuisance (*i.e.*, that it unreasonably interfered with the quiet enjoyment of their land and, thereby, caused them harm). The trial court⁶⁶ had found that, based on the facts of the case and New York law, the defendant's operation was a nuisance.

The issue on appeal was the remedy which should be awarded. The plaintiffs wanted a permanent injunction (*i.e.*, they wanted the court to order the defendant to shut its plant down); however, the trial court had refused to

⁶¹ Parties choose whether they want their case argued before a judge or a jury. If they choose a judge, the judge determines issues of fact and law. If they choose a jury, the jury determines issues of fact and the judge determines issues of law.

⁶² In civil and criminal cases, attorneys must meet a "burden of proof." In most civil actions, the attorney must prove that the alleged facts occurred "by a preponderance of the evidence." In criminal cases, the prosecutor must prove that the defendant caused the crime "beyond a reasonable doubt."

⁶³ Defenses include procedural defenses which allege that the plaintiff did not follow procedures required by the court system and substantive defenses which attack the legal sufficiency of the plaintiff's claim. A substantive defense to a trespass action would be the defendant's ownership of the land that the plaintiff alleges is being invaded.

⁶⁴ Boomer et al. v. Atlantic Cement Company, 257 N.E.2d 870 (1970).

⁶⁵ Once a case is cited in its entirety, subsequent references to the case are made by citing only the name of the party that brought the action.

⁶⁶ The trial court is the first court that hears a case. In New York, the trial court is called the Court of Special Term. The highest court in New York State is called the New York Court of Appeals. The second highest court is called the Supreme Court, Appellate Division. This is contrary to the system of most states that call their highest court the "supreme" court and the second highest court the "appellate" court.

grant a permanent injunction and its decision had been affirmed by the Supreme Court, Appellate Division.

The New York Court of Appeals found itself in a dilemma. The precedent in New York State was clear: whenever a continuing nuisance is found and substantial damage has resulted, the proper remedy is a permanent injunction. However, if the court followed precedent, it would have to overturn the lower court's denial of a permanent injunction which was premised on the court's finding that the plant's economic benefits to the community were large whereas the plant's injurious impact on the plaintiffs was relatively small. The court avoided the "drastic remedy"⁶⁷ of issuing a permanent injunction by awarding plaintiffs permanent damages, compensating them for the economic loss of their property due to the defendant's continuing nuisance.

To justify its award of permanent damages which broke with settled New York precedent, the Boomer court cited common law precedent from other states which it argued supported its issuance of a money award, albeit, in an attenuated way. The court first cited the general rule from *Corpus Juris Secundum*, a collection of legal research volumes that contain abstracts of state and federal case law. It wrote, "Where a nuisance is of such a permanent and unabatable character that a single recovery can be had, including the whole damage past and future resulting therefrom, there can be but one recovery."⁶⁸ This rule, however, does not exactly fit *Boomer's* facts because the defendant's continuing operation of its cement plant was not of a "permanent and unabatable character" -- it could be shut down!

In addition, the court cited an Indiana Supreme Court case that had facts similar to *Boomer* -- gases, odors, ammonia, and smoke from a gas plant had damaged a greenhouse operation. In that case, the court denied an injunction and, instead, granted permanent damages because, "less injury would be occasioned by requiring the appellant . . . to pay the appellee . . . all damages suffered by it . . . than by enjoining the [appellant's] operation. . . ."⁶⁹ The court cited the Indiana case as precedent even though its holding was precedent only in Indiana and the Boomer court was not required to follow its authority.⁷⁰

⁶⁷ Boomer, *supra* note 64, at 873.

⁶⁸ *Id.* at 874.

⁶⁹ *Id.*

⁷⁰ Each state has its own common law system and courts within each state are bound only by the precedent made by the higher courts of that state.

The Boomer court strayed from the settled precedent of New York when making its judicial determination; however, Boomer is unusual because courts are loathe to stray from settled precedent. Precedent represents years (often decades) of settled case law. As a result, precedent allows people to predict how the common law will govern their actions. This may explain why the Boomer court tried to ground its decision on precedent from other jurisdictions. Reasoned departures from precedent (*e.g.*, what the Boomer court tried to do although there is some dispute whether its reasoning was sound), however, give the common law its dynamism, allowing it to respond to a changing society.

It is important for chemical engineers to understand the common law system because it has as much of a regulatory impact as environmental statutes and regulations. For example, a company can be in compliance with statutory and regulatory requirements but still be the subject of a common law cause of action because compliance does not conclusively prove that a company is operating non-negligently or that its effluent does not constitute a nuisance.

PART III -- THE LAYERS OF ENVIRONMENTAL LAW: HOW THEY INTERACT TO CREATE A TANGLED WEB OF REGULATION

The categories of actors that define the field of environmental law consist of many members. "Legislatures," for example, include the United States Congress, the fifty state legislatures, and innumerable local governing bodies. "Administrative agencies" consist of federal, state, and local agencies, such as the Environmental Protection Agency, and, for each of the 50 states, their state and local counterparts. "Courts" include the United States Supreme Court, the fourteen United States courts of appeals, ninety-four United States district courts, fifty state supreme courts, and many state appellate and lower courts.

These actors all create environmental law and the law that they create, whether in statute, regulation, or case law form, can interact in one of four ways. The laws can have no effect on each other, the laws can complement each other, the laws can require the same thing or, the laws can conflict.

The first scenario -- where environmental laws have no effect on each other, is the general rule. As mentioned earlier, the United States Constitution and state constitutions delegate specific powers to their respective legislatures, administrative agencies, and courts. Because these actors have the power to act in distinct jurisdictional areas, the law that they create usually does not impact the law made by the other actors. An example is the state common law action of nuisance and the federal Clean Water Act. Regulated entities can and must comply with each law's mandates.

Environmental laws can also act cooperatively to effect some mutual purpose. Federal statutes often allow state agencies to administer and enforce regulatory programs that effect the federal statutes' purposes and goals. For example, the Clean Water Act allows states, in certain cases, to implement the national pollutant discharge elimination system (NPDES) permit program which regulates the discharge of pollutants into the nation's surface waters.⁷¹ If states do not assume an NPDES permit program or if they assume a program, but implement it ineffectively, EPA can reassert its authority over the program. In these cases, compliance with both the federal and the state laws is possible and necessary to give effect to their common purpose.

Environmental laws can also impose identical requirements. For example, many states have "mini-Superfund" laws that are modeled on CERCLA. Both the federal and the state laws impose liability on certain entities, called potentially responsible parties or "PRPs", for the clean up of abandoned and inactive hazardous waste sites. Cleanup actions can be brought under the state or the federal statute; however, these laws can provide problems in terms of enforcement because of their duplicative mandates.

Finally, environmental laws can conflict, making simultaneous compliance with the laws impossible or burdensome. Conflicting laws can emerge at the same level (*e.g.*, between a state court and a state administrative agency) or it can occur at different levels (*e.g.*, between a state legislature and a federal legislature). In both cases, conflicts usually occur because both actors have jurisdiction (or contend they do) to act concerning the same regulatory area.

When environmental laws conflict, one of the laws must be invalidated. The determination as to which law remains valid is governed by legal

⁷¹ CWA §402(b), 33 U.S.C.A. §1342(b) (West 1986).

principles. For example, conflicts between environmental laws that emerge at the same level (*e.g.*, between laws created by state administrative agencies and state courts) are often resolved using the doctrines of exhaustion and judicial deference to agency determinations.⁷² Rules have also evolved to settle conflicts between laws that emerge at different levels, such as at the federal and state levels.

A. THE DOCTRINE OF PREEMPTION

The relations between federal and state actors are governed by the Supremacy Clause and the state powers clause of the United States Constitution. The Supremacy Clause ensures that in any area where the federal government has been accorded national powers, its regulatory authority can be exercised to preempt concurrent state regulatory efforts.⁷³

The federal government is empowered to act only in specific areas, however. Those powers concern the regulation of interstate and foreign commerce (although federal exercises of such authority are broadly construed). In areas that have not been delegated to the federal government, the states have unfettered authority to regulate -- a point that is clearly expressed by the Tenth Amendment.⁷⁴

Courts use the Supremacy Clause and the Tenth Amendment to resolve conflicts between federal and state laws. Their goal is to balance the competing doctrines of federal supremacy and state authority. For example, when initially determining whether a conflict exists, courts presume that concurrent state and federal laws are valid. However, if further inquiry suggests that a conflict does exist, courts must determine whether the federal government has been accorded national powers over the specific area of regulation. If they find that it has, courts must rule that the federal regulation

⁷² These legal doctrines were discussed in Part II.

⁷³ The supremacy clause states, "This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding." U.S.C.A. Const. Art. 6 (West 1987).

⁷⁴ The Tenth Amendment states, "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." U.S.C.A. Const. Amend. 10 (West 1987).

preempts (*i.e.*, supersedes) the state or local law. However, if courts find that it has not, courts must invalidate the federal regulation and, in such cases, the state or local law remains valid.

When reviewing a law that is challenged on preemption grounds, courts determine whether the law contains an express or implied congressional intent to supersede state or local authority. To do this, they examine the challenged statutory provision in order to find evidence of express congressional intent and they examine the scope and range of the statutory scheme in order to find evidence of implied congressional intent.⁷⁵

In cases where courts cannot find an express or an implied preemptive intent, the Supremacy Clause still requires that, where a state or local law is incompatible with a federal law (*e.g.*, if dual compliance with both regulations is impossible or would contravene each other's policy), the state or local law must be invalidated. However, as mentioned earlier, courts begin any preemption challenge with a strong presumption against preemption and they uphold concurrent state or local authority unless they find that Congress has expressed a clear intent to displace state or local authority in a particular regulatory field. The doctrine of preemption can be illustrated by a Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) case -- Wisconsin Public Intervenor v. Mortier.⁷⁶ In Mortier, a chemical applicator challenged a local pesticide ordinance on preemption grounds. FIFRA contains an express statement that allows "states" to regulate pesticide applications more stringently than the federal government. The applicant argued that the express authorization of state power to regulate applicators more stringently than FIFRA precluded local governments from doing the same.

The Supreme Court rejected the applicant's challenge, finding that FIFRA did not contain express or implied language that its provisions were intended to supersede local authority. Because the Court also found that it was not

⁷⁵ Regarding implied congressional intent to preempt, the United States Supreme Court has written: "Absent explicit pre-emptive language, Congress' intent to supersede state law in a given area may nonetheless be implicit if a scheme of federal regulation is 'so pervasive as to make reasonable the inference that Congress left no room for the States to supplement it,' if 'the Act of Congress...touch[es] a field in which the federal interest is so dominant that the federal system will be assumed to preclude enforcement of state laws on the same subject,' or if the goals 'sought to be obtained' and the 'obligations imposed' reveal a purpose to preclude state authority." Wisconsin Public Intervenor v. Mortier, 501 U.S. 597, 605 (1991), quoting Rice v. Santa Fe Elevator Corp., 331 U.S. 218, 230 (1947).

⁷⁶ 501 U.S. 597 (1991)

impossible to comply with FIFRA and the local regulation and there was not a conflict between the two laws' goals, the Court ruled that FIFRA did not preempt the local ordinance.

B. THE DORMANT COMMERCE CLAUSE

When the United States Constitution was drafted, the states voluntarily ceded certain powers to the federal government. One of these powers was the power to regulate interstate and international commerce. The states surrendered that power to the federal government because it was vital to a strong national economy. Absent the Commerce Clause, states feared that they would isolate themselves and not trade with each other, resulting in "economic balkanization."⁷⁷

The Commerce Clause grants Congress the power "to regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes."⁷⁸ The clause is termed the "dormant" Commerce Clause because, although it is stated as an affirmative grant of legislative authority (*e.g.*, Congress has the power "to regulate"), courts have interpreted the clause to impliedly prohibit states and local governments from acting in ways that excessively interfere with interstate and international commerce.⁷⁹

When determining whether a law is valid despite its interference with interstate commerce (just because a state action interferes with interstate commerce, it does not automatically violate the Commerce Clause), courts apply one of two tests. When a law regulates even-handedly (*i.e.*, when it applies equally to items of commerce regardless of their origin), courts apply a test of lesser scrutiny. Under this test, called the "Pike test,"⁸⁰ a law will be upheld if it furthers a legitimate state interest unless the burden on interstate commerce is clearly excessive in relation to its putative local benefits. The Supreme Court wrote in Pike, "[T]he extent of the burden that will be

⁷⁷ This phrase, which is often used by courts when justifying invalidation of laws and regulations that violate the commerce clause, was first stated in H.P. Hood & Sons, Inc. v. Du Mond, 336 U.S. 525 (1949).

⁷⁸ U.S.C.A. Const. Art. I, §8, cl. 3 (West 1987).

⁷⁹ Although the dormant commerce clause prevents states from acting in ways that interfere with interstate commerce, Congress can enact legislation that gives states such power.

⁸⁰ The "Pike test" was established by the Supreme Court in Pike v. Bruce Church, Inc., 397 U.S. 137 (1970).

tolerated will of course depend on the nature of the local interest involved, and on whether it could be promoted as well with a lesser impact on interstate activities.”⁸¹

Laws that discriminate against interstate commerce as a means of responding to local concerns or that are motivated solely by a desire to protect local industries from out-of-state competition (*e.g.*, a law that requires raw materials to be processed in-state),⁸² are strictly scrutinized by the courts. Such laws are automatically (“*per se*”) invalid, except in a narrow class of cases in which the state or political subdivision can demonstrate that the law serves a legitimate governmental public purpose that cannot be served by other nondiscriminatory means.⁸³ This test, however, is very difficult to meet.

A recent Supreme Court case illustrates the use of these two tests. In C & A Carbone, Inc. v. Town of Clarkstown, N.Y.,⁸⁴ a town ordinance was challenged as a violation of the Commerce Clause. The ordinance required all solid waste to be processed at a designated transfer station before leaving the municipality. The Court in a 6-3 decision held that the ordinance was unconstitutional because the ordinance precluded competitors of the designated facility, including out-of-state firms, from accessing the local waste processing market.

Justice Kennedy, writing for the majority,⁸⁵ used the *per se* discriminatory test in striking down the flow control ordinance as a violation of the Commerce Clause. He wrote, “[T]he flow control ordinance discriminates, for it allows only the favored operator to process waste that is within the limits of

⁸¹ *Id.* at 142.

⁸² *See, e.g., City of Philadelphia v. New Jersey*, 437 U.S. 617 (1978) where the U.S. Supreme Court held that a New Jersey law that prohibited the importation of solid waste violated the Commerce Clause because, on its face, it prevented out-of-state interests from participating in in-state markets.

⁸³ For example, a Maine ban on the import of baitfish was upheld by the Supreme Court, even though the ban clearly benefitted the local baitfish industry, because the Court found that Maine had no other way to prevent the spread of parasites and the adulteration of its native fish species. Maine v. Taylor, 477 U.S. 131 (1986).

⁸⁴ 114 S. Ct. 1677 (1994).

⁸⁵ U.S. Supreme Court decisions are decided by a majority vote of its nine Justices. One Justice is assigned the task of authoring an opinion, which is then circulated among the other Justices. If a Justice does not agree with the opinion’s ruling or reasoning, he or she can author a separate opinion which then is circulated among the Justices. The opinion that receives the most signatures becomes the majority opinion. Concurring opinions are opinions that agree with the ruling of the majority opinion but differ on the reasoning. Dissenting opinions are opinions that disagree with the majority opinion’s ruling.

the town.”⁸⁶ In finding that the ordinance did not meet the narrow exception to the *per se* test, Justice Kennedy wrote, “[C]larkstown has any number of nondiscriminatory alternatives for addressing the health and environmental problems alleged to justify the ordinance . . . The most obvious would be uniform safety regulations enacted without the object to discriminate.”⁸⁷

Justice O’Connor joined the Court in a concurring opinion, writing separately because she found that the ordinance, rather than being *per se* discriminatory was even-handed in its application (*e.g.*, she found that it did not discriminate on the basis of geographic origin). In applying the Pike test, she found that the ordinance’s burden on interstate commerce was excessive in relation to the local benefits conferred and, as a result, she also found that the ordinance was unconstitutional.⁸⁸

Justice Souter, who wrote the dissenting opinion in C & A Carbone, stated that the Clarkstown ordinance did not violate the Commerce Clause because its burden fell “entirely on Clarkstown residents.”⁸⁹ He wrote:

There is, in short, no evidence that Local Law 9 causes discrimination against out-of-town processors, because there is no evidence in the record that such processors have lost business as a result of it. Instead, we know only that the ordinance causes the local residents to pay more for trash disposal services. But local burdens are not the focus of the dormant Commerce Clause, and this imposition is in any event readily justified by the ordinance’s legitimate benefits in reliable and sanitary trash processing.⁹⁰

⁸⁶ C & A Carbone, *supra* note 84, at 1682.

⁸⁷ *Id.* at 1683.

⁸⁸ She wrote: “The local interest in proper disposal of waste is obviously significant. But this interest could be achieved by simply requiring that all waste disposed of in the town be properly processed *somewhere*. For example, the town could ensure proper processing by setting specific standards with which all town processors must comply. In fact, however, the town’s purpose is narrower than merely ensuring proper disposal. Local Law 9 is intended to ensure the financial viability of the transfer facility. I agree with the majority that this purpose can be achieved by other means that would have a less dramatic impact on the flow of goods. *Id.* at 1690 (cite omitted) (O’Connor, J., concurring).

⁸⁹ *Id.* at 1700 (Souter, J., dissenting).

⁹⁰ *Id.*

PART IV -- NINE FEDERAL ENVIRONMENTAL STATUTES THAT EVERY CHEMICAL ENGINEER SHOULD KNOW

This section will outline the regulatory provisions of nine federal environmental statutes that regulate chemicals throughout their life cycle (*i.e.*, from their manufacture to their ultimate disposal). It will summarize the basic provisions of the nine laws, detail the regulatory requirements with which regulated entities must comply, and outline the enforcement mechanisms that are triggered if their requirements are not met.

The nine laws that will be outlined include:

(A) The Toxic Substance Control Act, which regulates the use of new and existing chemicals;

(B) The Federal Insecticide, Fungicide, and Rodenticide Act, which regulates pesticide products and their uses;

(C) The Clean Air Act, which regulates the discharge of pollutants into the nation's air;

(D) The Clean Water Act, which sets forth a regulatory/enforcement program for the discharge of wastes into the nation's waters;

(E) The Resource Conservation and Recovery Act, which regulates the disposal of solid and hazardous waste;

(F) The Comprehensive Environmental Response, Compensation, and Liability Act, which establishes a clean-up program for the nation's abandoned and inactive hazardous waste sites;

(G) The Emergency Planning and Community Right-to-Know Act, which establishes a system for the public reporting of toxic release and off-site transfer data by industrial facilities and requires states and local communities to plan how they will respond to emergency chemical releases into the environment;

(H) The Occupational Safety and Health Act, which establishes workplace standards that employers must meet in order to safeguard the health and safety of their employees; and

(I) The Pollution Prevention Act, which encourages facilities to reduce their generation of pollution so that less waste is treated and disposed of in all environmental media.

A. THE MANUFACTURE OF CHEMICAL SUBSTANCES -- THE TOXIC SUBSTANCES CONTROL ACT

The Toxic Substances Control Act⁹¹ (TSCA) was enacted on October 11, 1976. Incidents like the contamination of the Hudson River by polychlorinated biphenyls and the contamination of milk cows by polybrominated biphenyls in Michigan had illustrated the need for a federal system of toxic substance control that could assess the risks of chemicals prior to their introduction into commerce.

TSCA requires the EPA to screen new chemicals and certain existing chemicals in order to assess their risks and make sure that their use does not pose unnecessary risks to human health or the environment.⁹² When the EPA finds that a chemical poses an “unreasonable risk” to human health or the environment, TSCA authorizes EPA to take regulatory action. When EPA regulates a chemical, however, TSCA requires EPA to balance the economic and social benefits of a chemical against its purported risks.

1. Existing Chemicals Testing

Section 4 requires manufacturers, importers, and processors of TSCA-regulated chemical substances⁹³ to submit data to EPA on existing chemicals when the manufacture, processing, distribution, use, or disposal of the chemical “may present an unreasonable risk of injury to health or the environment”; or when the chemical is or will be produced in very large volumes and there is the potential for a substantial quantity to be released into the environment or there is a substantial or significant risk of human

⁹¹ 15 U.S.C.A. §2601 *et seq.* (West 1982 & Supp. 1994). Its regulations are found at 40 C.F.R. §§700-799 (1993 & 1994).

⁹² New chemicals are those that have not yet entered commerce. Existing chemicals are those that have entered commerce. TSCA requires prior notification and an opportunity for EPA to require testing before new chemicals are introduced into commerce or before an existing substance is put to a significantly new use. E. Elliott and E. Thomas, *Chemicals*, in *Sustainable Environmental Law* §17.1(B)(3), at 1267 (1993).

⁹³ These substances are defined as “any organic or inorganic substance of a particular molecular identity, including (i) any combination of such substances occurring in whole or in part as a result of a chemical reaction or occurring in nature and (ii) any element or uncombined radical. TSCA §3(2)(A), 15 U.S.C.A. §2602(2)(A) (West 1982). “Mixtures” and “chemicals manufactured for a non-commercial purpose” are explicitly excluded. Other exclusions include chemical substances manufactured in small quantities for research and development, pesticides (which are regulated under FIFRA), impurities, and chemical by-products.

exposure.⁹⁴ TSCA requires EPA to issue an administrative rule requiring tests if existing data are insufficient to resolve the question of safety.⁹⁵

The Interagency Testing Committee is responsible for determining which existing chemical substances will undergo TSCA testing.⁹⁶ If a chemical substance is listed on the Interagency Testing Committee's priority list, §8's reporting requirements are triggered. Section 8 requires manufacturers to submit production and exposure data and health and safety studies to the EPA.⁹⁷ All data must be submitted within 90 days of the chemical substance's listing.

2. New Chemical Review

Section 5 requires manufacturers, importers, and processors to notify EPA at least 90 days prior to producing or introducing a new chemical substance into United States commerce.⁹⁸ This is done through a premanufacture notice ("PMN") which must contain information regarding the identity of the chemical, categories of intended use, amounts intended to be manufactured, number of persons who will be exposed to the chemical, and the manner or method of disposal. It must also include data relating to the chemical's effects on human health and the environment.⁹⁹ Section 5 requires the EPA to evaluate the new chemical product's potential risk within 90 days of the PMN submission.¹⁰⁰ EPA must assess the potential risks associated with the

⁹⁴ TSCA §4, 15 U.S.C.A. §2603 (West 1982).

⁹⁵ *Id.*

⁹⁶ Every six months, the Interagency Testing Committee recommends candidate chemicals to EPA for inclusion on a list that determines which chemicals get priority in terms of test rule development. The list can contain no more than 50 chemicals at a time and EPA must respond within one year of listing by promulgating a test rule or by explaining why such rule is unnecessary. The ITC consists of designees from eight agencies of the federal government. See 15 U.S.C.A. §2603(2) (West 1982) and S. Landfair, *Toxic Substances Control Act*, in *Environmental Law Handbook*, *supra* note 3, at 373.

⁹⁷ TSCA §8, 15 U.S.C.A. §2607 (West 1982).

⁹⁸ TSCA §5, 15 U.S.C.A. §2604 (West 1982). If the chemical substance is not listed on the TSCA Inventory and it is not statutorily excluded nor exempted (*see*, 40 C.F.R. §723 (1993) for PMN exemptions), it is considered a new chemical substance. EPA must also be notified when there are plans to produce, process, or use an existing chemical in a way that differs significantly from existing uses. This requirement ensures that any new use does not pose greater risk to public health or the environment than old uses. The notification that is required is termed a "Significant New Use Notice" or "SNUN" (*see*, 40 C.F.R. §721 (1993)).

⁹⁹ More than 20,000 new chemical substances have been reviewed through the PMN process. S. Landfair, *supra* note 96, at 361.

¹⁰⁰ TSCA, §5, 15 U.S.C.A. §2604 (West 1982). EPA may extend the period for an additional 90 days for good cause. If EPA fails to act within 90 days, the manufacturer/processor/importer may commence manufacture/processing/import of the chemical substance. However, within 30

manufacture, processing, distribution, use, and disposal of the substance based on the information contained in the PMN as well as on other data that is generally available.

If the EPA determines that the manufacture, processing, distribution, use, or disposal of the new chemical substance presents or will present an unreasonable risk to human health or the environment, it must promulgate requirements to control such risk.¹⁰¹ EPA may issue a rule limiting or conditioning the manufacture of the substance or a proposed order totally banning its manufacture. If data are inadequate to make an informed determination about whether a chemical product's risks are reasonable, EPA is authorized to issue a proposed order prohibiting or limiting the manufacture, processing, distribution in commerce, use, or disposal of that chemical product.¹⁰²

3. TSCA's Regulatory Controls

When EPA determines that a new or existing chemical substance presents an unreasonable risk to the public health or environment,¹⁰³ EPA has several regulatory options to control its risk. The EPA's tools include total bans; limits on the amount of the chemical substance that can be produced, imported, or distributed; and requirements that the chemical substance bear a warning label at the point of sale.¹⁰⁴ EPA is required, however, to adopt the least burdensome regulatory approach when controlling unreasonable risks.¹⁰⁵ This means that EPA must utilize the approach that reduces the chemical product's risks to a reasonable level given its purported social and economic benefits.

days of commencing manufacture/processing/importation of the chemical substance, the regulated entity must file a Notice of Commencement (NOC) with EPA, triggering the chemical's inclusion on the TSCA Inventory and making it an "existing" chemical.

¹⁰¹ TSCA §6, 15 U.S.C.A. §2605 (West 1982).

¹⁰² TSCA §5(e)(1)(A)(i), 15 U.S.C.A. §2604(e)(1)(A)(i) (West 1982). EPA must first show that such manufacture, processing, *etc.* may present an unreasonable risk or that the chemical is produced in substantial quantities and the potential for environmental release is great. The purpose of this provision is to limit manufacture, distribution, use, disposal of a chemical pending the development of sufficient data for EPA to make a reasoned determination of its risk.

¹⁰³ In determining whether a risk is "unreasonable," EPA must conduct a risk assessment. EPA has regulated only six substances under this rule since TSCA's enactment -- asbestos (which was later overturned), polychlorinated biphenyls, chlorofluorocarbons, dioxins, hexavalent chromium, and certain metal-working fluids. S. Landfair, *supra* note 96, at 384.

¹⁰⁴ These tools are authorized by TSCA §6, 15 U.S.C.A. §2605 (West 1982).

¹⁰⁵ Corrosion Proof Fittings v. Environmental Protection Agency, 947 F.2d 1201 (5th Cir. 1991).

4. Information Gathering

Section 8 requires EPA to develop and maintain an inventory of all chemical substances manufactured or processed for commercial purposes in the United States.¹⁰⁶ To aid in the inventory's development, TSCA requires manufacturers, importers, and processors to report information to the relevant state or federal agency concerning their chemical production/use and any possible adverse effects to human health and the environment that such production/use may pose.¹⁰⁷ Manufacturers, importers, and processors must also maintain records of incidents involving adverse reactions to health or to the environment alleged to have been caused by their chemical product.¹⁰⁸

5. Enforcement

Section 11 authorizes EPA to conduct inspections and require regulated entities to disclose documents for the purpose of determining TSCA compliance.¹⁰⁹ It also allows the EPA to inspect any establishment where chemical substances or mixtures are manufactured, processed, stored, or held before or after distribution in commerce and any conveyance being used to transport such substances. All items are eligible for inspection including records, files, papers, processes, controls, and facilities, as long as they bear some relationship to TSCA compliance. In addition, §11(c) authorizes EPA to require the disclosure of materials (including the testimony of witnesses) if the EPA deems such disclosure is necessary to determine TSCA compliance.¹¹⁰

¹⁰⁶ TSCA §8, 15 U.S.C.A. §2607 (West 1982). This list is known as the "TSCA Inventory." The first version of this inventory contained approximately 55,000 chemicals. All chemicals that are not on this inventory are "new" and subject, therefore, to Section 5's premanufacture notification requirements.

¹⁰⁷ TSCA §8(a), 15 U.S.C.A. §2607(a) (West 1982). Regulations are at 40 C.F.R. §717 (1993). Examples of the information that must be provided include the chemical identity, name, and molecular structure; the categories or proposed categories of use; the total amount of the substance manufactured or processed for each category of use; a description of the by-products resulting from manufacture, processing, use, or disposal; data concerning the chemical's environmental and health effects; and exposure information.

¹⁰⁸ TSCA §8(c), 15 U.S.C.A. §2607(c) (West 1982). Records concerning employees must be maintained for 30 years; all other records must be maintained for 5 years. TSCA's reporting and recordkeeping requirements are found at 40 C.F.R. §704 (1993).

¹⁰⁹ TSCA §11, 15 U.S.C.A. §2610 (West 1982 & Supp. 1994).

¹¹⁰ TSCA §11(c), 15 U.S.C.A. §2610(c) (West 1982).

The EPA may seek civil and criminal penalties for TSCA violations.¹¹¹ In civil cases, the EPA uses a civil penalty policy to determine the amount of penalty that will be imposed. The policy allows EPA to consider the violator's culpability, compliance history, financial position, and "other matters" as justice requires when determining the amount of penalty.¹¹² EPA may also seize products in cases where a civil penalty is insufficient to protect public health or the environment.¹¹³ "Knowing or willful" violations of TSCA are punishable as crimes that carry up to 1 year imprisonment and up to \$25,000 per day of violation.¹¹⁴ To prove that a violation was "knowing" or "willful," some form of knowledge that a violation occurred must be proven; however, specific knowledge that a TSCA requirement was violated may not be necessary if the substance is so dangerous that the alleged violator should have known that the substance was regulated.¹¹⁵

TSCA, like most federal environmental statutes, contains a citizen suit provision.¹¹⁶ Any significantly affected person can bring a civil action against any person alleged to be in violation of TSCA. The provision also allows suits against the EPA Administrator for failing to implement a non-discretionary TSCA duty.¹¹⁷ However, before a citizens' suit action can be brought, the plaintiff must provide the alleged violator and the EPA Administrator with at least 60-days notice. In addition, if the EPA has commenced an action against the alleged violator, a suit is precluded.

¹¹¹ TSCA §16, 15 U.S.C.A. §2615 (West 1982 & Supp. 1994).

¹¹² There are actually two civil penalty policies -- one governing §5 violations and the other governing §8, §12, and §13 violations. The TSCA §5 penalty policy prescribes administrative penalties for noncompliance with TSCA §5(e) or §5(f) orders and requirements (*e.g.*, failure to submit a PMN). The TSCA §8, §12, and §13 penalty policy governs reporting and recordkeeping requirements and import/export notification violations. Both policies allow the EPA to reduce penalties by up to 80% for good behavior (*e.g.*, cooperation). S. Landfair, *supra* note 96, at 393.

¹¹³ See TSCA §§7 and 17(b), 15 U.S.C.A. §§2606 and 2616(b) (West 1982 & Supp. 1994). Under §7, EPA may conduct an "imminent hazard" seizure absent a TSCA violation.

¹¹⁴ TSCA §16(b), 15 U.S.C.A. §2615(b) (West 1982 & Supp. 1994).

¹¹⁵ S. Landfair, *supra* note 96, at 395, n. 147.

¹¹⁶ See, TSCA §20, 15 U.S.C.A. §2619 (West 1982 & Supp. 1994).

¹¹⁷ *Id.*

B. THE MANUFACTURE/USE OF PESTICIDES -- THE FEDERAL INSECTICIDE FUNGICIDE AND RODENTICIDE ACT

The Federal Insecticide Fungicide and Rodenticide Act (FIFRA) was originally enacted in 1947¹¹⁸ -- well before the 1962 publication of Rachel Carson's book *Silent Spring*, which raised public awareness of the environmental risks of pesticides. FIFRA has been amended several times -- most notably in 1972.

The 1972 amendments changed existing law by strengthening its enforcement provisions, shifting its emphasis from labelling and efficacy to protecting health and the environment, providing greater regulatory flexibility in controlling dangerous pesticides, extending the scope of federal law to cover intrastate registrations, and streamlining the administrative appeals process.¹¹⁹

1. Registration Requirements

Pesticides (*i.e.*, insecticides, fungicides, and rodenticides) are chemical and biological products that are designed to kill, repel, or control pests and the very qualities that make them effective as pesticides may result in their environmental risks. FIFRA requires pesticides to be registered with the EPA before they are distributed or sold in the United States.¹²⁰ FIFRA's registration requirements are designed to review pesticides for toxic effects and to authorize regulatory action if such effects are found.

Section 3 of FIFRA sets forth registration requirements.¹²¹ EPA's decision to register a pesticide is based on data submitted by the manufacturer in its

¹¹⁸ Pub. L. No. 92-516, 61 Stat. 190 (1947). It is codified, as amended, at 7 U.S.C.A. §§136 to 136y (West 1980 & Supp. 1994) and its regulations are found at 40 C.F.R. §§162-180 (1993).

¹¹⁹ M. Miller, *Federal Regulation of Pesticides*, in *Environmental Law Handbook*, *supra* note 3, at 415.

¹²⁰ FIFRA §3, 7 U.S.C.A. §136a (West 1980 & Supp. 1994).

¹²¹ *Id.* FIFRA's registration regulations are found at 40 C.F.R. §152 (1993). FIFRA has been called a "gate-keeping" statute because the use of active ingredients in pesticides is precluded until the EPA registers the substance. Limited exemptions from FIFRA's registration requirements are available. For example, a manufacturer may rely on data of a competitor; however, the manufacturer must provide the competitor with "reasonable compensation" for the use of the data if the data is less than 10 years old. An applicant may also apply for "conditional" registration if data on a product's safety have not yet been supplied to EPA or analyzed to ensure that the pesticide will not pose unreasonable adverse effects on the environment. It is important to note that FIFRA's registration requirements do not apply to exports. Pesticides that are banned for use in the United States, therefore, may be exported and used in other countries and these pesticides may reenter the United States when the crops on which they are used are imported for sale. This "loophole" has been called the "circle of poison" by individuals who want FIFRA to apply to exports.

registration application.¹²² The data that must be submitted is extensive and expensive to develop.¹²³ The data must specify the crops and insects on which the pesticide may be applied and each use must be supported by research data on safety and efficacy.¹²⁴ The EPA is responsible for analyzing the data to determine whether the pesticide has any unreasonable adverse effects on human health or the environment within the constraints of the pesticide's intended uses.

The EPA must approve a registration if the pesticide's composition is such as to warrant its proposed claim; its labeling and other materials submitted with its registration application comply with FIFRA; it will perform its intended function without unreasonable adverse effects on the environment; and when used in accordance with widespread and commonly recognized practice, it will not generally cause unreasonable adverse effects on the environment.¹²⁵

The term "unreasonable adverse effects on the environment" is defined in §2(bb) as ". . . any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."¹²⁶ If a pesticide's risks outweigh its benefits, therefore, its registration may be denied. Before registration can be denied, however, the manufacturer must be notified of the bases for EPA's determination and must be given an opportunity to correct the problem.¹²⁷ Registrations are valid for five years after which they automatically expire unless a reregistration petition is received by the EPA.

Section 6 of FIFRA authorizes EPA to suspend, cancel, or restrict the use of a pesticide if it is found, at any time, to pose unreasonable adverse effects or

¹²² Registrations are valid for 5 years after which they automatically expire unless manufacturers petition for renewal which requires the submission of additional data.

¹²³ Prospective manufacturers are required to submit a registration application, a proposed label, a statement of all claims to be made for the pesticide, directions for its use, a confidential statement of its formula, and a description of the tests on which its claims are based. E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(2), at 1290.

¹²⁴ If the manufacturer needs to "accumulate information necessary to register a pesticide under Section 3," FIFRA provides for the issuance of experimental use permits. FIFRA §5, 7 U.S.C. §136c (West 1980 & Supp. 1994). Regulations concerning such permits are set forth at 40 C.F.R. §172 (1993).

¹²⁵ M. Miller, *supra* note 119, at 417.

¹²⁶ FIFRA §2(b)(b), 7 U.S.C.A. §136(bb) (West Supp. 1994).

¹²⁷ E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(2), at 1291.

imminent hazards to the environment.¹²⁸ Cancellation or suspension decisions can be appealed by a registrant.¹²⁹ If EPA needs additional data to maintain registration and that data are not submitted, EPA may suspend the product's registration. Also, failure to pay FIFRA's registration maintenance fee is cause for cancellation.

Pesticides are registered for general or restricted use.¹³⁰ Restricted pesticides are those that EPA has judged to be more dangerous to the applicator or to the environment. FIFRA requires that registered pesticides be applied only under the instructions and control of a certified applicator.¹³¹ Interestingly enough, however, FIFRA does not require the certified applicator to be present at the time of application. Certified applicators are certified through state programs which must be approved by the EPA.¹³² Certification is designed to ensure that certified applicators are competent in terms of handling registered pesticides.¹³³

2. Labeling

FIFRA also requires all registered pesticides to be labeled in a manner that specifies approved uses and restrictions.¹³⁴ The label must specify the pesticide's active ingredients, instructions on the pesticide's use for specified

¹²⁸ FIFRA §6, 7 U.S.C.A. §136d (West 1980 & Supp. 1994).

¹²⁹ A cancellation order initiates review of a substance suspected of posing a "substantial question of safety" to man or the environment. A cancellation order is final if not challenged within 30 days. A suspension order immediately bans the production and distribution of a pesticide. It is mandated only when a pesticide constitutes an "imminent hazard" to human health or the environment. Upon receipt of a suspension notice, a manufacturer may request an expedited hearing within 5 days. If no hearing is requested, the suspension order is effective immediately. An emergency suspension is also authorized under FIFRA. An emergency exemption halts all uses, sales, and distribution of a pesticide immediately without a hearing. Cancellation and suspension orders have generally provided that banned pesticides may be used until supplies are exhausted. Emergency suspensions, however, require the immediate cessation of sale, use, and distribution.

¹³⁰ FIFRA §3(d), 7 U.S.C.A. §136a(d) (West 1980 & Supp. 1994).

¹³¹ *Id. See*, FIFRA §11(a)-(c), 7 U.S.C.A. §136i(a)-(c) (West 1994) for certification requirements. Regulations are found at 40 C.F.R. §171 (1993). There are several categories of pesticide applicators, including private applicators and commercial applicators. Commercial applicators use or supervise the application of pesticides on property that is not owned by them. Farmers who apply pesticides to their own land and their employees do not need to be certified to apply registered pesticides on their land.

¹³² FIFRA §11(a)(2), 7 U.S.C.A. §136i(a)(2) (West 1994).

¹³³ The 1975 amendments, however, relaxed the requirements for certification and EPA can no longer require the examination of applicants.

¹³⁴ *See*, FIFRA §§2(p)-(q) and 12j(a)(1)(F), 7 U.S.C.A §§136(p)-(q) and 136j(a)(1)(F) (West 1980 & Supp. 1994). For regulations pertaining to labeling, *see*, 40 C.F.R. §156 (1993).

crops, and any limitations on how or when it may be used.¹³⁵ Label specifications are designed to ensure efficacy but avoid adverse effect on adjacent and future crops, nontarget species and the environment, and to minimize application exposure. It is a violation of FIFRA to use a pesticide in a manner that is inconsistent with its label instructions.¹³⁶

3. Reregistration

FIFRA requires EPA to “reregister” older pesticides that never underwent EPA’s current registration process and, therefore, never underwent a determination as to whether their use presents unreasonable adverse environmental risks.¹³⁷ The task of reregistering older pesticides is enormous because approximately 35,000 pesticides were in use prior to enactment of the 1972 amendments which required review of a pesticide’s environmental risks.¹³⁸ To accelerate the reregistration process, Congress imposed a 10-year reregistration schedule on the EPA in 1988.

4. Protection of Trade Secrets

A controversial issue that has arisen concerning FIFRA’s implementation is its treatment of trade secrets. Registration data that are submitted by manufacturers often contain information regarding a pesticide’s active ingredients and chemical composition, which, if disclosed to a competitor, might result in the registrant’s loss of market share. Section 10 provides that trade secrets may not be released, but if the Administrator proposes to release them, she must provide notice to the company so that they may file an action in a United States district court to determine whether such release is warranted.¹³⁹ In 1978, Congress amended §10 to limit trade secret protection to formulas and manufacturing processes, thus leaving open the possibility that hazard and efficacy data may be released.

¹³⁵ FIFRA §2(q)(2), 7 U.S.C.A. §136(q)(2) (West 1980 & Supp. 1994).

¹³⁶ *Id.* FIFRA’s regulations regarding data submissions are found at 40 C.F.R. §158 (1993).

¹³⁷ FIFRA §4, 7 U.S.C.A. §136a-1 (West Supp. 1994).

¹³⁸ Although the 1947 version of FIFRA contained a registration process, environmental risks were not addressed.

¹³⁹ FIFRA §10, 7 U.S.C.A. §136h (West 1980 & Supp. 1994).

5. Enforcement

Section 12 makes it unlawful to distribute or sell to any persons unregistered pesticides, registered pesticides that are adulterated or misbranded, and registered pesticides whose claims or compositions are different from those disclosed during registration.¹⁴⁰ In addition, it is a violation of FIFRA to detach, alter, deface, or destroy any labeling required by FIFRA or to not comply with FIFRA's recordkeeping, reporting and entry/inspection requirements.¹⁴¹ FIFRA also makes it unlawful to "make available for use, or to use, any registered pesticide classified for restricted use for some or all purposes other than in accordance with" FIFRA and its regulations.¹⁴² False data submissions and registration statements also constitute FIFRA violations.¹⁴³

Section 26 grants states the primary authority for enforcing FIFRA; however, state programs must be substantially equivalent to the federal program in terms of implementation and enforcement.¹⁴⁴ EPA remains the primary enforcement authority in states that do not develop a state program and, in cases where state programs are not adequately enforced, EPA may rescind the state's enforcement authority.¹⁴⁵

Any violation of FIFRA is punishable by a civil fine of up to \$5,000.¹⁴⁶ Knowing violations of FIFRA registration requirements may be punishable by a criminal fine of up to \$50,000 and up to 1 year imprisonment.¹⁴⁷ Fraudulent data disclosures are punishable by up to \$10,000 or up to three years imprisonment.¹⁴⁸

¹⁴⁰ FIFRA §12, 7 U.S.C.A. §136j (West 1980 & Supp. 1994).

¹⁴¹ *Id.*

¹⁴² FIFRA §12(a)(2)(F), 7 U.S.C.A. §136j(a)(2)(F) (West 1980 & Supp. 1994).

¹⁴³ FIFRA §12(a)(2)(M), 7 U.S.C.A. §136j(a)(2)(M) (West 1980 & Supp. 1994).

¹⁴⁴ FIFRA §26, 7 U.S.C.A. §136w-1 (West 1980 & Supp. 1994).

¹⁴⁵ FIFRA §27, 7 U.S.C.A. §136w-2 (West 1980 & Supp. 1994).

¹⁴⁶ FIFRA §14(a), 7 U.S.C.A. §136l(a) (West 1980).

¹⁴⁷ FIFRA §14(b), 7 U.S.C.A. §136l(b) (West 1980 & Supp. 1994).

¹⁴⁸ FIFRA §14(b)(3), 7 U.S.C.A. §136l(b)(3) (West 1980).

C. THE REGULATION OF CHEMICALS IN THE WORKPLACE -- THE OCCUPATIONAL SAFETY AND HEALTH ACT

The Occupational Safety and Health Act ("OSH Act") was enacted on December 29, 1970.¹⁴⁹ The federal agency that is responsible for the OSH Act's implementation is the Occupational Safety and Health Administration ("OSHA"). The OSH Act's goal is to assure safe and healthful working conditions for every working man and woman in the Nation.¹⁵⁰ To that end, the Act has been successful. It has been estimated that the incident rate (as defined by the number of fatalities per 10,000 workers) has dropped from approximately 2.1 to 0.8, meaning that the absolute number of workplace incidents has fallen since 1970 even though the working population has doubled.¹⁵¹

The OSH Act applies to most private sector employers;¹⁵² however, facilities that employ 10 or fewer employees, and certain employment sectors¹⁵³ are exempt from the majority of the Act's regulatory provisions.¹⁵⁴

1. Workplace Health and Safety Standards

The OSH Act requires OSHA to set workplace standards that are designed to provide all workers with a safe and healthy work environment.¹⁵⁵ The standards include health standards, which protect workers from exposure to harmful substances by limiting the amount to which workers may be exposed (*e.g.*, hazardous substances) and safety standards, which protect workers from

¹⁴⁹ Pub. L. No. 91-596, 84 Stat. 1590 (1970). As amended, it is codified at 29 U.S.C. §651 to 678 (West 1985) and its regulations are found at 40 C.F.R. §§ 1910, 1915, 1918, and 1926 (1993).

¹⁵⁰ The Occupational Health and Safety Act §2(b), 29 U.S.C.A. §651(b) (West 1985).

¹⁵¹ D. Sarvadi, *Occupational Safety and Health Act*, in *Environmental Law Handbook*, *supra* note 3, at 483.

¹⁵² It has been estimated that more than 6 million facilities and over 90 million employees are covered by the OSH Act. *Id.* at 484.

¹⁵³ Excluded sectors include certain segments of the transportation industry which are covered by Department of Transportation regulations, the mining industry which is regulated by the Mine Safety and Health Administration, and the atomic energy industry which is subject to Nuclear Regulatory Agency standards.

¹⁵⁴ Small employers are not exempt from OSHA's complaint and accident investigation requirements.

¹⁵⁵ *See*, Occupational Health and Safety Act §6, 29 U.S.C.A. §655 (West 1985).

physical hazards (e.g., faulty equipment).¹⁵⁶ These standards may take a variety of forms, including exposure limits, labeling requirements, protective equipment requirements, and monitoring requirements.¹⁵⁷ Section 5 requires employers to comply with these standards.¹⁵⁸

When issuing a standard, OSHA must show that a “significant health risk” exists from the potentially regulated substance.¹⁵⁹ When determining a substance’s risk, OSHA looks at the acute or immediate health effects, chronic or long-term health effects, and the carcinogenicity of the substance. Standards can be set on a generic basis (e.g., all air contaminants) or on a specific basis (e.g., vinyl chloride). Any person may petition for promulgation of a standard or the Secretary may act on his/her own initiative or on the recommendation of the National Institute for Occupational Safety and Health (NIOSH).

2. Hazard Communication Standard

The OSH Act’s Hazard Communication Standard (“HCS”) is “designed to reduce the incidence of chemically-related occupational illnesses and injuries among employees in the manufacturing sector.”¹⁶⁰ The HCS establishes uniform hazard communication requirements for manufacturers and importers. For example, the OSH Act requires chemical manufacturers and importers to assess the hazards of the chemicals they manufacture and import. This data, termed “hazard assessment data,” must cover physical as well as health hazards.

¹⁵⁶ OSHA regulations pertaining to chemicals can be found at 29 C.F.R. §1910 (1993). The regulations set specific limits on chemical exposures and conditions on chemical usage. Unlike safety standards, OSHA does not need apply a cost-benefit analysis to a health standard before its promulgation. OSHA needs to show only that a substantial risk exists, the proposed standard is technically feasible, and compliance with the standard will not bankrupt the industry. Safety standards, however, are subject to a cost-benefit analysis. OSHA must determine that the standards produce measurable benefits in mitigation workers’ risks of injury and that the costs of achieving them do not threaten the economic viability of the covered industry. D. Sarvadi, *supra* note 151, at 488.

¹⁵⁷ The objective is for the standard to reduce to acceptable levels the risk of injury or illness of exposed employees. *Id.* at 489.

¹⁵⁸ The Occupational Health and Safety Act §5, 29 U.S.C.A. §654 (West 1985). Temporary and permanent variances may be obtained if employers can establish that they are unable to comply with specific standards in the requisite amount of time or that their practices and facilities provide equivalent protection. *Id.* at 490.

¹⁵⁹ The Occupational Health and Safety Act §6, 29 U.S.C.A. §655 (West 1985).

¹⁶⁰ D. Sarvadi, *supra* note 151, at 517.

Once a “hazard” determination is made, the OSH Act requires manufacturers and importers to provide purchasers with a material safety data sheet (“MSDS”) for each chemical they sell. The MSDS states the identity of the chemical, the physical and chemical characteristics of the chemical, and the health hazards of the chemical. Employers must keep a copy of the MSDS in the workplace for each chemical substance used.

Manufacturers and importers must also inform their workers of the hazards that are associated with the chemicals they manufacture and import. They are also required to train their employees in the handling of such substances. Manufacturers, importers, and distributors of hazardous chemicals are also required to label each chemical when it leaves their control according to OSH Act requirements.

Employers are required to disseminate information to their employees regarding all hazardous chemicals to which they may be exposed. They must develop a written hazard communication plan, including a list of all hazardous substances used in the workplace and a plan for informing all employees of those substances’ hazards through education or training. Employers must also ensure that chemicals in their workplace are labeled according to OSHA specifications and that MSDS for all hazardous chemicals used in the workplace are available to their employees.

3. Recordkeeping/Inspection Requirements

The OSH Act also requires employers to maintain annual records of their employees’ work-related deaths, injuries and illnesses and to report such incidents to OSHA periodically.¹⁶¹ Serious injuries or deaths must be reported to OSHA immediately. Employers must also maintain records of employee exposures to potentially toxic materials or harmful physical agents for at least 30 years.¹⁶² In addition to maintaining records of employee incidents of death, injury, illness, or exposure, employers must also maintain records of their efforts to comply with the OSH Act (*e.g.*, company safety policies, company inspection reports, and training records).¹⁶³

¹⁶¹ The Occupational Health and Safety Act §8, 29 U.S.C.A. §657 (West 1985). Minor injuries, however, are excluded. D. Sarvadi, *supra* note 151, at 499.

¹⁶² The Occupational Health and Safety Act §8, 29 U.S.C.A. §657 (West 1985). *See*, 29 C.F.R. 1910.20(d)(1)(ii) (1993) for regulations regarding exposure reports.

¹⁶³ *Id.*

The OSH Act provides for the inspection of covered facilities.¹⁶⁴ Compliance Safety and Health Officers are authorized to enter covered facilities at reasonable times; however, employers may refuse entry to any inspector who lacks a search warrant. Inspection may be triggered by an employee complaint or they may be part of a general inspection schedule. As part of an OSH Act inspection, the inspector may review all of the injury and illness logs that employers are required to maintain. The investigation may also review fire and emergency plans, company safety protocols, and safety committee minutes.¹⁶⁵

The OSH Act authorizes states to develop and implement workplace safety programs that are equivalent to the federal program; however, all state plans must obtain OSHA approval.¹⁶⁶ States may promulgate their own standards or they may adopt the federally-set standards.

4. Enforcement

After OSHA inspections have been conducted, a closing conference generally occurs at which the inspector and the employer and employee representatives discuss the violations that were found. Based on the inspection and closing conference, OSHA may issue citations to alleged violators.¹⁶⁷ Citations must be issued within six months of an OSHA inspection and citations must “describe with particularity the nature of the violation.”¹⁶⁸ Employers are required to post the citation at each location of violation or in a prominent place for all employees to see for at least three days.¹⁶⁹

¹⁶⁴ See, The Occupational Health and Safety Act §8, 29 U.S.C.A. §657 (West 1985).

¹⁶⁵ D. Sarvadi, *supra* note 151, at 492.

¹⁶⁶ As of 1991, 23 states and U.S. territories had OSHA-approved programs covering all employees and 2 states had programs that covered only public employees. If OSHA approval is not obtained, OSHA retains ultimate regulatory authority for workplace health in safety in those states. If OSHA approval is obtained, the state assumes authority for the implementation and enforcement of its occupational health and safety program. *Id.* at 485.

¹⁶⁷ Citations may allege violations of specific OSHA standards or they may allege violations of the “General Duty Clause” (“GDC”). If a standard exists to reduce the risks of a particular hazard and that standard has been met, use of the GDC is not available unless the employer knows that the standard is insufficiently protective. Before an employer can be cited for a violation of the GDC, OSHA must find a danger that threatens physical harm to employees. *Id.* at 493.

¹⁶⁸ The Occupational Health and Safety Act §9, 29 U.S.C.A. §658 (West 1985).

¹⁶⁹ D. Sarvadi, *supra* note 151, at 495.

Citations are classified according to their seriousness. *De minimis* violations are those which do not present a hazard to employee health or safety. Serious violations involve those that present a real potential of employee harm. Penalties of \$7,000 may be imposed for serious violations.¹⁷⁰ Furthermore, willful or repeated violations of the OSH Act carry penalties of up to \$70,000 per violation.¹⁷¹

D. AIR POLLUTANT EMISSIONS -- THE CLEAN AIR ACT

The Clean Air Act (CAA)¹⁷² was enacted to prevent and control air discharges of substances that may harm public health and the environment.¹⁷³ Regulated sources include mobile sources (*e.g.*, automobiles, trucks, and airplanes)¹⁷⁴ as well as stationary sources (*e.g.*, power plants and factories). The CAA achieves its goals by requiring all new and existing sources of air pollution to comply with source-specific emission limits that are designed to meet health-based, ambient air¹⁷⁵ quality standards. The CAA also addresses specific air pollution problems, such as hazardous air pollutants, acid rain, and stratospheric ozone depletion.

The Clean Air Act has been amended eight times. The most significant amendments occurred in 1977 and 1990. The 1977 Amendments “fine-tuned” the law and added new provisions designed to ensure that clean air areas

¹⁷⁰ The Occupational Health and Safety Act §17, 29 U.S.C.A. §666 (West 1985 & Supp. 1994).

¹⁷¹ *Id.*

¹⁷² The legislation known as the Clean Air Act was actually the Clean Air Act Amendments of 1970 (Pub. L. No. 91-604, 84 Stat. 1713) which amended the 1955 Air Pollution Act. The 1955 act had practically no regulatory provisions and, instead, relied entirely on voluntary state efforts to control air pollution. The Clean Air Act is codified at 42 U.S.C. §7401 *et seq* (West 1983 & Supp. 1994).

¹⁷³ Releases into the air are the primary source of toxic chemicals in the environment. It has been estimated that they account for approximately seventy percent of all chemicals discharged into the environment. E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(1), at 1277.

¹⁷⁴ Mobile sources are the primary source of carbon monoxide emissions in urban areas. They also contribute one-half of volatile organic compound and nitrous oxide emissions – both of which contribute to the formation of smog.

¹⁷⁵ Ambient air refers to the background air, not the air that is emitted from a point source, such as a smokestack. Ambient air standards allow some pollution to be assimilated into the environment while ensuring that the surrounding air is protective of public health and safety. Ambient air quality standards are also called “media-quality” standards because they are set based on the amount of pollution that is deemed acceptable for discharge into specific environmental media. They differ from technology-based standards which are set based on the level of pollution control deemed attainable given available technology. E. Elliott and E. Thomas, *supra* note 92, §17.1(B)(3), at 1267.

would not be dirtied and new pollution sources would have to meet stringent technical standards. The 1990 Amendments significantly revised the hazardous air pollution regulatory program;¹⁷⁶ established a market-based emissions allowance and trading program for sulphur dioxide¹⁷⁷ and a program for the phaseout of ozone depleting substances;¹⁷⁸ established a clean-fuel vehicle program, created a market for reformulated and alternative fuels, and required strict tailpipe emission standards in the most-polluted areas;¹⁷⁹ and instituted a comprehensive state-run operating permit program that consolidates all CAA requirements that apply to a given source of pollution.¹⁸⁰

1. State Implementation Plans

States have the primary responsibility for achieving adequate air quality under the Clean Air Act.¹⁸¹ Sections 107 and 110 require each state to develop state implementation plans (SIPs)¹⁸² that outline how it intends to achieve national ambient air quality standards (NAAQS).¹⁸³

¹⁷⁶ The Amendments switched to a primary reliance on technology-based regulations rather than health-based regulations that had been difficult to implement.

¹⁷⁷ The program is designed to curtail acid rain precipitation which occurs when pollutants, primarily sulphur dioxide, combine with water vapor, and later fall to the earth in an acidic form, acidifying waterways and damaging ecosystems. To reduce sulphur dioxide emissions, the program assigns annual allowances (an allowance is defined as an authorization to emit one ton of sulphur dioxide) to sulphur dioxide emission sources, primarily coal-burning power plants. Sources are not allowed to exceed their allocated allowances; however, they can acquire additional allowances from other plants or through auction-like sales held by the EPA. This program reduces the amount of sulphur dioxide emitted each year by limiting the total number of allowances available. The goal is to halve sulphur dioxide emissions by the year 2000.

¹⁷⁸ Beginning in 1991, it is unlawful for any person to produce any Class I substance (*e.g.*, chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform) in an annual quantity greater than certain percentages specified in a table set forth in the statute. Exceptions are made for essential uses, such as medical devices that use the substance. The CAA also requires the complete phaseout of the use and production of Class II substances (*e.g.*, hydrochlorofluorocarbons) by the year 2030.

¹⁷⁹ The amendments established a classification system for areas that have not achieved air quality standards and require the most polluted areas to institute strict controls, such as stringent automobile emission standards.

¹⁸⁰ The 1990 Amendments are designed to cut toxic air pollution and motor vehicle emissions by at least 90 percent and to reduce 56 billion tons of air pollutants annually. Their implementation is expected to cost \$25 billion. Part of that cost is a 5-year \$250 million program for retraining and unemployment benefits for workers displaced by the requirements of the CAA. M. Worobek, *Toxic Substances Control Guide* 108 (2nd Ed. 1992).

¹⁸¹ CAA §107, 42 U.S.C.A. §7407 (West 1983 & Supp. 1994).

¹⁸² A state implementation plan describes the methods that the state will use to meet air quality standards that it sets for the state.

¹⁸³ CAA §§107 and 110, 42 U.S.C.A. §§7407 and 7410 (West 1983 and Supp. 1994). State

NAAQS are nationwide standards, set by EPA, that establish a basic standard of air quality across the nation. They are set at levels that protect public health and the public welfare. Health protective standards are termed "primary" NAAQS.¹⁸⁴ The welfare protective standards are termed "secondary" NAAQS.¹⁸⁵ Under the CAA, adverse effects on public welfare include effects on soil, water, crops, vegetation, and wildlife. Because secondary NAAQS are designed to prevent a broader set of environmental harms, they are more stringent than primary NAAQS. However, their attainment has taken a "backseat" to the attainment of primary NAAQS due to political opposition.

NAAQS have been established for six criteria pollutants -- sulphur dioxide, nitrogen dioxide, particulate matter,¹⁸⁶ carbon monoxide, ozone,¹⁸⁷ and lead. The NAAQS are implemented through source-specific emission limitations established by state SIPs. The stringency of the limitations is dependent upon whether the sources are located in a NAAQS attainment or nonattainment area.¹⁸⁸

implementation plans use emission inventories and computer models to determine whether air quality violations will occur. If the data show that exceedances will occur, the state must impose controls on existing sources. States must revise SIPs and keep them up-to-date and if a new or revised NAAQS is promulgated, states must revise their SIPs within 3 years. See F. Brownell, *Clean Air Act*, in *Environmental Law Handbook*, *supra* note 3, at 121-123.

¹⁸⁴ NAAQS are found at 40 C.F.R. §50 (1993).

¹⁸⁵ *Id.*

¹⁸⁶ Particulates are suspended pieces of matter, such as soot, that discharged by air pollution sources. When inhaled, particulates enter the lung and may cause lung damage or respiratory problems. Particulate matter that is larger than 10 microns in diameter is regulated under the CAA.

¹⁸⁷ Ozone is not a specific pollutant. It is the by-product of two specific air pollutants -- volatile organic compounds (VOCs) and carbon monoxide. These two pollutant combine in the presence of sunlight in the troposphere to create ozone which is popularly known as "smog."

¹⁸⁸ Areas not meeting the NAAQS are called "nonattainment" areas. NAAQS are established using relatively objective criteria. As a result, they are uniform throughout the nation whereas each state's SIP is tailor-made to achieve NAAQS compliance given the quality of the airshed, each state's needs, and the technological capabilities of its polluters. For example, states may allow higher emissions of pollutants in relatively clean air areas or may prohibit the construction of new stationary sources in areas that have air pollution levels close to the NAAQS. The 1990 CAA Amendments require increasingly more stringent emission limitations in areas that do not attain the NAAQS. For example, ozone nonattainment areas are classified as marginal, moderate, serious, severe, or extreme. Although areas classified as extreme ozone nonattainment areas have 20 years to attain the ozone NAAQS and marginal areas have only three years, extreme areas must implement more stringent control measures, such as work-related vehicle trip reduction programs, than the measures required to be taken in marginal non-attainment areas.

The SIP-NAAQS system is an example of “cooperative federalism.” By statute, the federal government is responsible for ensuring that the CAA will be implemented, but states that wish to implement the act can assume primary responsibility for regulating local polluting activities. Under the Clean Air Act, this means that EPA establishes NAAQS, reviews state-authored SIPs to ensure that they will achieve the NAAQS,¹⁸⁹ and may take over a state program if the state fails to act or acts ineffectively when implementing its SIP.¹⁹⁰

2. New Source Performance Standards (NSPS)

New sources and significant modifications of existing industrial sources¹⁹¹ are subject to more stringent levels of air pollution control than existing sources. The rationale is that as new and modified sources begin operation, they can adopt the best pollution control technologies whereas existing sources may have difficulty retrofitting their facilities to include new air pollution control devices.

Section 111 of the Clean Air Act requires the EPA to identify categories of new and modified sources that significantly contribute to air pollution and set new source performance standards (NSPS) for these sources.¹⁹² NSPS reflect the “degree of emission reduction achievable” through technology that EPA determines has been “adequately demonstrated” to be the best, taking into consideration “non-air quality health and environmental impact and energy requirements.”¹⁹³ Each standard is specific to a given industry and sets the emission limit that any new plant in that industrial category must meet.

¹⁸⁹ If the EPA finds that a state implementation plan is “substantially inadequate,” the administrator must notify the state and establish a reasonable deadline for its revision. CAA, §110(k)(5), 42 U.S.C.A. §7410(k)(5) (West Supp. 1994).

¹⁹⁰ The state is required to enforce the control standards set forth in SIPs. However, if the state fails to develop a SIP or enforce a SIP, the federal government can take over. The federal government “takes over” by establishing a federal implementation plan (FIP) -- the federal equivalent of a SIP. Prior to assuming a state program, however, the EPA can impose penalties on the state for failing to develop an adequate SIP. Penalties include denial of federal highway funds and the requirement of emission offsets for sources seeking new source permits.

¹⁹¹ Regulations, codified at 40 C.F.R. §60.15 (1993), determine when the reconstruction of an existing facility is so extensive that it triggers NSPS requirements.

¹⁹² CAA §111, 42 U.S.C.A. §7411 (West 1983 & Supp. 1994). In June 1990, EPA promulgated a NSPS for emissions of volatile organic compounds (VOCs) from the synthetic organic chemical manufacturing industry (SOCMI). The NSPS applies to all new, modified, or reconstructed facilities that commence construction after its promulgation. The NSPS sets a floor for both LAER and BACT determinations, which will be discussed *infra*.

¹⁹³ *Id.*

NSPS serve as the minimum level of control¹⁹⁴ that can be required at new or modified sources through the new source review program. Because they are nationwide standards, NSPS are intended to establish a level playing field throughout the country and discourage plants from moving to states that have less stringent pollution control laws.

3. New Source Review

New sources of air pollution and significant modifications¹⁹⁵ of existing sources are subject to preconstruction review and permitting (New Source Review). The New Source Review program applies to the six criteria pollutants regulated by the NAAQS. The program is usually implemented by state environmental agencies and the conditions contained in the permits that they issue depend upon whether the new or modified source is located in an NAAQS attainment or nonattainment area. Sources located in attainment areas are subject to the prevention of significant deterioration (PSD) program and sources located in nonattainment areas are subject to the CAA nonattainment (NA) program. The emissions limitations required by these two programs must be at least as stringent as NSPS.

The PSD program is designed to prevent deterioration of clean air areas that comply with NAAQS. The PSD program applies to new sources that have the potential to emit over 250 tons per year (tpy) of a regulated pollutant or over 100 tpy of a regulated pollutant if the source falls within one of 28 listed source categories. In a PSD area, before a new source is constructed or before an existing source is modified, the owner or operator must obtain a permit. To receive a permit under the PSD program, the owner/operator must establish that (1) the source will comply with ambient air quality levels designed to prevent deterioration of the current ambient air quality (*i.e.*, the source can not degrade the quality of the existing ambient air beyond that

¹⁹⁴ The NSPS, like other technology-based standards, are performance standards that prescribe the numerical level of control that must be achieved. Although the NSPS are derived from considering the control levels achieved by the “best...adequately demonstrated” technologies, they are not specification standards that require the use of a particular control technology.

¹⁹⁵ In general, physical changes or operational changes of an existing plant that increase emissions above the levels defined as major would be considered “major modifications” that trigger NSR. However, routine repair or maintenance would not. E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(1), at 1278.

which is allowed through “PSD increments”),¹⁹⁶ and (2) the source will utilize the “best available control technology,” (commonly referred to as “BACT”)¹⁹⁷ for each regulated pollutant¹⁹⁸ that it will emit in significant amounts.

The nonattainment program (NA) applies in areas that are violating the NAAQS. It is designed to bring nonattainment areas into attainment. Like the PSD, its application to new and modified sources is triggered by emission amounts. It applies to sources that have the potential to emit as little as 100 tpy of a nonattainment pollutant depending upon the classification of the area in which it will be constructed or modified. For example, in areas that are classified as extreme ozone nonattainment areas,¹⁹⁹ new or modified sources having the potential to emit as little as 10 tpy of ozone precursors (volatile organic compounds and nitrous oxides) must receive a nonattainment permit before construction and operation may commence.²⁰⁰

The PSD and nonattainment programs are administered on a pollutant-by-pollutant basis and areas that are in attainment for some regulated pollutants may not be in attainment for others. As a result, new or modified sources may have to obtain both PSD and nonattainment permits and sources located in a “clean” or PSD area may have to meet more stringent requirements if their

¹⁹⁶ A source in a PSD area must conduct continuous onsite air quality monitoring for one year prior to its operation in order to determine the effect that its emissions may have on the air quality. The monitoring data are used to establish a PSD baseline which is then used to determine the incremental increase in pollution that will be allowed in the area. E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(1), at 1281.

¹⁹⁷ BACT is defined as “the maximum degree of [emission] reduction...achievable,” taking into account economic, energy, and environmental factors. CAA §169(3), 42 U.S.C.A. §7479(3) (West Supp. 1994). BACT must be at least as stringent as any NSPS applicable to the source category. By statute, BACT determinations may take into account a broader array of factors than LAER (which will be discussed *infra* in relation to the NA program), however, EPA has begun to take a “top-down” approach when promulgating MACT standards, beginning with the most stringent controls available and ruling out less stringent controls only if they are not achievable in terms of the statutory factors. *Id.* at 1280.

¹⁹⁸ Traditionally, the CAA was interpreted to require BACT for both criteria pollutants as well as hazardous air pollutants. However, the 1990 Amendments explicitly state that substances listed under the new air toxics program are not subject to the PSD program and, therefore, not subject to BACT.

¹⁹⁹ As of 1992, Los Angeles was the only area classified as an “extreme” ozone nonattainment area. Nonattainment of ozone is likely to be the most significant NA consideration for chemical plants that discharge volatile organic compounds -- a precursor or ozone. E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(1), at 1279.

²⁰⁰ It is recommended that new and modified sources in NA areas begin the permit application process at least one year prior to construction of the source since the permitting authority has up to one year to issue the permit. *Id.* at 1281.

emissions would cause or contribute to a violation of the NAAQS in nearby NA areas.²⁰¹

Nonattainment permits also must include a requirement that new or modified sources will meet a technology-based emission standard that is based on the “lowest achievable emissions rate” (known as “LAER”). LAER is based on “the most stringent emissions limitation” contained in any SIP or that has been “achieved in practice” by the same or similar source category, whichever is most stringent.²⁰²

In addition, a new or modified source must obtain offsets (*i.e.*, reductions in emissions of the same pollutant) at a greater than 1-1 ratio before commencing operation.²⁰³ Offsets ensure that new sources will not increase the amount of air pollution in the area and, over time, that the nonattainment area will move toward attainment. The 1990 Amendments require, in more severe nonattainment areas, higher offset ratios. For example, in extreme ozone nonattainment areas, the offset ratio is 1.5 to 1.0.²⁰⁴ In addition, the owner/ operator must certify that all of its other sources are in compliance or are scheduled to comply with all applicable air quality requirements and that the benefits of the proposed new or modified source outweigh its environmental and social costs.²⁰⁵

4. Hazardous Air Pollutants

Section 112 of the CAA requires EPA to establish national technology-based emissions standards for hazardous air pollutants.²⁰⁶ Hazardous air pollutants

²⁰¹ *Id.* at 1278.

²⁰² CAA §171, 42 U.S.C.A. §7501(3) (West 1983). In ozone nonattainment areas, new and modified source must install “California technology” since the extreme ozone problems in that state have resulted in the development of state-of-the-art technology. *Id.* at 1279.

²⁰³ CAA §173(c), 42 U.S.C.A. §7503(c) (West Supp. 1994). The offsets can be procured through other facilities or they can come from within the same facility (*e.g.*, by installing additional controls on existing production lines or by shutting them down). The offset must be of the same pollutant however.

²⁰⁴ CAA §182, 42 U.S.C.A. §7511(e)(1) (West Supp. 1994).

²⁰⁵ CAA §173(a), 42 U.S.C.A. §7503 (West Supp. 1994).

²⁰⁶ These standards are termed NESHAPs -- National Emission Standards for Hazardous Air Pollutants. Prior to the 1990 Amendments, hazardous air pollutants were regulated through harm-based standards. The standards were to be set at a level that in the judgment of the EPA was adequate to protect the public health...with an ample margin of safety.” CAA §112(b)(1)(B), 42 U.S.C.A. §7412(b)(1)(B) (West 1983). In light of the difficulty EPA experienced when attempting to set such standards (standards had been established for only eight hazardous air pollutants), Congress replaced the health-based mandate with a technology-based one in the

were originally defined as pollutants, other than criteria pollutants, the exposure to which “may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.”²⁰⁷ However, that definition was replaced in the 1990 Amendments by a list of 189 pollutants that Congress statutorily determined were hazardous.²⁰⁸

Any stationary source that emits more than 10 tpy of any listed hazardous air pollutant or 25 tpy of any combination of listed hazardous air pollutants is considered a major source and is subject to §112. In addition, a source may be subject to hazardous air pollutant regulation under an “area source” program, which EPA must develop within five years of the 1990 Amendments’ enactment.²⁰⁹

EPA is required to publish a list of major source and area source categories and a draft schedule for promulgation of emission standards for each source category.²¹⁰ For each source category, EPA is required to promulgate standards that require installation of technology that will result in the “maximum degree of reduction” that EPA determines is “achievable” (these are termed

1990 Amendments. *See*, CAA §112(d), 42 U.S.C.A. §7412(d) (West Supp. 1994). Nevertheless, even though these standards are now technology-based, Congress provided for a second phase of regulatory control to ensure that the standards are sufficiently protective. *Id.* For known or suspected carcinogens, further control may be required if the new technology-based standard, known as MACT (*see, infra*), does not reduce lifetime risk to a level of less than one in one million. The health-based inquiry would occur no later than eight years after promulgation of the MACT standard.

²⁰⁷ CAA §112(a)(1), 42 U.S.C.A. §7412(a)(1) (West 1983).

²⁰⁸ *See* CAA §112, 42 U.S.C.A. §7412(b) (West Supp. 1994). The rationale behind the list was to reduce delay in EPA’s identification of hazardous air pollutants which, prior to the amendments, had proceeded very slowly on a pollutant-by-pollutant basis. The statute provides for delisting substances if the EPA can show that “there is adequate data” to determine that a substance “may not reasonably be anticipated to cause adverse effects to human health or adverse environmental effects.” EPA can also add substances to the list. E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(1), at 1282.

²⁰⁹ Area sources are categories of small sources, such as dry cleaners, that the EPA determines present a threat of adverse effects to human health or the environment. *See* CAA §112(c)(3), 42 U.S.C.A. §7412(c)(3) (West Supp. 1994).

²¹⁰ The amendments require the EPA to develop technology-based MACT (maximum achievable control technology) standards on a tight statutory schedule. EPA must establish MACT standards for 41 source categories within 2 years of enactment, 25% of total source categories within 4 years, and additional 25% of the sources within 7 years, and all sources within 10 years. MACT standards become applicable to all and new existing sources three years after promulgation. If the deadlines are not met, a statutory “hammer” is triggered which requires states to develop emission limits when permitting facilities that are “equivalent to” the stringent MACT standards established in the New Source Review programs. E. Elliott and E. Thomas, *supra* note 92, §17.2(B)(1), at 1283-1284.

“MACT” standards for “maximum available control technology”).²¹¹ MACT standards must provide an ample margin of safety to protect the most sensitive individuals.²¹² If an existing source can demonstrate that it has achieved or will achieve a reduction of 90 percent of hazardous air pollution emissions before promulgation of MACT standards, it may be eligible for a six-year extension of its MACT compliance deadline.²¹³

The 1990 Amendments also established a program to address and investigate accidental releases of toxic chemicals. The program requires the EPA to list 100 substances that pose the greatest risk of death or serious injury in the event of release and requires owners and operators of facilities handling such substances to take risk management measures that are necessary to prevent the substances’ accidental release.²¹⁴ In addition, the program creates a Chemical Safety and Hazard Investigation Board which is authorized to conduct a broad range of investigatory, research and advisory functions, including promulgating regulations for accidental release reporting.²¹⁵

5. Permits for Existing Sources

The 1990 Amendments require states to develop and implement an operating permit program for existing air pollution sources. The program is intended to consolidate in a single document all federal and state regulations that pertain to each source in order to facilitate compliance and enforcement.²¹⁶ Under this program, sources must submit a permit application to the permitting authority within one year after the permit

²¹¹ CAA §112(d)(3), 42 U.S.C.A. §7412(d)(3) (West Supp. 1994). MACT standards are designed to provide for emission reduction of approximately 95%. Under the MACT standard development process, EPA looks at a group of facilities that are similar, such as industrial boilers, and bases the MACT standard on the emissions that are achieved in practice by the least-emitting 12 percent of existing sources. In setting a MACT standard, EPA is required to consider the emissions of all hazardous air pollutants as opposed to regulating emissions on a pollutant-by-pollutant basis; however, EPA can consider factors such as the cost of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements. *Id.* at 1284-1285.

²¹² The amendments also require the EPA to assess the residual health risk remaining after MACT controls have been implemented. This review is scheduled to occur after the year 2000. CAA §112(f), 42 U.S.C.A. §7412(f) (West Supp. 1994).

²¹³ See CAA §112(i)(5), 42 U.S.C.A. §7412(i)(5) (West Supp. 1994).

²¹⁴ CAA §112(r)(1), 42 U.S.C.A. §7412(r)(1) (West Supp. 1994).

²¹⁵ CAA §112(r)(6), 42 U.S.C.A. §7412(r)(6) (West Supp. 1994).

²¹⁶ F. Brownell, *supra* note 183, at 140.

program becomes effective.²¹⁷ The application must include a compliance plan, outlining how the source plans to comply with all applicable federal and state air pollution requirements.²¹⁸

Within sixty days of receipt, the permitting authority must determine whether an application is complete. Unless the permitting authority requests additional information or notifies the applicant that the application is deficient, the application is deemed complete. Within 18 months, the permitting authority must take final action on the application.²¹⁹

Permits must contain all of a source's air emission obligations and each source is required to report periodically on its compliance with permit conditions. Permit amendments are required if certain operational changes occur that result in emission increases; however, the law provides for states to include operational flexibility into their permit programs, enabling sources to make minor adjustments that do not significantly increase their air emissions without undergoing permit revision procedures.

6. Enforcement

Violations of the Clean Air Act are subject to both civil and criminal penalties.²²⁰ Civil penalties can consist of injunctions or monetary fines of up to \$25,000 per day of violation. The CAA imposes criminal liability on "any person" who knowingly violates the statute and "persons" can include corporations and partnerships in addition to individuals who directly cause violations. The 1990 Amendments increased the fine for knowing violations to \$250,000 per day and up to 5 years imprisonment. Corporations may be fined up to \$500,000 per violation. Repeat offenders may face doubled fines.

²¹⁷ An interim, partial, or full permit program is effective upon approval by EPA. If the state fails to develop and implement a permit program, EPA must establish a program which becomes effective upon promulgation. *See*, CAA §502(i), 42 U.S.C.A. §7661a(i) (West Supp. 1994).

²¹⁸ *See* CAA §503(b), 42 U.S.C.A. §7661b(b) (West Supp. 1994). Section 504(f) of the CAA provides that compliance with the permit shall be deemed compliance with applicable provisions of the Act if the permit includes applicable requirements or if the permitting authority deems that such requirements are not applicable and the determination is explicit in the permit. This is called the "permit shield." CAA §504(f), 42 U.S.C.A. §7661c(f) (West Supp. 1994).

²¹⁹ *See* CAA §503(c), 42 U.S.C.A. §7661b(c) (West Supp. 1994). For permit requirements, *see* 40 C.F.R. §70.6(c) (1993).

²²⁰ CAA §113(b)-(c), 42 U.S.C.A. §7413(b)-(c) (West Supp. 1994).

Violations for which criminal penalties may be sought include record-keeping violations and failure to pay permit fees. Further, “knowing” releases of any hazardous air pollutant or “extremely hazardous substance” which place another person in “imminent danger of death or serious bodily injury” are subject to fines of up to \$250,000 per day and up to 15 years imprisonment. Corporations may be fined up to \$1 million. Actual knowledge that individuals may be harmed must be proven for these fines to be imposed; however, “negligent” (*i.e.*, careless) releases that place other individuals in “imminent danger of death or serious bodily injury” are punishable by fines of up to \$100,000 (corporations may be fined up to \$200,000) and imprisonment for up to one year.

The 1990 Amendments authorized the EPA to bring administrative enforcement actions against violators.²²¹ Such violations are subject to \$200,000 fines. The fines can be higher if the EPA and the Department of Justice agree that a more severe penalty is warranted. The Amendments also established a “field citation” program for minor violations which allows EPA officials to issue fines of up to \$5,000 per day of violation.

The Amendments also authorize citizen suits, seeking civil penalties, against persons (including the EPA Administrator) who allegedly violate the CAA’s requirements.²²² Any money that is obtained through citizen suits is deposited into a fund that helps finance EPA’s enforcement efforts. Plaintiffs must provide the EPA, the state, and the alleged violator with notice of their intent to bring a citizen’s suit 60-days prior to commencing such action and, if the federal or state has already commenced an action, a citizen’s suit is precluded.

²²¹ CAA §113(d), 42 U.S.C.A. §7413(d) (West Supp. 1994). In an administrative enforcement action, the EPA must first notify the violator of the alleged violation. The alleged violator has 30 days to request an adjudicatory hearing.

²²² CAA §304, 42 U.S.C.A. §7604 (West 1983 & Supp 1994). Prior to the Amendments, although citizens had a right to bring an action against EPA for failing to enforce the act or against a particular source for violations, their only remedy was an order requiring EPA to enforce the act or an order forcing the source to comply.

E. WATER POLLUTANT DISCHARGES -- THE CLEAN WATER ACT

The Clean Water Act was enacted into law on October 18, 1972.²²³ Although the law was not the first federal statute regulating discharges of pollutants into the nation's surface waters;²²⁴ it was the first statute that authorized a comprehensive federal water pollution control system that was designed to reduce such discharges.²²⁵

The stated objective of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."²²⁶ To that end, its goals are: (1) to eliminate all discharges of pollution into the nation's waterways (the "zero discharge" goal), and (2) to make the nation's waterways suitable for fishing, swimming, and recreation (the "fishable and swimmable" goal).²²⁷ Although the statutorily set deadlines for achieving both goals have passed and the goals have not been met,²²⁸ the Clean Water Act is still considered to be a success largely because industrial discharges into the nation's waterways have dramatically decreased since its enactment.

The Clean Water Act has two basic components: the National Pollutant Discharge Elimination System permit program and the Publicly Owned Treatment Works construction program.²²⁹

²²³ Pub. L. No. 92-500, 86 Stat. 896 (1972), codified at 33 U.S.C.A. §§ 1251 *et seq.* (West 1986 & Supp. 1994). Its regulations are found at 40 C.F.R. §§100-140, §§400-470 (1994). The Act is cited as the Federal Water Pollution Control Act, however, it is commonly referred to as the Clean Water Act.

²²⁴ The Refuse Act of 1899 was the first. 33 U.S.C.A. §407 (1986). The Refuse Act was largely an anti-litter statute that was enacted to keep navigable waterways free of debris in the interests of commerce. It was a precursor to the CWA in that it prohibited all discharges into navigable waters unless a permit was obtained from the Army Corps of Engineers.

²²⁵ "Navigable waters" are defined by the statute as "the waters of the United States including the territorial seas." CWA §502(7), 33 U.S.C. §1362(7). Although courts have interpreted the phrase "navigable waters" broadly (wetlands, drainage ditches, mosquito canals, and intermittent streams have been determined to be navigable waters), the statute does not extend to underground water sources -- unless they are hydrologically connected to surface waters. Such sources are subject to the regulation provided by the Safe Drinking Water Act which will not be discussed in this Guide.

²²⁶ CWA §101, 33 U.S.C.A. §1251 (West Supp. 1994).

²²⁷ CWA §101(a)(1)-(2), 33 U.S.C.A. §1251(a)(1)-(2) (West 1986).

²²⁸ The "zero discharge" goal was scheduled to be met by 1985 and the "fishable and swimmable" goal was scheduled to be met by July 1, 1983. Statutory goals are not legal mandates, however; but they do illustrate how Congress intended the act to be implemented and are important in statutory interpretation.

²²⁹ This program originally provided grants to Publicly Owned Treatment Works (POTWs) so that they could upgrade from primary to secondary treatment. Federal grants were available

1. The Control of Point Sources

The Clean Water Act's success is directly tied to the National Pollution Discharge Elimination System (NPDES) which requires point sources to obtain permits before discharging pollutants into navigable waters.²³⁰ The statute classifies water pollution sources as point sources or nonpoint sources. A point source is defined as "any discernible, confined and discrete conveyance . . . from which pollutants are or may be discharged."²³¹ An example of a point source is a discharge pipe. "Point sources" are further divided into municipal point sources (also known as "publicly owned treatment works" or "POTWs") and industrial point sources.

The Clean Water Act defines a pollutant as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water."²³² Unpermitted discharges constitute violations of the act and are subject to civil and criminal penalties.

Like the Clean Air Act, the Clean Water Act represents a federal-state regulatory partnership. The federal government promulgates national standards (*e.g.*, effluent guidelines) but the states are given considerable flexibility in achieving those standards through EPA-approved state permit programs.²³³

for as much as 55% of total project costs. Grants, having no repayment obligation, were generally available for as much as 55% of the costs. The 1987 amendments converted the grant program into a revolving loan program that enables municipalities to obtain low interest loans which must be repaid.

²³⁰ See, CWA §402, 33 U.S.C.A. §1342 (West 1986 & Supp. 1994). More than 65,000 industrial and municipal point source dischargers must obtain NPDES permits. Dischargers are required to submit applications at least 180 days before their discharges are scheduled to begin that contain information about the point source and its expected pollutant discharges. See, 40 C.F.R. §122.21 (1994). Based on this information, the permitting agency determines the levels of effluent discharges that will be allowed. Permit applications are subject to public review and comment. See, C.F.R. §122.1 (1994).

²³¹ CWA §502(14), 33 U.S.C.A. §1362(14) (West Supp. 1994). Under the Clean Water Act, any source of pollution that does not meet the definition of a point source is termed a "nonpoint source." For example, agricultural runoff is a nonpoint source because it does not enter navigable waters through a discrete conveyance. It is very difficult to regulate nonpoint sources because they are not susceptible to traditional forms of regulation. As a result, the CWA has not been successful at controlling nonpoint source pollution which represents the greatest remaining contributor to water quality degradation.

²³² CWA §502(6), 33 U.S.C.A. §1362(6) (West 1986). Courts have broadly construed the term to include virtually all waste material.

²³³ A state can administer a NPDES permit program if the program meets federal standards.

If a state does not implement and enforce its program in accordance with CWA requirements; however, the EPA can take over the state program.

NPDES permits contain effluent limitations²³⁴ with which the regulated point source must comply. Effluent limitations can mandate the adoption of specific control technologies (*e.g.*, the installation of specific pollution control equipment) or compliance with numerical limits that specify the amount of discharge that is permitted on a pollution-specific basis (the amounts are based on units of production, with a maximum daily allowance and a monthly limit).²³⁵

When drafting effluent limitations for an NPDES permit, the permitting authority (which is the state in most cases) uses effluent guidelines that have been set the EPA and water quality standards that have been set by the state. Effluent guidelines determine the minimum level of effluent limitation that will be required of all dischargers within a particular source category. These guidelines are determined for categories of industrial dischargers by examining the levels of control that can be achieved through the use of various levels of technology.²³⁶

State water quality standards are based on the quality of the receiving waterbody. The standards designate the waters' intended uses (*e.g.*, recreational or industrial) and the conditions that are necessary to continue those uses. The water quality standards that are established must be maintained and uses that would degrade the quality of a designated waterbody are prohibited except under strict conditions.²³⁷

As of August 1992, 38 states and territories had approved NPDES programs. State-issued NPDES permits are subject to EPA review and may not be issued if EPA objects within 90 days.

²³⁴ Effluent limitations are defined as "any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources" into navigable waters. CWA §502(11), 33 U.S.C.A. §1362(11) (West 1986).

²³⁵ Traditionally, only conventional pollutants were regulated (*e.g.*, biochemical oxygen demand (BOD), suspended solids); however, permits now regulate toxic pollutants due to provisions contained in the 1987 Amendments.

²³⁶ See, 40 C.F.R. §§400-471 (1993 & 1994) for EPA's effluent guidelines. Effluent guidelines are periodically reviewed and updated as technology improves and economic feasibility changes. Over time, they require regulated entities to achieve higher and higher levels of pollution control. Point sources may obtain variances from their requirements. One way a permittee can obtain a variance is by showing that the guideline should not apply to its facility because of factors that are fundamentally different from those considered when the guideline was issued.

²³⁷ See, 40 C.F.R. §131 (1994).

Effluent limitations, therefore, are tailored to account for both the industrial classification of the point source and the water quality of the receiving waterbody. An effluent limitation may be more stringent than the EPA-set effluent guideline if the water quality of the receiving waterbody warrants a stricter standard. Permits must be reviewed and reauthorized every five years;²³⁸ even during their effective period, they are subject to revocation or modification.²³⁹

NPDES permits also establish monitoring and reporting requirements.²⁴⁰ Permit holders must collect data, monitor their discharges, and keep records of the pollutant levels of their effluent. Permit holders are required to submit those records to the administrative agency that issued their NPDES permit so the agency can verify that the permit limits are not being exceeded. Permits also allow the permitting agency to enter the premises of the discharger at any reasonable time to inspect records and to take test samples to determine compliance with the CWA.²⁴¹

Industrial sources that discharge into sewers (and, therefore, indirectly into surface waters through POTWs) do not need to obtain an NPDES permit; however, they must comply with pretreatment standards that are promulgated by the EPA.²⁴² Such sources are called “indirect dischargers.”²⁴³

Pretreatment standards require indirect dischargers to treat their waste prior to discharge in order to remove the worst or the most toxic pollutants, preventing the “pass through”²⁴⁴ of pollutants into receiving waterways

²³⁸ In order to reissue an NPDES permit, the permittee must establish that the point source can comply with more stringent criteria if they have been promulgated since the permit was originally issued. The permit renewal application must be submitted 180 days before expiration of the existing permit.

²³⁹ See, 40 C.F.R. §122.46 (1994).

²⁴⁰ CWA §308, 33 U.S.C.A. §1318 (West 1986 & Supp. 1994). For regulations pertaining to monitoring and reporting requirements, see, 40 C.F.R. §122.48 (1994).

²⁴¹ The data required by NPDES are subject to public disclosure and may result in commencement of a citizens’ enforcement suit.

²⁴² CWA §307, 33 U.S.C.A. §1317 (West 1986 & Supp. 1994). They also may have to obtain permits from state and local authorities.

²⁴³ It has been estimated that approximately 15,000 companies discharge their wastes into local sewer systems and, therefore, indirectly into navigable waters through POTWs. M. Worobek, *supra* note 180, at 170.

²⁴⁴ “Pass through” occurs when POTWs are unable to neutralize pollutants. Many POTWs are unable to treat certain industrial wastes. These wastes, if not pretreated, travel through the POTW untreated and could disrupt operation of the plant by destroying or blocking the POTWs mode of treatment. As a result, certain wastes are prohibited from being discharged into POTWs. See, 40 C.F.R. §403.5 (1994).

which could degrade water quality or into sewage sludge which could increase disposal costs. They also eliminate any competitive advantage that indirect dischargers may have over direct dischargers.²⁴⁵

Pretreatment standards are promulgated by EPA and reflect the best available control technology (“BAT”).²⁴⁶ Pretreatment standards are designed to result in the same level of treatment that is achieved by direct dischargers. Point sources can obtain removal credits that allow for some relaxation in applicable pretreatment standards. Removal credits are based on the receiving POTW’s demonstrated capability to consistently remove a particular pollutant through treatment.²⁴⁷ Pretreatment standards are usually written into effluent guidelines which are enforced through the POTW’s NPDES permit; however, the permitting authority can also enforce pretreatment requirements directly.

2. Dredge and Fill Permits

The United States Army Corp of Engineers has primary responsibility for implementing section 404 which requires dischargers to obtain permits before discharging dredged or fill materials into navigable waters, including wetlands.²⁴⁸ The Corp of Engineers is authorized to bring enforcement actions to collect civil fines of up to \$25,000 per day and to compel violators to restore filled areas.²⁴⁹

3. Discharge of Oil/Hazardous Substances

Section 311 prohibits the discharge of oil or hazardous substances into navigable waters and provides mechanisms for the clean up of oil and

²⁴⁵ Without pretreatment standards, direct dischargers would be at an unfair disadvantage vis-a-vis indirect dischargers because the CWA requires direct dischargers to pay for the costs of treating pollutants contained in their effluent.

²⁴⁶ They are based on treatment results that are achieved when the best available control technology is utilized.

²⁴⁷ Removal credits take into account the fact that a POTW may be able to treat indirect discharger’s pollutants effectively. As a result, they enable indirect discharger to avoid treating effluent that will be effectively treated once it reaches the POTW. J. Arbuckle, *supra* note 9, at 178.

²⁴⁸ CWA §404, 33 U.S.C.A. §1344 (West 1986 & Supp. 1994). EPA has veto power over all dredge and fill permits issued by the United States Army Corp of Engineers. Certain types of activities are exempted from §404. They include certain farming, ranching, and forestry practices.

²⁴⁹ *Id.*

hazardous substance spills and other releases.²⁵⁰ Any person in charge of a vessel or facility must notify the National Response Center, which is run by the Coast Guard, and state officials whenever a designated substance is spilled in certain quantities.²⁵¹ Any person who fails to notify officials under this provision is subject to 5 years imprisonment. Section 311 also created an emergency fund, like that of Superfund,²⁵² which can be used to pay for the cost of cleaning up oil and hazardous substance discharges into navigable waters. Discharges of oil or hazardous substances into the environment are punishable by civil penalties of up to \$250,000 and responsible parties are also liable for cleanup costs.

4. Enforcement

The EPA may issue a compliance order or bring a civil suit in a United States district court against persons who violate the terms of an NPDES or a dredge and fill permit. The 1987 amendments increased civil penalties from \$10,000 per day of violation to \$25,000 per day.²⁵³ The amendments also outlined a number of factors that courts can weigh when determining civil fines.²⁵⁴ They include the seriousness of the violation, the economic benefit that resulted from the violation, and the facility's history of violations. Civil actions may also seek injunctive relief (*e.g.*, shutting down the facility and, thereby, restraining or abating illegal discharges).

Criminal penalties are also authorized under the Act.²⁵⁵ Negligent (*i.e.*, careless) violations of the Act may be punished by up to \$25,000 per day of violation, by 1 year imprisonment, or both. Second violations may result in a fine of \$50,000 per day of violation or 2 years imprisonment. "Knowing" violations (*i.e.*, acts that were done with the knowledge that they violated the CWA), are punished still more severely (up to \$50,000 per day of violation and up to 3 years imprisonment; second violations are punished by up to

²⁵⁰ CWA §311, 33 U.S.C.A. §1321 (West 1986 & Supp. 1994).

²⁵¹ EPA has designated approximately 300 substances as hazardous when spilled or discharged and has established a "reportable quantity" for many of these substances. *See*, 40 C.F.R. §§109-117 (1994).

²⁵² The "Superfund" is a pool of money, created by a tax on petrochemical feedstocks, used to clean up abandoned and inactive hazardous waste sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA will be discussed *infra*.

²⁵³ CWA §309, 33 U.S.C.A. §1319 (West 1986 & Supp. 1994).

²⁵⁴ *Id.*

²⁵⁵ *Id.*

\$100,000 per day and up to 6 years imprisonment). “Knowing endangerment” violations, which occur when a person acts with the intent to violate the Act and with the knowledge that the action will subject others to the risk of serious bodily injury or death, can be punished with the maximum \$250,000 fine or up to 15 years imprisonment (again, second violations can result in doubled penalties). Under this provision, an organization can be fined up to \$1,000,000.²⁵⁶ Violations that involve false reports or illegal monitoring are subject to a \$10,000 fine and up to two years imprisonment.

Enforcement actions can be brought by the federal government, the states, or, in certain cases, citizens.²⁵⁷ Citizens may bring a citizen suit in a U. S. district court against persons who violate prescribed effluent limitations or against the EPA administrator for failing to implement a nondiscretionary CWA duty. Before a citizen suit can be brought, however, 60-days notice must be given to the federal or state agency responsible for implementation of the act.

F. DISPOSAL OF HAZARDOUS WASTES -- THE RESOURCE CONSERVATION AND RECOVERY ACT

The Resource Conservation and Recovery Act (RCRA)²⁵⁸ was enacted in 1976 to control the land disposal of solid wastes, encourage recycling, and promote the development of alternative energy sources that use solid waste as a feedstock. The term “solid waste” is a misnomer in terms of RCRA since RCRA regulates liquid and gaseous wastes that technically are not “solid.”²⁵⁹ RCRA regulates the land disposal of discarded materials,²⁶⁰ including both

²⁵⁶ CWA §309, 33 U.S.C.A. §1319 (West Supp. 1994).

²⁵⁷ Section 505 of the CWA authorizes any person “having an interest which is or may be adversely affected” to commence civil actions against alleged violators or against the EPA Administrator. 33 U.S.C.A. §1365 (West 1986 & Supp. 1994).

²⁵⁸ Pub. L. No. 94-580, 90 Stat. 2798 (1976), codified at 42 U.S.C.A. §6901 *et seq.* (West 1983 & Supp. 1994). RCRA’s regulations are found at 40 C.F.R. §§240-271 (1993). RCRA actually amended the Solid Waste Disposal Act (SWDA); however, its amendments were so comprehensive, the resulting set of laws is commonly called RCRA although the SWDA remains its “official” title.

²⁵⁹ The 1976 law included in the definition of solid waste, “sludge..., other discarded material, including solid, liquid, semi-solid, or contained gaseous material...” SWDA §1004, 42 U.S.C.A. §6902(27) (West 1983). *See*, 40 C.F.R. §261.4(a) (1993) for a listing of materials that are not considered solid waste under RCRA.

²⁶⁰ RCRA’s definition of solid waste focuses on discarded materials. As a result, residuals that are not discarded are not considered a solid waste under RCRA. This has important ramifications for recycling because certain recyclable materials are not solid waste if they are not being accumulated speculatively. E. Elliott and E. Thomas, *supra* note 92, §17.2(C)(1), at 1311.

hazardous and nonhazardous solid waste. RCRA's Subtitle C²⁶¹ provisions regarding the management and disposal of hazardous solid waste, however, have become the statute's key provisions.

RCRA was significantly amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). The Amendments placed a number of restrictions on waste disposal facilities in order to reduce the land disposal of hazardous wastes.²⁶² They also added a new Subtitle -- Subtitle I, which regulates underground storage tanks, containing hazardous substances or petroleum.²⁶³ Most importantly, HSWA imposed a number of deadlines on EPA that forced the agency to implement RCRA's provisions (these are termed "hammer" provisions). If EPA missed the statutorily set deadlines, very restrictive disposal provisions automatically went into effect.²⁶⁴

RCRA requires hazardous waste to be treated, stored, and disposed of so as to minimize the present and future threat to human health and the environment.²⁶⁵ RCRA's Subtitle C sets forth the regulatory provisions with which

²⁶¹ RCRA contains 10 subtitles. Subtitle A contains general provisions (*e.g.*, definitions). Subtitle B establishes the EPA Administrator's duties. Subtitle D concerns municipal solid waste. Subtitles E-F concern the development of recycling markets. Subtitle G contains miscellaneous provisions. Subtitle H lists research, development, demonstration, and information programs. Subtitle I regulates underground storage tanks. Subtitle J authorizes a demonstration medical waste tracking program. Non-hazardous solid waste is regulated under Subtitle D. Its regulations apply primarily to state and municipal solid waste facilities.

²⁶² The most famous restriction was the "land ban" which prohibits the disposal of bulk or non-containerized hazardous liquid wastes in landfills and severely restricts the disposal of containerized hazardous liquids. Under the "land ban," hazardous wastes can be land disposed only if they meet certain treatment standards or if they are placed in a land disposal unit from which they will not migrate. The Amendments also established minimum technological standards that require, for example, double liners in landfills and leachate collection systems. Due to HSWA regulatory requirements, the cost of hazardous waste disposal has skyrocketed. It has been predicted that HSWA's land disposal requirements will compel chemical manufacturers to either treat all hazardous secondary materials immediately consistent with treatment standards or reintroduce the material into the production process. E. Elliott and E. Thomas, *supra* note 92, §17.2(C)(1), at 1318.

²⁶³ RCRA §§9001-9001h, 42 U.S.C.A. §§6991-6991h (West Supp. 1994).

²⁶⁴ For example, the "land ban" was scheduled to go into effect in May 1990 unless the EPA could promulgate regulations that were designed to protect the public health and environment from the land disposal of such hazardous wastes. EPA succeeded in meeting these stringent deadlines.

²⁶⁵ RCRA states: "The Congress hereby declares it to be the national policy of the United States that, whenever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nonetheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment." RCRA §1002(b), 42 U.S.C.A. §6902(b) (West Supp. 1994).

generators of hazardous waste, transporters of hazardous waste, and owners/operators of hazardous waste treatment, storage and disposal facilities must comply. RCRA represents a comprehensive “cradle-to-grave” regulatory system that tracks hazardous wastes from their generation to their disposal to ensure that they do not pose a threat to public health or the environment throughout their life cycle.

1. Identification/Listing of Hazardous Wastes

Section 3001²⁶⁶ requires EPA to promulgate regulations, providing for the identification and listing of hazardous wastes. EPA has implemented this provision by establishing three hazardous waste lists. The first list contains approximately 500 wastes from non-specific sources (*e.g.*, specific chemicals).²⁶⁷ The second list identifies hazardous wastes from specific sources (*e.g.*, wastes from petroleum refining).²⁶⁸ The third list contains commercial chemical products which, when discarded or spilled, must be treated as hazardous wastes.²⁶⁹ In addition, if wastes exhibit hazardous wastes “characteristics” such as ignitability,²⁷⁰ corrosivity,²⁷¹ reactivity,²⁷² or EP toxicity,²⁷³ they are considered to be hazardous wastes.

In addition to the listed and characteristic hazardous wastes, a mixture of a hazardous waste and a solid waste is considered a hazardous wastes unless its generator can prove that it should be exempt (this is termed the “mixture” rule).²⁷⁴ Similarly, a waste that is generated during the treatment, storage, or

²⁶⁶ RCRA §3001, 42 U.S.C.A. §6921 (West 1983 & Supp. 1994).

²⁶⁷ 40 C.F.R. §261.31 (1993).

²⁶⁸ 40 C.F.R. §261.32 (1993).

²⁶⁹ 40 C.F.R. §261.33 (1993).

²⁷⁰ “Ignitability” is defined as posing a fire hazard during routine management.

²⁷¹ “Corrosivity” is defined as having the potential to corrode standard containers or to dissolve toxic components of other wastes.

²⁷² “Reactivity” is defined as having a tendency to explode under normal management conditions, to react violently when mixed with water or heated, or to generate toxic gases.

²⁷³ “EP Toxicity” is defined as exhibiting the presence of one or more specified toxic materials at levels greater than those specified in the EPA’s regulations. This characteristic is designed to identify wastes that are likely to leach hazardous concentrations of specific toxic constituents into groundwater under mismanagement conditions.

²⁷⁴ 40 C.F.R. §261.3(a)(2) (1993). Exemptions are provided in three cases: (1) if the listed hazardous waste in the mixture was listed solely because it exhibited a hazardous characteristic and the mixture does not exhibit that characteristic; (2) the mixture consists of waste water and certain specified hazardous wastes in dilute concentrations and is subject to Clean Water Act regulation; and (3) the mixture consists of a discarded commercial chemical product resulting in minimal losses during manufacturing operations.

disposal of a hazardous waste is also a hazardous waste unless it is exempted (this is termed the "derived-from" rule).²⁷⁵ In 1991, these two rules were invalidated by the United States Circuit Court for the District of Columbia²⁷⁶ because the EPA had promulgated the rules without sufficient public notice and comment. Shortly thereafter, EPA repromulgated the rules on an interim basis.²⁷⁷

Certain wastes are exempt from Subtitle C's requirements. They include household waste; agricultural wastes that are returned to the ground as fertilizer; and wastes from the extraction, beneficiation, and processing of ores and minerals, including coal.²⁷⁸ In addition, if generators can prove that their wastes do not contain the hazardous constituents that resulted in the waste's initial listing or any other constituents that would cause the waste to be hazardous, their wastes can be delisted.²⁷⁹ Also, hazardous waste generators that generate less than 100 kilograms per month²⁸⁰ are not subject to Subtitle C's regulatory provisions.²⁸¹ Recyclable materials that otherwise meet RCRA's hazardous waste definitions are fully regulated under RCRA unless they fall within certain narrow exceptions that trigger less stringent regulation.²⁸²

²⁷⁵ 40 C.F.R. §261.3(b) (1993). If the waste is derived from a listed waste, exemption is provided by delisting. If the waste is derived from a characteristic waste, exemption is provided if the waste does not exhibit a hazardous characteristic.

²⁷⁶ *Shell Oil Co. v. EPA*, 950 F.2d 741 (D.C. Cir. 1991).

²⁷⁷ 57 Fed. Reg. 7628 (1992).

²⁷⁸ *See*, 40 C.F.R. §261.4(b) (1993).

²⁷⁹ RCRA §3001(f), 42 U.S.C.A. §6921(f) (West Supp. 1994). Chemical manufacturers may petition for delisting of their waste; however, delisting occurs only on a facility-specific basis. The EPA must act on a petition for delisting within two years.

²⁸⁰ Originally, the exemption covered generators who produced less than 1,000 kg per month. Although these generators are technically exempt, RCRA still requires them to meet certain minimum standards. *See*, 40 C.F.R. §261.5 (1993).

²⁸¹ HSWA lowered the threshold exemption amount to 100 kg/month; however, HSWA also established less restrictive rules for generators who generate between 100 and 1,000 kg per month. For example, they may accumulate up to 6,000 kg of hazardous waste on-site for up to 180 days without a permit. If the waste must be shipped over 200 miles, the waste may be stored for up to 270 days. In addition, they are relieved from RCRA's full manifest provisions and benefit from reduced emergency planning requirements. These generators are termed "small quantity generators." *See*, 40 C.F.R. §261.5, §262.34(d)-(f) (1993).

²⁸² *See*, 40 C.F.R. §261.6(a)-261.6(d) (1993).

2. Generator Requirements

RCRA's generator requirements are set forth in §3002.²⁸³ EPA has defined a "generator" as "any person, by site, whose act or process produces hazardous waste identified or listed in Part 261 of this chapter or whose act first causes hazardous waste to become subject to regulation."²⁸⁴ When a generator determines that its solid waste is hazardous, the generator must obtain an EPA identification number within 90 days of generating the waste.²⁸⁵ RCRA also requires generators to properly prepare the waste for transportation off-site and to use appropriate labels and shipping containers.²⁸⁶ Generators must also maintain records concerning the amount of waste that they generate and file biennial reports with EPA that specify where their waste was sent for disposal.²⁸⁷

The generator is also responsible for preparing a Uniform Hazardous Waste Manifest, which is a shipping form that must accompany the waste at all times.²⁸⁸ Generators must ensure that their hazardous waste reaches its designated disposal site by examining the manifest copy that is returned to the generator when the waste reaches the disposal site. If the manifest is not sent back or is sent back in an untimely manner, generators must file an "exception report" with EPA or the state.²⁸⁹

²⁸³ RCRA §3002, 42 U.S.C.A. §6922 (West Supp. 1994). Regulations are found at 40 C.F.R. §§262.10 *et seq.* (1993).

²⁸⁴ 40 C.F.R. §260.10 (1993).

²⁸⁵ RCRA §3010(a), 42 U.S.C.A. §6930(a) (West Supp. 1994), 40 C.F.R. §262 (1993).

²⁸⁶ 40 C.F.R. §262.30-262.34 (1993).

²⁸⁷ Or with the authorized state if RCRA is implemented by a state agency. *See*, 40 C.F.R. §§262.40-262.44 (1993).

²⁸⁸ The manifest must contain the following information: the generator's name, address, and EPA identification number; the names and EPA identification numbers of all transporters (generators must use transporters that have an EPA identification number); the disposal facility's name, address, and EPA identification number (generators must use facilities that have an EPA identification number); a description of the waste from the DOT hazardous materials table; the quantity of the waste and the number and type of shipping containers; the generator's signature certifying that the waste has been labeled, marked, and packaged in accordance with EPA and DOT regulations; and a certification that the volume of waste has been minimized and that the planned method of treatment, storage, and/or disposal minimizes the present and future threat to human health and the environment (this was designed to encourage generators to reduce the amount of pollution that they generate). Generators must keep copies of their manifests for three years. 40 C.F.R. §262.40 (1993).

²⁸⁹ 40 C.F.R. §262.42 (1993).

3. Transporter Requirements

Section 3003 sets forth RCRA's transportation requirements.²⁹⁰ EPA defines a transporter as any person engaged in the off-site transportation of hazardous waste by air, rail, highway, or water.²⁹¹ Transporters must comply with EPA and Department of Transportation (DOT) regulations, governing the shipment of hazardous materials.²⁹² Transporters are also responsible for cleaning up any spills or discharges that may occur during the transport of hazardous wastes.²⁹³

Like generators, RCRA requires transporters to get an EPA identification number and to use the Uniform Hazardous Waste Manifest system. When a transporter picks up hazardous waste from a generator, the transporter and the generator must sign and date the hazardous waste manifest.²⁹⁴ The generator then keeps one copy and the transporter keeps the others. The transporter must keep the manifest copies with the hazardous waste at all times. Whenever the waste is transferred to a transporter or disposal facility, the transferee and the transferor must both sign and date the manifest. The transferor keeps one copy and the other copies remain with the transferee. Transporters must keep their manifest copies for three years.

4. Treatment, Storage, Disposal Requirements

Section 3004 sets forth RCRA's requirements for treatment, storage, and disposal facilities (TSDFs).²⁹⁵ Facilities that accept hazardous wastes for treatment, storage, or disposal are considered treatment, storage, and disposal facilities under RCRA. Treatment is defined as "any method, technique, or process . . . designed to change the physical, chemical, or biological character

²⁹⁰ RCRA §3003, 42 U.S.C.A. §6923 (West 1983 & Supp. 1994). regulations are found at 40 C.F.R. §§263.10 *et seq.* (1993).

²⁹¹ 40 C.F.R. §260.10 (1993).

²⁹² DOT standards were promulgated under the Hazardous Materials Transportation Act. 49 U.S.C.A. §§1801, *et seq.* (West 1976 & Supp. 1994). Regulations are found at 40 C.F.R. §§171-179 (1993).

²⁹³ 40 C.F.R. §263.30 (1993).

²⁹⁴ Waste that travels by rail or by bulk in water does not need to be accompanied by a manifest. However, if transport occurs by any other means (even if some portion is by rail or by bulk in water), the manifest system must be utilized. *See*, 40 C.F.R. §§263.20(e)-(g), 263.22(b)-(d) (1993).

²⁹⁵ RCRA §3004, 42 U.S.C.A. §6924 (West Supp. 1994). Regulations can be found at 40 C.F.R. §§264-267 (1993).

or composition of any hazardous waste so as to neutralize such waste or as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced in volume.”²⁹⁶

A “storage facility” is defined as a facility where hazardous wastes are held for a temporary period, at the end of which, the hazardous waste is treated, disposed of, or stored elsewhere.²⁹⁷ A “disposal facility” is one where hazardous waste is intentionally placed into or onto any land or water, and where waste is intended to remain indefinitely.²⁹⁸ Generators who store hazardous wastes on-site for more than 90 days²⁹⁹(or transporters who store hazardous waste in approved containers for more than ten days) or generators who treat or dispose of their own wastes themselves, are considered TSDFs under RCRA.³⁰⁰

TSDFs³⁰¹ must comply with a number of requirements that are designed to protect human health and the environment.³⁰² Initially, they must obtain an identification number³⁰³ and a storage-facility permit from EPA.³⁰⁴

There are two types of RCRA permitted facilities: interim status facilities and facilities that hold final RCRA permits. Interim status allows TSDFs to

²⁹⁶ RCRA §1004(34), 42 U.S.C.A. §6903(34) (West 1983). See, also 40 C.F.R. §260.10 (1993).

²⁹⁷ 40 C.F.R. §260.10 (1993).

²⁹⁸ *Id.*

²⁹⁹ Storage must comply with 40 C.F.R. §262.34 (1993).

³⁰⁰ Generators may accumulate hazardous substances in-site without obtaining a RCRA storage permit in two cases: (1) generators can accumulate up to 55 gallons of hazardous wastes at or near the point of generation if the waste is properly marked and maintained; and (2) generators are allowed to store hazardous waste on-site prior to shipment for a period of 90 days if certain standards are met. 40 C.F.R. §262.34(a) (1993). Transporters are allowed to store hazardous wastes for up to ten days without having to obtain a RCRA permit. 40 C.F.R. §263.12 (1993).

³⁰¹ RCRA does not apply to certain facilities that technically may meet the definition of a TSDF. They include facilities that dispose of hazardous waste by underground injection pursuant to the Safe Drinking Water Act, publicly owned treatment works that are regulated by the Clean Water Act, and facilities that meet the definition of a “totally enclosed treatment facility.” See, 40 C.F.R. §264.1 and §265.1(c) (1993).

³⁰² Most of these requirements pertain to the facility’s design, construction, and operation. For example, operators must install a security system, prepare and implement an inspection plan, ensure that facility personnel are adequately trained, install emergency response equipment, prepare emergency response plans, and file biennial reports concerning the facility’s waste management activities. D. Case, *Resource Conservation and Recovery Act*, in *Environmental Law Handbook*, *supra* note 3, at 78-81.

³⁰³ 40 C.F.R. §265.11, §264.11 (1993).

³⁰⁴ Or from a state agency if RCRA is implemented through a state program. States are encouraged to assume EPA’s hazardous waste program. Section 3006 allows states to administer and enforce a program that is equivalent to the federal program (states can adopt more stringent requirements). 42 U.S.C.A. §6926 (West 1983 & Supp. 1994). Virtually all of the states are assisting EPA implement RCRA in some form.

operate prior to the issuance of final RCRA permits.³⁰⁵ Facilities that are eligible for interim status must have been in existence on November 19, 1980, or on the date of any statutory or regulatory change that made them subject to RCRA. In addition, they must have notified EPA of their hazardous waste management activities and filed a Part A application.³⁰⁶ Interim status facilities obtain a final facility permit by filing Part B of their RCRA application.³⁰⁷

After a complete RCRA application (consisting of Parts A and B) is filed, EPA (or the relevant state) must process the application. Permit applications are subject to public notice and comment requirements. Once issued, permits are effective for ten years but subject to review every five years.

TSDFs must also comply with the Uniform Hazardous Waste Manifest system. The owner or operator of the facility must sign, date and return a copy of the manifest to the transporter and to the generator within 30 days of receiving hazardous waste. The TSDF owner or operator must also inspect the waste to ensure that the manifest information is correct. If there are discrepancies, the owner or operator must report them to the EPA within 15 days. The facility must keep its manifest copies for at least three years.

The TSDF operator must also keep records of the type, quantity, and origin of the waste that is disposed of at the site as well as records concerning the methods of waste treatment, storage and/or disposal. All of these records are subject to EPA inspection.³⁰⁸ In addition, the operator must monitor the facility to ensure that the methods of waste treatment, storage, and/or disposal remain protective of the public health and the environment.

RCRA also requires disposal facilities to have written closure³⁰⁹ and post-closure plans that prescribe what will happen to the facility when it no longer

³⁰⁵ A new facility or an existing facility that failed to obtain interim status must obtain a final RCRA permit before commencing construction.

³⁰⁶ The permit application consists of two parts. Part A must be completed for a facility to obtain interim status. Part A requires information such as a description of the treatment processes, the facility design and the types of waste to be treated.

³⁰⁷ RCRA §3005(c), 42 U.S.C.A. §6925(a) (West Supp. 1994). Part B of the permit is more detailed and requires specific information such as waste analysis procedures, inspection schedules, and closure and post-closure plans (closure will be discussed *infra*).

³⁰⁸ Or the state under a state authorized program. Inspection occurs at least once every two years. Facilities that are operated by the federal, state or local governments are required to be inspected annually. Section 3007 authorizes EPA to enter and inspect sites for compliance, to collect samples of wastes, and to examine and copy records relating to the wastes. 42 U.S.C.A. §6927 (West 1983 & Supp. 1994).

³⁰⁹ Closure is the formal process of closing a waste disposal facility.

accepts waste. Post-closure plans must provide for groundwater monitoring and other maintenance activities to guard against future environmental harm. The closure and post-closure plans must be submitted to the EPA within 180 days of the expected closure date and the post-closure plan must provide for protection of the site 30 years after closure. The costs of closure and post-closure must be guaranteed by the owner or operator of the facility.³¹⁰

TSDFs must also take corrective action (even beyond their facility borders if necessary to protect human health and the environment)³¹¹ if hazardous wastes are released from their facility.³¹² RCRA permits contain schedules of compliance for corrective action and assurances of financial responsibility for completing such action.

5. Enforcement

Section 3008 authorizes EPA to utilize a variety of enforcement actions, including administrative compliance orders and civil and criminal penalties, to enforce Subtitle C.³¹³ Failure to comply with Subtitle C or EPA compliance orders carries a civil penalty of up to \$25,000 for each day of violation. A violation may also result in the suspension or revocation of RCRA permits. In addition, RCRA imposes a criminal penalty of up to \$50,000 per day of violation and/or 2 years imprisonment.³¹⁴ Monetary fines and jail time may be doubled for repeat offenders.

When a person violates Subtitle C, knowing that the violation places another individual in imminent danger of death or serious bodily injury (“knowing endangerment”), RCRA authorizes the imposition of up to

³¹⁰ Assurances must be made in one of the following ways: (1) establishing a guarantee, (2) posting a surety bond, (3) arranging a letter of credit, (4) obtaining insurance, or (5) meeting a financial test. *See*, 40 C.F.R. §§265-.140-.151, 264.140-.151 (1993).

³¹¹ This requirement does not apply if the operator can not obtain permission to undertake the corrective action from the property owner. E. Elliott and E. Thomas, *supra* note 92, §17.2(C)(4), at 1331.

³¹² Section 3004(u)-(v), 42 U.S.C.A. §6924(u)-(v) (West Supp. 1994). RCRA corrective actions have much in common with CERCLA cleanup actions (see *infra*).

³¹³ 42 U.S.C.A. §6928 (West 1983 & Supp. 1994). Compliance orders are administrative orders that the agency can use to force regulated entities to implement specific actions.

³¹⁴ In a recent case, the U.S. Court of Appeals for the Seventh Circuit ruled that the federal government was not required to prove that a defendant knew that a RCRA permit was required to store spent ferric chloride before the defendant could be found criminally liable on unpermitted storage charges. *U.S. v. Wagner*, 29 F.3d 264 (7th Cir. 1994). Under this court’s reasoning, knowledge of a RCRA permit requirement is not a necessary element which must be proven in a RCRA prosecution case.

\$250,000 per day in monetary fines and/or up to 15 years' imprisonment.³¹⁵ Organizations can be fined up to \$1,000,000.³¹⁶

Section 7003 authorizes the EPA Administrator to bring an action against any person who has contributed to or who is contributing to the handling, storage, treatment, transportation, or disposal of any solid waste or hazardous waste that may present an imminent and substantial endangerment to health or the environment.³¹⁷ Under this section, the EPA Administrator can order such person to restrain from "such handling, storage, treatment, transportation, or disposal, to order such person to take such other action as may be necessary or both."³¹⁸ EPA has used its §7003 authority to order persons to clean up dangerous releases of hazardous materials.³¹⁹ Violations of §7003 orders are punishable by fines of up to \$5,000 per day.³²⁰

RCRA also contains a citizen suit provision that allows any person to bring a civil action against persons alleged to be in violation of RCRA or against the EPA Administrator for failing to perform a nondiscretionary RCRA duty (*e.g.*, enforcing the Act).³²¹ The 1984 Amendments significantly increased RCRA's citizen suit provision by authorizing actions against any person, including any past or present generator, past or present transporter, or past or present owner of a TSDF who "has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment."³²² A citizen action is precluded, however, in cases where the EPA or the state has taken action regarding the site under RCRA or Superfund. In addition, the person

³¹⁵ RCRA §3008(e), 42 U.S.C.A. §6927(e) (West Supp. 1994).

³¹⁶ *Id.*

³¹⁷ RCRA 7003, 42 U.S.C.A. §6973 (West 1983 & Supp. 1994). An action must be brought in a United States District Court.

³¹⁸ *Id.*

³¹⁹ In effect, §7003 acts like a mini-Superfund provision. It imposes strict liability (*e.g.*, liability regardless of fault) on persons who have contributed in the past or who are presently contributing to conditions that threaten public health or the environment. Most actions are brought under CERCLA, however, because CERCLA contains mechanisms that relate to recoupment and allocation of cleanup costs among potentially responsible parties. CERCLA also contains cleanup standards and provides for a wider variety of recoverable costs (*e.g.*, natural resource damages). *See, infra.*

³²⁰ RCRA §7003(b), 42 U.S.C.A. §6973(b) (West 1983).

³²¹ RCRA §7002, 42 U.S.C.A. §6972 (West 1983 & Supp. 1994).

³²² *Id.*

bringing the action must give the EPA, the state, and alleged violators at least 60 days notice prior to the commencement of any citizen suit.

G. THE CLEANUP OF ABANDONED AND INACTIVE HAZARDOUS WASTE SITES -- THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT

The Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as CERCLA, was enacted in 1980 to protect the public and the environment from the uncontrolled dumping of hazardous waste and abandoned hazardous waste sites.³²³ The toxic contamination of Love Canal in upstate New York by an industrial facility and the resulting evacuation of hundreds of families from the area³²⁴ had convinced Congress that a system was needed to identify and cleanup contaminated wastes sites that resulted from past, unregulated releases of hazardous pollutants into the environment.³²⁵

CERCLA established a \$1.6 billion³²⁶ Hazardous Substances Trust Fund (commonly known as the "Superfund") to ensure that funding would be available to finance the cleanup of the most contaminated sites.³²⁷ Although CERCLA authorizes the EPA to force parties that were responsible for releases of hazardous substances to finance and conduct cleanups,³²⁸ such parties are not always identifiable or they may be unwilling or unable to finance cleanup actions. Often, the parties that were responsible for disposing of wastes are no

³²³ Pub. L. No. 96-510, 94 Stat. 2767, codified at 42 U.S.C.A. §§9601-9675 (West 1983 & Supp. 1994). The law was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). Its regulations are found at 40 C.F.R. §§300 *et seq.* (1993).

³²⁴ President Carter declared a state of emergency at Love Canal in August 1978. Families were evacuated and a nearby school were closed when hazardous waste, which had been carelessly disposed years before, contaminated their properties.

³²⁵ CERCLA is different from other environmental statutes, such as the Clean Water Act, the Clean Air Act, and the Resource Conservation and Recovery Act that regulate pollutant discharges into the environment. CERCLA's main purpose is to clean up environmental contamination that has already occurred, not prevent it from happening in the first place.

³²⁶ Congress increased the size of the fund for the years 1987-1991 to \$8.6 billion when it enacted the Superfund Amendments and Reauthorization Act in 1986. In 1990, Congress added another \$5.1 billion when it reauthorized Superfund through 1995.

³²⁷ The fund consists of taxes imposed on petroleum and chemical feedstocks and imported chemical derivatives, as well as an environmental tax on corporations and general tax revenues.

³²⁸ One of the basic principles of CERCLA is that, to the greatest extent possible, the costs of cleaning up these abandoned sites should be borne by those who were responsible for the sites' operation or who arranged to have hazardous substances taken to the sites. E. Elliott and E. Thomas, *supra* note 92, §17.2(C)(4), at 1335.

longer around. They may have gone out of business, gone bankrupt, or been taken over by other entities. Likewise, due to poor recordkeeping and the passage of time, it may be impossible to identify all of the parties responsible for releases. In such cases, the Superfund finances the cleanups.³²⁹

When CERCLA was enacted, the number of contaminated waste sites was expected to be small. As a result, CERCLA was intended to be a temporary program. It soon became apparent, however, that the number of potential CERCLA sites was, in fact, growing. By mid-1994, there were 1,232 facilities, including 150 Federal facilities, on the National Priorities List (NPL).³³⁰ Fifty-four additional facilities had been proposed for NPL listing and were awaiting a final EPA determination. According to the EPA, an additional 340 to 370 facilities are expected to be added to the NPL between October 1, 1994, and September 30, 1999.³³¹ The task of cleaning up present and future Superfund sites is expected to cost tens of billions of dollars³³² and may take decades.³³³

The Superfund Amendments and Reauthorization Act of 1986 (SARA) added provisions that extended and expanded the taxes that finance the Superfund and authorized an appropriation of \$8.5 billion through December 31, 1991. In addition, SARA required EPA to use "applicable or relevant and appropriate requirements" (ARARs) of other environmental laws when designing remedies at CERCLA sites. SARA also added a preference for permanent cleanup and treatment remedies as opposed to containment

³²⁹ EPA is authorized to finance cleanups and enforcement actions using Superfund monies. The fund is also used to pay for private party cleanups in certain cases. See, CERCLA §111, 42 U.S.C.A. §9611 (West 1983 & Supp. 1994).

³³⁰ The National Priority List, otherwise known as the "NPL," is EPA's ranking of hazardous waste sites that are eligible for cleanup using the Superfund. To rank sites, the EPA established the Hazardous Ranking System (HRS) which, for each site, scores factors such as the quality and nature of hazardous wastes present, the likelihood of contamination, and the proximity of the site to population and sensitive natural environments. EPA is required to update the NPL at least once a year. Even if a site is not listed on the NPL, it may be eligible for a short-term removal action. It also may be the subject of a cleanup action under state "mini-Superfund" statutes. H.R. Rep. No. 582, 103rd Cong., 2nd Sess. 75 (1994).

³³¹ *Id.*

³³² The cost of cleaning up hazardous waste sites is enormous. EPA has estimated that the average cost for a Superfund cleanup is between \$25 and \$30 million per site and that the cost of cleaning up the sites currently on the NPL will exceed \$40 billion. H.R. Rep. No. 35, 103rd Cong., 1st Sess. 5 (1993).

³³³ Since the Superfund program began, only 49 sites have been cleaned up and removed from the NPL. The Congressional Budget office estimates that 15 years or more is needed from discovery to the completion of cleanup at the average Superfund site. *Id.* at 23-26 (1993).

remedies³³⁴ and established new mechanisms that are designed to facilitate settlements with liable parties and, thereby, hasten cleanups.³³⁵

1. EPA Response Authority

CERCLA provides EPA with the authority to initiate cleanup actions at abandoned hazardous waste sites. This authority (termed EPA's "response authority") is triggered by the release³³⁶ or threatened release³³⁷ of a hazardous substance³³⁸ from a vessel or a facility into the environment.³³⁹ EPA can respond to a release or threatened release of a hazardous substance in two

³³⁴ SARA requires EPA to choose remedies that will neutralize the waste as opposed to preventing its migration from the site. SARA's preference for treatment has been very controversial because treatment remedies are usually much more expensive than containment remedies. Also, in some cases, treatment of the waste is technologically infeasible. This provision is expected to be modified when CERCLA is reauthorized by Congress.

³³⁵ CERCLA reform is expected to occur in the 104th Congress. Legislative proposals that were offered but failed to pass the 103rd Congress would have hastened cleanups and achieved them at lower cost, reduced litigation over insurance coverage and cleanup liability, and improved state and community participation in Superfund cleanups.

³³⁶ A "release" is defined as any situation that leads to a hazardous substance being freed from its normal container, such as through "spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaking, dumping, or disposing into the environment. . . ." CERCLA §101(22), 42 U.S.C.A. §9601(22) (West Supp. 1994). Certain releases that are regulated under other laws, such as workplace related releases that are covered by the Occupational Safety and Health Act and emissions from the exhaust of motor vehicles that are covered by the Clean Air Act, are not covered by CERCLA.

³³⁷ A "substantial threat of release" is not defined in the statute; however courts have interpreted the term broadly. For example, abandoned and corroding tanks have been deemed examples of threatened releases. New York v. Shore Realty Corp., 759 F.2d 1032, 1045 (2d Cir. 1985), United States v. Northern Plating Co., 670 F.Supp. 742, 747 (W.D. Mich. 1987).

³³⁸ The statute defines "hazardous substance" by referencing other environmental statutes. For example, "hazardous substance" includes hazardous wastes, as defined by RCRA; hazardous substances as defined by the Clean Water Act; and hazardous air pollutants, as defined by the Clean Air Act. CERCLA §101(14), 42 U.S.C.A. §9601(14) (West Supp. 1994). To facilitate identification, EPA has listed CERCLA hazardous substances at 40 C.F.R. §302 (1994). Petroleum and most nuclear materials are expressly excluded from CERCLA; however, petroleum products that are specifically designated as hazardous substances under the Solid Waste Disposal Act, the Clean Water Act, or the Toxic Substances Control Act are covered by CERCLA.

³³⁹ "Vessel" is defined as "every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water." CERCLA §101(28), 42 U.S.C.A. §9601(28) (West Supp. 1994). "Facility" is defined as "any building, structure, installation, equipment, pipe or pipeline...well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling craft, or aircraft, or...any site or area where a hazardous substance has been deposited, stored, disposed or, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel." CERCLA §101(9), 42 U.S.C.A. §9601(9) (West Supp. 1994).

ways.³⁴⁰ First, the government can conduct a short-term removal action at any site that requires emergency action. Removal actions are designed to reduce immediate threats to the public health or welfare and the environment.³⁴¹ For example, the EPA can remove barrels of waste if the condition of the barrels presents an imminent risk of explosion. Second, the government can conduct a long-term remedial action; however, such actions can occur only at NPL sites.³⁴² Unlike removal actions, remedial actions are designed to permanently effect the cleanup³⁴³ of contaminated sites.³⁴⁴ Implementation of a remedial action may occur years after a CERCLA site is identified and listed on the NPL.³⁴⁵

³⁴⁰ CERCLA §104(a)(1), 42 U.S.C.A. §9604(a)(1) (West Supp. 1994). CERCLA requires EPA response actions to follow strict statutory guidelines. The primary guidance document is the National Contingency Plan, also known as the “NCP” which is found at 40 C.F.R. §300 (1993). The NCP sets forth procedures which must be followed by the government and private parties when conducting cleanups. The NCP establishes methods and criteria for determining the appropriate extent of response (*e.g.*, removal or remedial action) and outlines the procedures that must be followed. The EPA is the lead agency for all response actions except for spills that occur in coastal areas and inland waterways where the Coast Guard assumes responsibility.

³⁴¹ A removal action must be capable of being completed within one year and it must not cost more than \$2 million. There are exceptions, however, that include situations where continued action is necessary to respond to an emergency, situations where there is an immediate risk to public health or the environment, situations where the action is part of a larger approved remedial action, and situations where continuation of the removal is consistent with the remedial action to be taken. CERCLA §104(c)(1), 42 U.S.C.A. §9604(c)(1) (West Supp. 1994).

³⁴² The NPL was designed to ensure that the most serious sites are cleaned up first. By restricting remediation actions to NPL sites, this provision is designed to ensure the Superfund is used only for the cleanup of the most contaminated sites.

³⁴³ The level of cleanup that will be achieved at a contaminated site is one of the most contentious issues that arises under CERCLA. Many argue that certain sites should not be cleaned up to pristine conditions – particularly those that will always be used for industrial purposes. Ironically, the 1986 Amendments made cleanups more expensive because they expressed a preference for treatment versus containment remedies at Superfund sites and treatment is usually disproportionately costly. In addition, the current statute requires that all cleanups meet “all legally applicable or relevant and appropriate” requirements of other federal or state environmental laws. CERCLA §121, 42 U.S.C.A. §9621 (West Supp. 1994). These requirements have resulted in very costly and conservative cleanups and are likely to be the future subject of CERCLA reform.

³⁴⁴ An example of a remedial action is the installation and operation of a groundwater “pump and treat” system or a soil incinerator.

³⁴⁵ When a potential Superfund site is discovered, a preliminary assessment (PA) is conducted, consisting of a brief review of available site information to determine whether the site poses sufficient risk to warrant further action. After the preliminary assessment (PA) is conducted, the EPA can initiate a site inspection (SI) or drop the site from further review. The SI consists of more detailed data collection than the PA, such as soil and water sampling. If the site poses a sufficient threat to human health or the environment (which is determined by ranking the site according to the Hazard Ranking System), the site is added to the National Priorities List (NPL). Once listed, the EPA can perform a remedial investigation (RI) which assesses the presence of contaminants on the site and their risks. After the RI is conducted, EPA conducts a

2. PRP Liability

When a release or threatened release of a hazardous substance from a vessel or facility results in the incurrence of response costs³⁴⁶ (either by the EPA or by private parties), CERCLA authorizes an action for cost recovery for persons who have incurred response costs.³⁴⁷ Liability for response costs and natural resource damages³⁴⁸ can be imposed on four categories of parties: (1) current owners or operators of a facility at which hazardous substances were disposed;³⁴⁹ (2) past owners or operators of a facility at which hazardous

feasibility study (FS) which identifies and evaluates alternative methods of remediating the contamination at the site. When the RI and FS are completed, EPA issues a Record of Decision (ROD) that sets forth EPA's chosen remedy. Before the remedy selection is final, however, a public comment period occurs. Thereafter, EPA prepares a comprehensive remedial design (RD) plan and proceeds to implement the remedial action (RA). The final step is NPL delisting. The entire process, from identification to delisting, can take up to 15 years. H.R. Rep. No. 35, 103rd Cong. 1st Sess. 23-26 (1993).

³⁴⁶ "Response costs" include any costs associated with a "removal" or "remedial" action incurred by the United States government or tribal government and any other necessary costs of response incurred by any other person consistent with the NCP; damages for injury to, destruction of, or loss of natural resources; and the cost of any health assessment of health effects. Interest on these costs is also recoverable. CERCLA §107, 42 U.S.C.A. §9607 (West Supp. 1994). The courts are split as to whether private parties' attorney's fees are recoverable; however, they have held that EPA's enforcement costs are recoverable. Courts have also found that EPA's indirect (*e.g.*, administrative and oversight) costs are also recoverable. United States v. Hardage, 733 F. Supp. 1424, 1438-1439 (W.D. Okl. 1989); United States v. R.W. Meyer, Inc., 889 F.2d 1497, 1503 (6th Cir. 1989). To be recoverable, however, response costs must be "consistent" with the National Contingency Plan (NCP) in private action for costs.

³⁴⁷ CERCLA §107, 42 U.S.C.A. §9607 (West Supp. 1994).

³⁴⁸ Liability includes damages for injury to, destruction of, or loss of natural resources including the reasonable costs of assessing such injury, destruction, or loss" resulting from a release of hazardous substances into the environment. CERCLA §107(a)(4)(C), 42 U.S.C.A. §9607(a)(4)(C) (West Supp. 1994).

³⁴⁹ This is termed "current owner/operator" liability. A current owner or operator of a Superfund site is liable regardless of whether it had any involvement in the handling, disposal, or treatment of hazardous substances. There are a few exemptions to this "owner/operator" liability. For example, state or local governments are not liable if they acquired ownership or control of the site involuntarily through bankruptcy, tax delinquency, abandonment, or other circumstances where the government involuntarily acquires title by virtue of its function as sovereign. *See*, CERCLA §101(20)(D), 42 U.S.C.A. §9601(20)(D) (West Supp. 1994). In addition, liability does not extend to persons, who, without participating in the management of a vessel or facility, holds indicia of ownership primarily to protect his or her security interest in the vessel or facility. *See* CERCLA §101(20)(A), 42 U.S.C.A. §9601(20)(A) (West Supp. 1994). Courts have found lessees liable as "owners." United States v. South Carolina Recycling and Disposal Inc., 653 F. Supp. 984, 1003 (D.S.C. 1984). Courts have also found corporate officials to be "operators" in cases where they actively participated in their companies' waste management and disposal activities. New York v. Shore Realty Corp., 759 F.2d 1032 (2d Cir. 1984). Courts have also "pierced the corporate shield" and held parent corporations liable for the actions of their subsidiaries in cases where the parent corporation exercised control over the

substances were disposed;³⁵⁰ (3) persons, including generators, who arranged for the disposal and treatment of hazardous waste at any facility;³⁵¹ and (4) transporters, or those who arranged for the transport of hazardous waste to a facility.³⁵² Courts have interpreted CERCLA's liability provisions liberally in order to ensure that CERCLA's cleanup objectives are achieved.³⁵³

The liability of these parties, termed "potentially responsible parties" or "PRPs," is strict (*i.e.*, liability can be imposed regardless of fault or negligence), joint and several (*i.e.*, one party can be held liable for the actions of others when the harm is indivisible)³⁵⁴ and retroactive (*i.e.*, parties can be held liable for actions that predated CERCLA's enactment). The EPA does not have to prove that a particular PRP's waste caused the release or threatened release in order for that PRP to be held liable. EPA only has to show that there are hazardous substances present at the site that are "like" those associated with the PRP's waste management/disposal activities.

subsidiaries' waste management and disposal activities. United States v. Kaiser-Roth Corporation, 910 F.2d 24 (1st Cir. 1990).

³⁵⁰ This is termed "past owner/operator" liability. "Disposal" was originally interpreted by courts to mean active disposal during the past owner's/operator's period of ownership/operation. A recent court has interpreted the term "disposal" however to mean passive disposal which theoretically extends past liability to all parties who owned or operated the site from the initial act of disposal if the facts suggest that the hazardous substances were passively disposed (*e.g.*, leaching) over that period of time. See Nurad Inc. v. William E. Hooper & Sons Co., 966 F.2d 837 (4th Cir. 1992).

³⁵¹ This is termed "generator" or "arranger" liability. At most Superfund sites, "generators" and "arrangers" form the largest PRP group; their liability depends on whether they made arrangements for the disposal of hazardous substances or whether they owned or possessed hazardous substances that were disposed of at the site. Courts have interpreted this liability broadly and have imposed liability in cases where there has been a relationship between two or more entities that results in the handling or disposal of a waste containing a hazardous substance. One court held that to be liable, the party does not need to know that disposal of the hazardous substance would result. Florida Power & Light v. Allis-Chalmers Corp., 893 F.2d 1313 (11th Cir. 1990). In addition, "constructive possession" (*i.e.*, not actual possession but the ability to influence where the hazardous waste is disposed of) may be sufficient for liability to be triggered.

³⁵² This is termed "transporter" liability. Typically, these parties are commercial waste haulers. To be liable, the transporter must have selected the disposal or treatment site.

³⁵³ R. Lee., *Comprehensive Environmental Response, Compensation, and Liability Act*, in *Environmental Law Handbook*, *supra* note 3, at 286.

³⁵⁴ CERCLA's joint and several liability stems from the extreme difficulty associated with apportioning liability among numerous contributors. CERCLA sites can have upwards of 500 PRPs -- each of whom may have sent similar hazardous materials to the site. The idea is that by imposing joint and several liability on the PRPs, the PRPs will bear the burden of coming forward with information which will exculpate them (if such information is available) or with information that will identify other PRPs. If the waste is not commingled and each PRPs portion can be allocated accordingly, joint and several liability will not be imposed.

CERCLA's liability scheme and its minimal standard of causation have resulted in the EPA suing a few PRPs at major Superfund sites for the entire cost of cleanup. Those PRPs, in turn, then sue other, usually smaller, PRPs for contribution.³⁵⁵ Some PRPs have complained that CERCLA's liability scheme is unconstitutional; however, courts have repeatedly upheld CERCLA as constitutional.³⁵⁶

After a site is listed on the NPL, EPA identifies PRPs that it can link to the site³⁵⁷ and sends them a "PRP letter," notifying them of their potential CERCLA liability. CERCLA imposes two types of liability on these parties depending upon whether a site cleanup is conducted by the government or by PRPs. If the cleanup is conducted by the government, PRPs are liable to the government for their share of its response costs.³⁵⁸ If the site has not yet been cleaned up, PRPs can be ordered to effect the actual cleanup of the site.³⁵⁹

3. Private Party Cleanups

In lieu of using the Superfund to cleanup sites, CERCLA also provides EPA with the authority to compel private parties to perform response action when releases or threatened release of hazardous substances present an imminent and substantial endangerment to the public health or welfare or the environment.³⁶⁰ Before SARA, EPA did not use its §106 authority very

³⁵⁵ Contribution actions seek to impose liability on other parties who the person who has been held liable for the costs of cleanup alleges are also responsible. Large industrial PRPs have used this provision to sue small PRPs, such as pizza shops and girl scout troops, solely on the basis that they sent municipal solid waste to the hazardous waste site (they technically are "generators"). This has been very controversial. During the 103rd Congress, the Senate and the House introduced bills that would have provided "de micromis" generators (defined as parties that generate or transport less than 100 pounds or 55 gallons of materials containing hazardous substances unless such materials contribute significantly to the response costs at the site) with a statutory exemption from Superfund liability; however, CERCLA reform bills did not pass Congress.

³⁵⁶ See *e.g.*, United States v. Monsanto Co., 858 F.2d 160 (4th Cir. 1988), *cert. denied*, 490 U.S. 1106 (1989); United States v. NEPACCO, 810 F.2d 726 (8th Cir. 1986), *cert. denied*, 484 U.S. 848 (1987).

³⁵⁷ EPA conducts a "PRP search" which reviews documents associated with the site's operation. For example, many Superfund sites are old landfills and the waste records from haulers that sent waste to the landfill often provide crucial identifying information.

³⁵⁸ CERCLA §107, 42 U.S.C.A. §9607 (West Supp. 1994).

³⁵⁹ CERCLA §106, 42 U.S.C.A. §9606 (West 1983 & Supp. 1994).

³⁶⁰ CERCLA §106, 42 U.S.C.A. §9606 (West 1983 & Supp. 1994). This provision has been interpreted to provide an equivalent cause of action as §107. However, there are some differences between §106 and §107. Section 106 provides for equitable relief (*e.g.*, it authorizes EPA to issue a unilateral administrative order to compel a private party to undertake a response action) whereas §107 does not. Also §106 provides only for the abatement of an imminent and

often. After SARA, however, EPA began to routinely use §106 to force private parties to conduct the site cleanups. This new policy, termed "enforcement first,"³⁶¹ is achieved by ordering PRPs to cleanup the site through administrative or judicial actions. These cleanups, termed "private party cleanups," have conserved the Superfund and have ensured that the Fund is only used at sites where PRPs cannot be identified or found. In addition, private party cleanups are usually faster and more efficient than government cleanups.

The private party cleanup order has been called "EPA's most potent enforcement tool and a powerful settlement incentive."³⁶² A failure to comply with a §106 order triggers substantial penalties (\$25,000 per day)³⁶³ and §106 orders are not immediately eligible for judicial review.³⁶⁴ As a result, parties who are issued a §106 order have little choice but to comply. CERCLA does allow private parties, who comply with §106 orders, to sue other parties for contribution and to file a claim against the Superfund for reimbursement of compliance costs; however, a party can recover from the fund only if it can prove that it is not a valid PRP at the site.

4. Defenses

CERCLA contains defenses that PRPs may use to escape its liability scheme.³⁶⁵ They include: (1) an act of God, (2) an act of war, or (3) an act or omission of a third party if the PRP exercised due care and took precautions against foreseeable acts of the third party.³⁶⁶ These defenses are rarely used

substantial hazard whereas §107 provides for cost recovery of sums expended in a full cleanup of a site. In practice, §106 has effected the same types of cleanups as §107.

³⁶¹ R. Lee, *supra* note 353, at 288.

³⁶² *Id.* at 299.

³⁶³ Punitive damages, equal to three times the amount of costs incurred as a result of the party's failure to comply with the order, can also be imposed. To avoid punitive damages, a party must show that it had "sufficient cause" to not comply with the §106 order. Courts interpret "sufficient cause" strictly. Parties must prove they had a reasonable, objectively grounded belief that: (1) it was not a liable party or that it had a defense; (2) it was a *de minimis* contributor; (3) the order was technically invalid; (4) financial, technical, or other inability precluded its compliance; or (5) the response action ordered was not cost-effective. *Id.* at 301-302.

³⁶⁴ Section 113(h) provides that "no Federal court shall have jurisdiction...to review any order issued under section [106]..." 42 U.S.C.A. §9613(h) (West Supp. 1994). When the EPA seeks to enforce its order, the order becomes subject to judicial review.

³⁶⁵ CERCLA §107(b), 42 U.S.C.A. §9607(b) (West 1983).

³⁶⁶ The third party must be someone other than an employee, agent, or party with whom the PRP had a contractual arrangement such as through leases, employment contracts, waste hauling contracts, and real estate sales. Typically, the third party is someone who acts in a way that could not have been prevented, such as a vandal.

because they are valid only in extraordinary cases. The third party defense, in particular, has been narrowly construed by the courts.

SARA added a new defense, termed the “innocent landowner” defense. Under this defense, the owner or operator of a Superfund site can escape liability if the owner or operator can establish that it did not know or have reason to know that any hazardous substance had been disposed of at the site at the time of purchase. To meet this burden of proof, an owner or operator must prove that he or she made “all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice”³⁶⁷

5. Release Reporting

CERCLA also requires parties to notify the EPA whenever there has been a release of a hazardous substance that is equal to or greater than the reportable quantity for that substance.³⁶⁸ EPA has promulgated regulations listing the reportable quantities of various hazardous substances.³⁶⁹ Failing to report releases of hazardous substances can result in civil and criminal penalties.³⁷⁰ The maximum criminal penalty is three years in prison for a first conviction and five years for a subsequent conviction. Civil penalties amounting to more than \$25,000 per day may also be imposed. Certain releases which are exempted from CERCLA’s reporting requirements include federally permitted releases, releases pursuant to FIFRA, releases regulated under RCRA, and continuous releases from a facility that has already notified the National Response Center of such releases.³⁷¹

³⁶⁷ CERCLA §101(35), 42 U.S.C.A. §9601(35) (West Supp. 1994). Environmental audits, required prior to the transfer of real estate in some states, are often used to establish the innocent landowner defense. An environmental audit is usually conducted by an environmental consultant who examines the property (both the structures and the land) and reviews land records for evidence of past waste disposal. The innocent landowner defense is not available to owners/operators who fail to disclose any knowledge they have obtained of on-site waste disposal activities acquired during his or her period of ownership/possession.

³⁶⁸ CERCLA §103(a), 42 U.S.C.A. §9603(a) (West 1983).

³⁶⁹ See, 40 C.F.R. §302 (1993).

³⁷⁰ CERCLA §103, 42 U.S.C.A. §9603 (West 1983 & Supp. 1994).

³⁷¹ CERCLA §103(a), 42 U.S.C.A. §9603(a) (West 1983).

6. Enforcement

In addition to authorizing actions for cleanup and for response costs, CERCLA also contains a "citizen suit" provision that permits private citizens to initiate a civil action against parties that violate CERCLA (including the EPA Administrator for failing to perform nondiscretionary CERCLA duties, such as enforcing CERCLA's provisions).³⁷² Before a citizen suit can be brought, however, the citizen must notify the EPA and the alleged violator at least 60 days prior to bringing the action. In addition, if the government has already brought a prosecution action against the alleged violator, no citizens' suit may commence.

Because CERCLA issues have been heavily litigated and the case law is well established, most CERCLA cases end in a negotiated settlement between PRPs and the EPA.³⁷³ SARA added Section 122 that established procedures to encourage settlements with PRPs.³⁷⁴ The consent decrees that end judicial actions and the consent orders that end administrative actions usually contain covenants not to sue. These covenants provide settling PRPs with some finality as to future CERCLA liability at the site; however, consent decrees and consent orders also often contain "reopeners" that allow subsequent suits to be filed against the settling PRPs if information is disclosed at a later date that shows that the chosen remedy is no longer protective of the environment.³⁷⁵

³⁷² CERCLA §310, 42 U.S.C.A. §9659 (West Supp. 1994).

³⁷³ CERCLA authorizes settlement agreements under which PRPs are required to undertake necessary response actions at a site. See CERCLA §122, 42 U.S.C.A. §9622 (West Supp. 1994).

³⁷⁴ For example, §122(g) added a section on *de minimis* settlements that encourages EPA to reach a final settlement with *de minimis* parties (parties who contributed only small amounts of low-toxicity waste to the site) "as promptly as possible." 42 U.S.C.A. §9622(g) (West Supp. 1994).

³⁷⁵ One commentator has written: "From EPA's perspective, settlement is preferable because it conserves Superfund monies as well as EPA's limited resources. Settlements also free EPA's personnel to work on other cleanups. From the perspective of PRPs, settlement is often preferred because it permits them to exercise greater control over the selection and implementation of remedial actions, presumably minimizing costs. PRPs also often prefer settlement to avoid the tremendous costs of litigating a CERCLA case." R. Lee, *supra* note 353, at 312.

H. RESPONDING TO CHEMICAL EMERGENCIES – THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

In 1984, a Union Carbide facility released methyl isocyanate into the atmosphere in Bhopal, India, killing more than 2500 people and permanently disabling some 50,000 more. The Bhopal incident highlighted the potential for accidental chemical releases in the United States and illustrated the need for emergency planning to deal with such releases should they occur. The Bhopal incident also made communities, located near industrial plants, eager to know what substances the plants were emitting.

Title III of the Superfund Amendments and Reauthorization Act (SARA), contained a separate law known as the Emergency Planning and Community Right-to-Know Act (EPCRTKA or EPCRA).³⁷⁶ EPCRA does two things: (1) it requires states to create local emergency units that must establish plans for responding to chemical emergencies and (2) it requires the EPA to develop a national inventory of releases of toxic chemicals from manufacturing facilities which is subject to public disclosure.

1. Emergency Planning

Section 301 requires each state to create a State Emergency Response Commission (SERC), designate emergency planning districts, and establish local emergency planning committees (LEPCs) in each district.³⁷⁷ The local committees are required to work with local facilities that produce, use, or store extremely hazardous substances³⁷⁸ to develop response procedures, evacuation plans, and training programs in preparation for a chemical emergency.³⁷⁹ The SERC is responsible for reviewing all local plans developed by LEPCs to determine whether they comply with EPCRA.

³⁷⁶ EPCRA is codified at 42 U.S.C.A. 11001-11050 (West Supp. 1994).

³⁷⁷ EPCRA §301, 42 U.S.C.A. §11001 (West Supp. 1994).

³⁷⁸ Covered facilities include facilities that produce, use, or store any of the hazardous substance on EPA's list of Extremely Hazardous Substances in quantities equal to or greater than the threshold planning quantity established for each substance. *See*, Appendix A or Appendix B to 40 C.F.R. §355 (1993).

³⁷⁹ Each LEPC is responsible for reviewing information submitted by covered facilities and developing a plan to respond to local hazardous chemical releases. EPCRA §303, 42 U.S.C.A. §11003 (West Supp. 1994).

Section 302 requires facilities that store extremely hazardous substances in amounts greater than the threshold planning quantity to notify the SERC when the facility is subject to EPCRA's emergency planning requirements.³⁸⁰ They must also designate a representative who will participate with the LEPC to prepare emergency response plans for the facility. Facilities are also required to provide the LEPC with any information that the LEPC deems is necessary to develop or implement an emergency plan.

Section 304 requires covered facilities to immediately report³⁸¹ any release (other than a federally permitted release)³⁸² of a listed hazardous substance³⁸³ in an amount that exceeds the threshold amount³⁸⁴ to the SERC of the state that is likely to be affected by the release, to the LEPC for the district where the release occurred, and to the National Response Center if the substance is a CERCLA-listed hazardous substance. Initial notification may be made by phone, radio, or in person; however, Section 304 requires the facility to provide a written follow-up emergency notice as soon as possible after the release.³⁸⁵ EPCRA also requires facilities to file a one-time follow-up report within 30 days of the one-year anniversary of the initial written notification with the appropriate EPA regional office.

2. The Toxic Release Inventory (TRI)

EPCRA contains provisions that are designed to provide information to the general public concerning chemicals to which they may be exposed. Section 311 requires owner and operators of facilities that are subject to OSHA's Hazard Communication Standard regulations to submit copies of

³⁸⁰ EPCRA §302, 42 U.S.C.A. §11002 (West Supp. 1994). Notification was required by May 17, 1987; after that date, covered facilities have to notify the SERC within 60 days of becoming subject to EPCRA (e.g., when they store an extremely hazardous substance at the facility in an amount that is equal to or above the EPA-set threshold amount).

³⁸¹ See, 40 C.F.R. §355.40(b)(2) (1994) for the required contents of such notice.

³⁸² Continuous releases are subject to reduced reporting requirements. See, 40 C.F.R. §302.8 (1994). If a release changes in composition or source, the release is considered a "new" release but is subject to reduced reporting requirements.

³⁸³ Substances are listed under §302 of the Act or §103(a) of CERCLA.

³⁸⁴ The threshold amount is an amount that is equal to or greater than 10,000 pounds for hazardous chemicals and an amount that is equal to or greater than 500 pounds for extremely hazardous chemicals unless the substance has a set threshold amount that is lower than 500 pounds.

³⁸⁵ See, 40 C.F.R. §355.40 (1994).

their Material Safety Data Sheets or a list of hazardous substances that they handle to the SERC, the LEPC, or the local fire department.³⁸⁶ New facilities must comply with Section 311 within three months of becoming subject to EPCRA's provisions.

Section 312 of EPCRA requires owner and operators of covered facilities to submit an emergency and hazardous chemical inventory form to the SERC, the LEPC, and the local fire department.³⁸⁷ Section 312 reporting takes two forms. Tier One reporting covers general health and physical hazard information. Tier Two reporting outlines health and physical hazards on a chemical-specific basis.³⁸⁸ Tier One reports are required to be filed on March 1st of the first year after which a covered facility becomes subject to EPCRA's reporting requirements and annually thereafter. Tier Two reporting usually occurs upon request by an interested party; however, some facilities prefer to file Tier Two reports in lieu of Tier One reports.³⁸⁹

TRI reporting requirements are set forth in Section 313 of EPCRA.³⁹⁰ Section 313 requires manufacturers with more than 10 employees who either use more than 10,000 pounds or manufacture or process more than 25,000 pounds of one of the listed chemicals or categories of chemicals³⁹¹ to report annually to EPA and the state on the maximum amount of chemical present at the location during the previous year, the treatment or disposal methods used, and the amount released³⁹² to the environment or transferred off-site³⁹³

³⁸⁶ EPCRA §311, 42 U.S.C.A. §11021 (West Supp. 1994).

³⁸⁷ EPCRA §312, 42 U.S.C.A. §11022 (West Supp. 1994).

³⁸⁸ EPCRA does provide covered facilities with some trade secret protection. The specific chemical identity of a covered chemical can be claimed as a trade secret in submissions to EPA; however, disclosure may be required to health professionals if the information is required for the purpose of diagnosis/treatment, to assess exposures, or in cases of medical emergencies. W. Halbleib, *Emergency Planning and Community Right-to-Know Act*, in *Environmental Law Handbook*, *supra* note 3, at 477.

³⁸⁹ *Id.* at 465.

³⁹⁰ EPCRA §313, 42 U.S.C.A. §11023 (West Supp. 1994).

³⁹¹ More than 320 chemicals are covered.

³⁹² Routine and accidental releases, in addition to permitted releases, are covered.

³⁹³ Releases to POTWs and other treatment, storage, and/or disposal facilities are included as well as releases to the air, water, and land.

for treatment and/or disposal.³⁹⁴ Covered facilities must use the Chemical Release Inventory Reporting Form (Form R).³⁹⁵

The data that are obtained through EPCRA's reporting requirements are compiled in the Toxic Release Inventory, also known as "TRI," which is a computerized database maintained and published each year by EPA.³⁹⁶ Covered facilities must maintain the records, supporting their TRI submissions, for at least three years from the date the report was filed. These records are subject to EPA inspection and verification.

The TRI has been widely used by citizens, environmentalists, states, and industry, as an environmental "scorecard" and the public disclosure of facilities' toxic chemical release and transfer information has resulted in many facilities voluntarily reducing their releases and off-site transfers.³⁹⁷ In 1990, EPA implemented the "33/50 Program" which requests companies to voluntarily reduce their toxic chemical releases and off-site transfers by 33% by 1992 and 50% by 1995. As of October 1992, more than 977 companies had committed to the program, pledging an emission reduction of nearly 350 million pounds.

3. Enforcement

EPCRA authorizes the imposition of administrative, civil, and criminal penalties for violations of its provisions.³⁹⁸ Actions for enforcement can be

³⁹⁴ Section 313 applies to facilities that are in Standard Industrial Classification (SIC) Codes 20 through 39; that have ten or more full-time employees; and that manufacture, import, process, or otherwise use a listed toxic chemical in excess of threshold quantities. Certain uses of listed toxic chemicals are exempt, such as (1) use as a structural component of a facility, (2) use of products for routine janitorial or maintenance services, (3) personal uses by employees, (4) use of toxic products in connection with motor vehicle maintenance, and (5) use of toxic materials contained in intake water or intake air. Also, if the processing or use of similar articles results in less than 0.5 pounds of a listed toxic chemicals per year, the releases are exempt. W. Halbleib, *supra* note 388, at 468-469.

³⁹⁵ The information required by Form R includes the name, location, and principal business activities at the facilities; off-site locations to which listed waste has been transferred; the quantity of listed chemicals entering each environmental medium annually; information on source reduction and pollution prevention activities undertaken at the facility during the preceding year; and a certification that the report is complete and accurate.

³⁹⁶ The TRI is available through EPA; however, the public may obtain specific information about facilities or releases by submitting a request in writing to EPA.

³⁹⁷ In response to TRI, nine major petrochemical manufacturers made public commitments to reduce their emissions of selected toxics into the environment by almost 83 percent by December 1993. E. Elliott and E. Thomas, *supra* note 92, §17.1(B)(3), at 1270.

³⁹⁸ EPCRA §325, 42 U.S.C.A. §11045 (West Supp. 1994).

brought by the EPA, SERCs, LEPCs, and private citizens. EPCRA enforcement is generally done at the state level; however, violations of Section 313 are subject to federal enforcement.

Section 325 allows the EPA Administrator to order owners and operators of covered facilities to comply with Sections 302 and 303's emergency planning requirements.³⁹⁹ Violations are punishable by civil penalties of up to \$25,000 per day. Violations of Section 304's emergency notifications may be punished more severely. Any person who knowingly and willfully fails to provide notice of reportable releases can be fined up to \$25,000 or imprisoned for up to two years or both.⁴⁰⁰ Second violations may be subject to a fine of up to \$50,000 or 5 years imprisonment. Violations of §311 are subject to \$10,000 fines per day of violation; violations of §§312 and 313 are subject to fines of up to \$25,000 per day of violation.⁴⁰¹

I. A PROACTIVE APPROACH TO REDUCING ENVIRONMENTAL BURDEN --THE POLLUTION PREVENTION ACT

On October 27, 1990, Congress passed the Pollution Prevention Act,⁴⁰² establishing pollution prevention⁴⁰³ as the nation's primary pollution control strategy. Prior to its enactment, the control of pollution after its generation had been the main focus of federal and state environmental statutes. The emergence of pollution prevention reflected a growing awareness on the part of environmental policy makers that controlling

³⁹⁹ *Id.*

⁴⁰⁰ EPCRA §325(b), 42 U.S.C.A. §11045(b) (West Supp. 1994).

⁴⁰¹ *Id.*

⁴⁰² The Pollution Prevention Act, 42 U.S.C.A. §§13101 *et seq.* (West Supp. 1994).

⁴⁰³ Pollution prevention is defined as "any practice which: (1) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment...prior to recycling, treatment, and disposal; and (2) reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants. PPA §6603(5)(A), 42 U.S.C.A. §13102(5)(A) (West Supp. 1994). Pollution prevention techniques aim to reduce the volume and/or toxicity of pollution that is generated. Common techniques include equipment or technology modifications, such as equipment modernizations; process or procedure modifications, such as materials reuse within a manufacturing process; reformulation or redesign of products, such as eliminating the need for toxic chemicals in a manufacturing process; substitution of raw materials, such as the substitution of non-toxic chemicals for toxic chemicals; and improvements in housekeeping, maintenance, training, or inventory controls that produce more efficient operations and materials handling. *Id.*

pollution after its generation was no longer effective.⁴⁰⁴

Traditional methods of pollution control had proved ineffective because their focus on regulating chemical releases into specific environmental media failed to reduce the total amount of pollution that was entering the environment through all environmental media -- land, water, and air. For example, the Clean Water Act regulates pollutant discharges into the nation's navigable waters; the Clean Air Act regulates discharges into the nation's air, and the Resource Conservation and Reauthorization Act regulates pollutant discharges into the nation's land. Each environmental statute focuses on cleaning up a specific environmental medium; however, in doing so, they neglect the fact that in cleaning up one environmental medium, waste is often shifted to another for ultimate disposal.⁴⁰⁵

The goal of the Pollution Prevention Act is to shift the nation's waste strategy from the control of waste after its generation to the reduction of waste at its source. The premise is that, by reducing waste generation at its source, the Act will reduce the need for the waste's treatment and subsequent disposal, resulting in less waste entering the environment through all environmental media.

The Act establishes a hierarchy of waste strategies with pollution prevention as the highest priority. The Act states that: (1) pollution should be prevented or reduced at the source whenever feasible, (2) pollution that cannot be prevented or reduced should be recycled, (3) pollution that cannot be prevented or reduced or recycled should be treated, and (4) disposal or other releases into the environment should be employed only as a last resort.⁴⁰⁶

The Pollution Prevention Act, however, is not an action-forcing statute in that it does not require industrial facilities to adopt pollution prevention. Rather, its provisions are designed to educate facilities about the

⁴⁰⁴ Data had shown that, despite more than twenty years of regulation, the volume and hazards of toxic chemical releases into the environment continues to grow as the nation creates and uses more toxic chemicals. S. Johnson, *From Reaction to Proaction: The 1990 Pollution Prevention Act*, 17 Colum. J. Env'tl. L. 153, 156 (1992).

⁴⁰⁵ For example, traditional air pollution control devices, such as scrubbers, remove pollutants from the air stream. This practice ensures that air pollution is controlled but it increases the pollution that enters the environment because the removed pollutants are usually disposed of in another environmental medium. As a result, traditional environmental policy does not reduce the total amount of pollution entering the environment through all media. It merely shifts it around.

⁴⁰⁶ PPA §6602(b), 42 U.S.C.A. §13101(b) (West Supp. 1994).

environmental and economic benefits of pollution prevention in the hope that education will be sufficient to encourage its widespread adoption.

To that end, the Act required EPA to set up a Pollution Prevention Office, independent of its media-specific programs, to develop and implement a strategy to promote source reduction. In addition, it authorized a grant program to encourage the development of state source reduction technical assistance programs and it created a Pollution Prevention Information Clearinghouse to compile information on source reduction and make it available to the public.

The only mandatory provision contained in the Pollution Prevention Act is §7, which requires owners and operators of facilities that are required to file a Form R under SARA Title III to report to the EPA information regarding the source reduction and recycling activities that the facility has undertaken during the previous year.⁴⁰⁷ This information is then made available to the public through EPA's Pollution Prevention Information Clearinghouse.

Like EPCRA's TRI data, §7 has been effective at triggering some companies' voluntary adoption of pollution prevention. Rather than explaining to the public why they generate and dispose of such large quantities of toxic chemicals, these companies have chosen to adopt pollution prevention in order to reduce the amount of waste they generate and, therefore, treat or transfer off-site for disposal.

By reducing the generation of pollution, pollution prevention reduces the need for pollution's treatment and subsequent disposal. It, thereby, protects the environment because less waste enters the environment through all media -- air, water, and land. However, pollution prevention also produces economic benefits for industrial facilities. By reducing their generation of pollution, industrial facilities can enjoy lower waste disposal costs, decreased environmental liabilities, and more efficient manufacturing operations.

⁴⁰⁷ PPA §7, 42 U.S.C.A. §13106 (West Supp. 1994). Section 7 requires owners and operators to provide information on source reduction and recycling activities with each annual toxic chemical release inventory report. The information required to be reported includes: (1) the amount of each listed chemical entering the waste stream before recycling, treatment, or disposal, and the percentage change from the previous year; (2) the amount recycled, the percentage change from the previous year, and the recycling process used; (3) the amount treated on-site or off-site and the percentage change from the previous year; (4) specific source reduction practices used by the facility; (5) techniques used to identify source reduction opportunities; and (6) the amount released because of accidents or other one-time releases.

As of April 1, 1991, more than one-half of the states had enacted pollution prevention laws which varied widely. Some state laws require industry to develop facility-wide pollution prevention plans.⁴⁰⁸ Other states simply require facilities to declare that pollution prevention is their preferred method for dealing with hazardous waste.⁴⁰⁹

CONCLUSION: POLLUTION PREVENTION-- IT'S THE BEST POLICY

The present system of environmental law and regulation is complex, costly, and fraught with potential liability --civil and, more frighteningly, criminal. The system's complexity stems from the fact that environmental regulation can emerge on federal, state, and local levels and often those regulations conflict. In addition, statutory mandates and environmental regulations may be ambiguous or they may have been improperly promulgated. The uncertainty over the validity and meaning of environmental mandates often results in litigation between the regulated community and regulatory agencies.

Although litigation can settle conflicts over the validity and meaning of environmental laws and regulations; the inevitable price of litigation is delay. Delay can benefit regulatees who want to postpone their compliance with regulatory requirements for financial reasons. However, prolonged litigation can also delay cleanup actions⁴¹⁰ and produce further environmental damage, resulting in more expensive cleanups in the long-run.

In addition, the cost of complying with environmental laws and regulations is skyrocketing as new regulations are promulgated. The EPA has estimated that, by the year 2000, over \$155 billion (in 1996 dollars) or approximately 2.7 percent of the Gross National Product will be spent

⁴⁰⁸ As of April 1992, industrial facilities are required to develop pollution prevention plans in Arizona, California, Georgia, Louisiana, Maine, Massachusetts, Minnesota, Mississippi, New Jersey, New York, Oregon, Tennessee, Texas, Vermont, and Washington. See, WRITAR, State Legislation Relating to Pollution Prevention (April 1992).

⁴⁰⁹ Alaska, Colorado, Connecticut, Delaware, Florida, Illinois, Indiana, Iowa, Kentucky, North Carolina, Rhode Island, and Wisconsin have all enacted pollution prevention laws; however, these states do not require facilities to develop pollution prevention plans, Rather, they encourage facilities to adopt pollution prevention by providing technical assistance and grants. *Id.*

⁴¹⁰ The perfect example of needless delay occurs in the Superfund program. The average site takes approximately 10 years from discovery to delisting from the NPL; however, only 3 of those 10 years are spent actually cleaning up the site. E. Elliott and E. Thomas, *supra* note 92, §17.5(B), at 1348.

annually on environmental compliance.⁴¹¹ A tremendous amount of money will be spent on environmental lawyers who will be hired by regulated entities and government agencies to litigate and enforce the system's complex requirements. Federal and state regulatory agencies are also increasingly using their enforcement authority to impose criminal and civil liability on individuals as well as on companies.⁴¹² Virtually all of the major federal environmental statutes contain enforcement mechanisms and provide for some form of criminal liability.⁴¹³ In such a hostile regulatory environment, regulated entities are advised to make good-faith efforts to comply with state and federal environmental requirements. Self-reporting and cooperating with governmental officials may reduce the chance that harsh penalties will be imposed at trial.⁴¹⁴

The environmental law system's complexities, costs, and liabilities have triggered the development of corporate strategies designed to reduce the regulatory requirements to which regulated facilities are subject. One of those strategies is pollution prevention. By reducing a facility's generation and, therefore, release of pollutants into the environment, pollution prevention can simplify the facility's compliance duties and reduce its environmental liabilities.

Another strategy is implementation of a corporate compliance program that is designed to determine whether a facility is in compliance with environmental law and regulations.⁴¹⁵ The main tool that companies use

⁴¹¹ *Id.*

⁴¹² In 1982, the United States Department of Justice formed an "Environmental Crimes Unit" that prosecutes environmental offenses. As of October 1983, that unit had indicted 704 individuals and 315 corporations, convicted 476 individuals and 240 corporations, and received more than 237,647,692 in fines. In addition, more than 404 years of jail time had been sentenced consisting of over 206 years of actual confinement. J. Arbuckle, *supra* note 9, at 57.

⁴¹³ *Id.* at 47.

⁴¹⁴ For example, EPA recently proposed about \$2.9 million in fines against 39 chemical companies for reporting violations under the Inventory Update Rule of TSCA. The total reflected 50% reductions for companies that reported even though they had missed the reporting deadline. *EPA Proposes \$2.9 Million in TSCA Fines; Self-Reporters Get 50% Reduction*, Environmental Policy Alert (BNA) 24 (July 6, 1994).

⁴¹⁵ There is a growing trend to provide companies that perform environmental audits with some immunity from environmental enforcement actions. The premise is that companies that conduct good-faith, voluntary environmental audits, disclose violation to government agencies, and act promptly to correct the violations should enjoy some immunity. *Companies Say EPA Enforcement Policy Collides with Voluntary Audit Program*, Environmental Reporter (BNA) 416-417 (June 24, 1994).

to determine compliance is the environmental audit. An environmental audit is a comprehensive accounting of material and waste flows through a facility, focusing on specific industrial processes in order to ensure that all by-products of the process are captured, treated, disposed of, or re-used. Environmental audits enable facilities to account for their waste flows and ensure that they are properly managed, simplifying their compliance duties and reducing their environmental liabilities.

The purpose of this guide has been to introduce chemical engineers to the field of environmental law. The field, however, is constantly changing. As a result, this guide should be used as a reference to the structure and scope of environmental laws and regulations. It should not be used to guide compliance. For specific compliance questions, readers are advised to consult the relevant federal or state environmental agencies.

APPENDIX A — AN INTRODUCTION TO THE LEGAL CITATION SYSTEM

I have used the uniform system of legal citation, which is used in legal writing, throughout this guide. The rules of the citation system can be found in A Uniform System of Citation, which is available at any bookstore that carries law books.

FEDERAL STATUTES

The basic citation form for United States environmental statutes contains a citation to the United States Code -- a series of volumes (consisting of what are called "Titles") in which every federal statute is codified after it is enacted. Many environmental statutes are found in Title 42 of the United States Code (U.S.C.) which covers matters concerning public health and welfare. As a result, their citation usually begins with "42 U.S.C." or "42 U.S.C.A." "U.S.C.A." is an abbreviation for "United States Code Annotated."⁴¹⁶

After the "42 U.S.C." or "42 U.S.C.A.", the citation will list a section symbol and a section number (e.g., "42 U.S.C.A. §7401").⁴¹⁷ The section number tells the reader where to find the specific provision within the cited title. For example, if a statute is cited as "42 U.S.C.A. §7401", the citation indicates that the specific statutory provision can be found in Title 42 of the United States Code Annotated at section 7401. If the citation contains two section symbols and then a range of sections numbers, the citation indicates that the referenced provisions consist of a series of statutory provisions (e.g., 42 U.S.C.A §§ 9601-9675).⁴¹⁸ The year that appears on the spine of the volume, the year that appears on the title page, or the latest copyright year (in that

⁴¹⁶ The United States Code Annotated is an unofficial version of the United States Code that contains more information than the official version, such as very brief abstracts of cases that have interpreted a specific statute's terms. As a result, it is usually more helpful when conducting legal research. It is called an "unofficial" reporter because it is published by a private publisher as opposed to the federal government which publishes the United States Code.

⁴¹⁷ Statutes are often discussed in their uncodified form. For example, a reference may refer to §9607 of CERCLA as "§107." "§107" is the section number that designated the statutory provision before the statute was codified in the United States Code. Once the statute was codified, §107 became §9607 of Title 42. It is often helpful to discuss statutes in their uncodified form because many people are more familiar with that form; however, when formally citing a statute, the U.S.C. or the U.S.C.A. form is proper.

⁴¹⁸ This form is often used when an entire statute is cited. An entire statute can also be cited in this form: 42 U.S.C.A. §9601 *et seq.* which tells the reader that the statute begins at section 9601 and follows thereafter.

order of preference) follows the section numbers and is enclosed in parentheses. When referencing statutes, keep in mind that a single Title can encompass a number of volumes of the United States Code.

STATE STATUTES

State statutes are codified in a different series of volumes. For example, Michigan statutes can be found in a series of volumes known as Michigan Compiled Laws Annotated. These volumes are cited as "Mich. Comp. Laws Ann." As with federal statutes, the citation will be followed by a section number and the publication date of the volume. Each state has a different citation system, so refer to A Uniform System of Citation for the proper form for each state.

FEDERAL REGULATIONS

The basic citation form for federal regulations is a citation to the Code of Federal Regulations, which is abbreviated as "C.F.R." For example, the citation for a Clean Water Act Effluent Limitation Guidelines is 40 C.F.R. §405.53 (1980). Like statutes, the citation contains a title number, a section number, and the date of the volume. This means that the cited regulations can be found in Title 40 of the C.F.R. at section 405.53. Like statutes, C.F.R. titles can encompass a number of volumes.

STATE REGULATIONS

State administrative regulations are found in the state's respective administrative compilation. For Michigan, state environmental regulations are found in Michigan Administrative Code, which is cited as "Mich. Admin. Code." The citation system that is used (in terms of title number, section number, and date of the volume) are the same as in the federal system.

FEDERAL CASE LAW

Federal judicial decisions (cases) are published in federal case law reporters. For example, all federal Supreme Court cases are found in either the official reporter -- United States Reports, which is cited as "United States" or the unofficial reporter (published privately) --Supreme Court Reporter, which is cited as "S.Ct". All federal appellate court cases are found in the Federal

Reporter, which is cited as either "F.", "F.2d", or "F.3d".⁴¹⁹ All federal district court cases are found in the Federal Supplement, which is cited as "F.Supp."

For example, the citation: United States v. Northeastern Pharmaceutical & Chemical Co., 810 F.2d 726 (8th Cir. 1986), tells the reader (1) the name of the case (the name of the entity who brought the case is listed first followed by a "v" which denotes "versus" then the name of the party that is defending the case), (2) the volume of the federal reporter in which it is found -- here, volume 810 of the second series of the Federal Reporter, (3) the page number where the case begins -- page 726, (4) the court that decided the case if the reporter covers the cases of multiple courts -- the Federal Court of Appeals for the Eighth Circuit, and (5) the year that the case was decided -- 1986.

STATE CASE LAW

State judicial decisions (cases) are published in many different reporters. For example, Michigan's Supreme Court reporter, Michigan Reports, is cited as "Mich." The reporter that contains Michigan appellate court cases, Michigan Appeals Reports, is cited as "Mich.App." The reporter that contains Michigan Court of Claims (the courts of the first level of adjudication in Michigan), Michigan Court of Claims Report, is cited as "Mich. Ct. Cl." In addition, Michigan case law can be found in the North Western Reporter, which is an unofficial reporter of case law from several states including Michigan. It is cited as "N.W" or "N.W.2d" if the more recent series is used.

⁴¹⁹ The "2d" and "3d" refer to the second and third series of volumes respectively.