

CHAPTER 4

WASTEWATER DISCHARGE REGULATIONS

4-1. Army Regulations

The Department of the Army has prescribed general policy on environmental protection in the form of AR 200-1 and AR 200-2. The policy contained in these documents or their successors is the governing regulation for Army facilities. Any conflict between these regulations and this chapter are inadvertent. In all cases, AR 200-1 and AR 200-2 take precedence.

4-2. Legislation

a. Historical perspective. The decade of the 1970's saw the enactment and implementation of a variety of legislation designed to protect the environment and to regulate the disposal of waste materials. While some legislation was enacted prior to the 1970's, the statutes were generally cumbersome in the delegation of authority for enforcement of standards. In addition to the passage of several significant pieces of Federal legislation in this decade, the formation of the U.S. Environmental Protection Agency (U.S. EPA) in December, 1970, created, for the first time, a single Federal agency responsible for all aspects of environmental control including:

- air pollution.
- water pollution.
- solid and hazardous wastes.
- pesticides.
- radiation.
- noise.

This chapter will be limited to the major pieces of legislation and the resulting regulations affecting water pollution control.

b. National Environmental Policy Act (NEPA). The enactment of the National Environmental Policy Act (NEPA) of 1969 established protection of the environment as a national goal. Although NEPA is a short piece of legislation whose declared purpose is to establish a national policy to encourage productive and enjoyable harmony between man and the environment; the Act did contain "action-forcing" provisions for the preparation and evaluation of environmental impact statements. AR 200-2 prescribes the Department of the Army policy with regard to the implementation of NEPA.

(1) Environmental Impact Statement. A major provision of NEPA was the requirement of Environmental Impact Statements (EIS) for all

major projects of Federal agencies and all State or local projects funded or regulated by a Federal agency. The EIS is required to address all the following considerations:

(a) Potential environmental impacts of the proposed action.

(b) Any unavoidable adverse environmental effects resulting from implementation of the proposed action.

(c) Alternatives to the proposed action.

(d) Irreversible and irretrievable resource commitments associated with implementation of the proposed action.

(e) Local short-term use of the environment as compared to the preservation of long-term productivity.

(2) Public participation. By requiring the publication of an EIS for public comment prior to commencement of any action on applicable projects, NEPA established the means for public participation and, therefore, promoted the field of environmental law through citizen's suits and other types of litigation. Another provision of NEPA established the Council on Environmental Quality (CEQ) to advise the President on environmental matters, to review Environmental Impact Statements, and to prepare an Environmental Quality Report assessing the status and condition of the air, aquatic, and terrestrial environments.

c. Federal Water Pollution Control Act (FWPCA) The Federal Water Pollution Control Act of 1972, PL 92-500, provided a comprehensive revision of prior water pollution control legislation. This Act superseded the original Federal Water Pollution Control Act passed in 1956, and its amendments prior to 1972 including the Water Quality Act of 1965, the Clean Water Restoration Act of 1966, and the Water Quality Improvement Act of 1970. The Clean Water Act of 1977 further amended PL 92-500 which subsequently is commonly referred to as the Clean Water Act.

(1) Legislative requirements. The Federal Water Pollution Control act established national goals for elimination of all pollutant discharges by 1985 and called for attainment of interim water quality standards to provide "fishable and swimmable" waters by July 1, 1983. This legislation also established requirements for:

- Establishment of a permit system to restrict discharges of pollutants from point sources.
- Development of necessary technology to eliminate the discharge of pollutants into navigable waters.
- Federal financing programs for construction of publicly owned treatment works (POTW's).
- Development of area-wide waste treatment management programs to insure

- pollution control in each State.
- Control of toxic pollutants.
- Federal facility compliance with Federal, State, and local requirements.

This comprehensive piece of legislation contained many other provisions relating to water pollution control. The items mentioned above will be discussed in more detail in paragraphs 4-3 and 4-4 of this chapter. Major highlights of this legislation are summarized in figure 4-1.

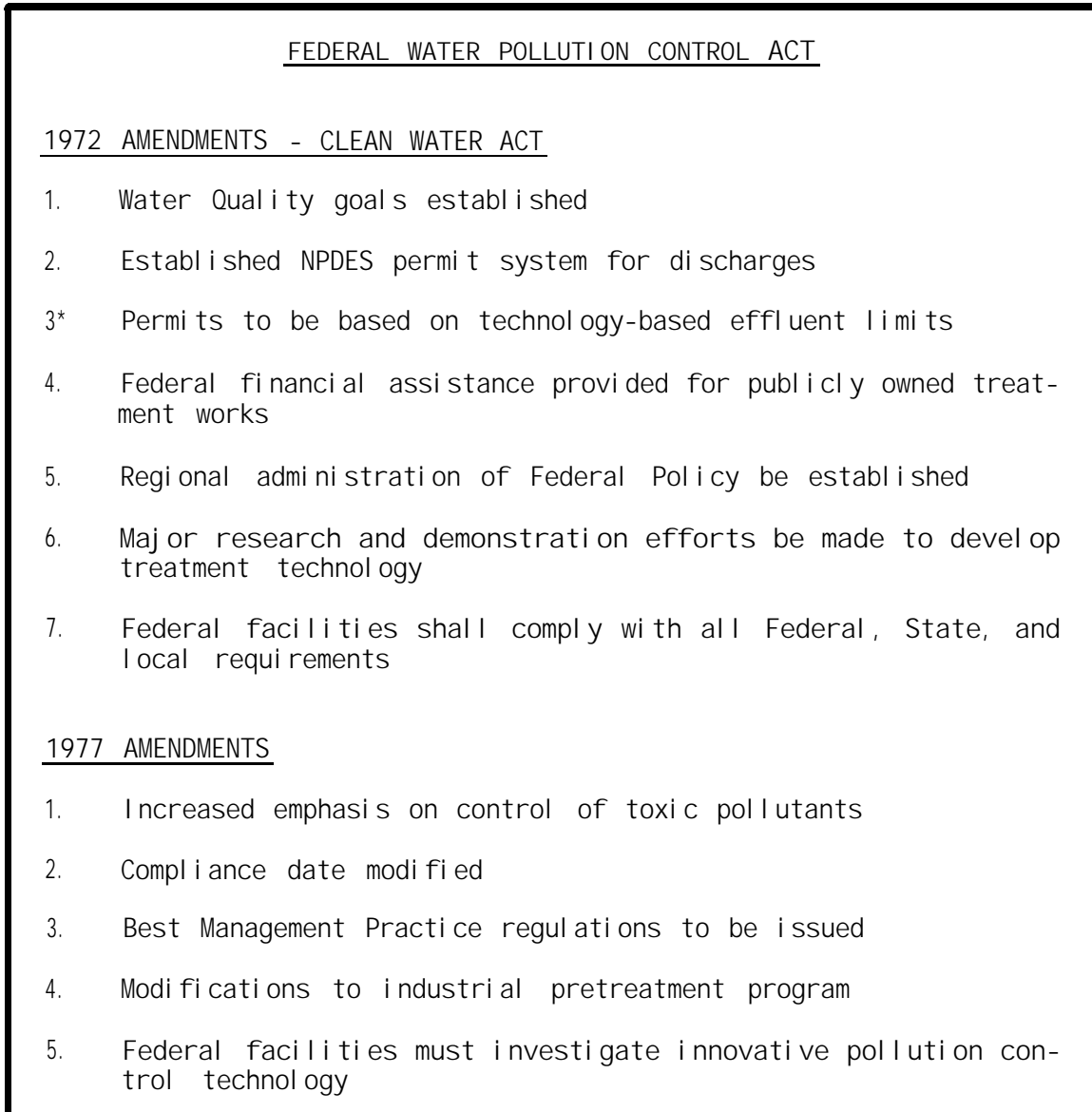


Figure 4-1. Highlights of the Federal Water Pollution Control Act.

(2) Effluent limitations. Perhaps the most significant changes in the Federal approach to water pollution control contained in the Clean Water Act included the establishment of a permitting system by which all discharges were required to meet prescribed "effluent limitations" and the appropriation of significant Federal expenditures for control of water pollution. The Act provides that all discharges to surface waterways must, as a minimum, meet certain effluent criteria. In addition, the Act requires the establishment of water quality standards for all waters and requires that all wastes must be treated to a level sufficient not to interfere with the maintenance of these water quality standards, even if this requires treatment in excess of the minimum level established by the effluent criteria.

(3) Amendments. As a result of the first five years of experience with the 1972 Amendments, Congress, in 1977, passed the 1977 Amendments to the Federal Water Pollution Control Act. The most important changes recognized by the 1977 Amendments include the following:

- Several changes in compliance dates were made allowing more time for compliance with certain regulations.

- An increased emphasis on the control of toxic pollutants was added.
- U.S. EPA was authorized to issue "best management practices" regulations for the control of toxic and hazardous pollutants contained in industrial plant site runoff, spills or leaks, and discharges from other activities ancillary to industrial operations.
- Modifications in requirements for pretreatment of industrial wastes required for discharge to municipal sewage treatment systems were made.
- Federal facilities were required to investigate innovative pollution control technology before construction of new facilities.

d. Resource Conservation and Recovery Act (RCRA) of 1976. In 1976, Congress enacted the Resource Conservation and Recovery Act (RCRA). This legislation completely revised the older Solid Waste Disposal Act. Perhaps the most significant impact of this legislation was the requirement for controlling the handling and disposal of hazardous wastes. A summary of the features of RCRA is presented in figure 4-2.

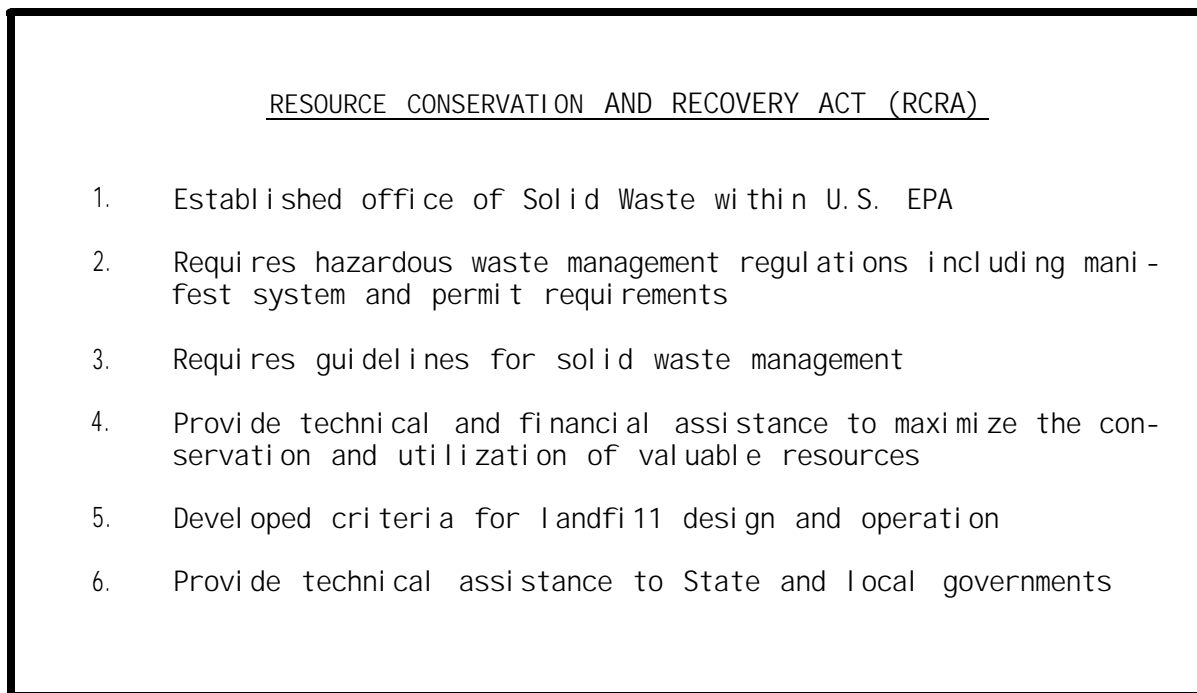


Figure 4-2. Features of Resource Conservation and Recovery Act (RCRA).

The significance of RCRA to wastewater treatment is that wastewater itself may be classified as a hazardous waste and the sludge generated by wastewater treatment may be hazardous.

(1) Provisions of the Act. The Act estab-

lished guidelines regulating various aspects of solid waste handling practices by:

- Requiring the U.S. EPA to develop and publish guidelines and performance standards for solid waste management.

- Establishing the Office of Solid Waste within the U.S. EPA.
- Requiring the development of hazardous waste management regulations.
- Establishing minimum requirements for State or regional solid waste plans by providing technical and/or financial assistance for developing environmentally safe disposal methods which also maximize the utilization and conservation of valuable resources.
- Developing criteria for sanitary landfills, especially with respect to characteristics distinguishing sanitary landfills from open dumps and, consequently, provisions for the prevention of open dumping.
- Establishing resource and recovery panels to provide technical assistance to State and local governments.

(2) Manifesting disposal. Perhaps the single most important feature of RCRA is the establishment of a “manifest system” regulating the handling of hazardous wastes which incorporates a “cradle-to-grave” concept. Generators of hazardous wastes will be required to initiate documentation regarding the transport, handling, and disposal of these wastes. Permits will be required in each step of the handling and disposal processes and records will be kept by the waste generator identifying all persons who have responsibility for transportation and disposal of a particular waste.

e. *Safe Drinking Water Act (SD WA) of 1974.* The Safe Drinking Water Act required the establishment of national standards for all public water supplies.

(1) The National Interim Primary Drinking Water Standards were established for contaminants known to have adverse effects on human health. Compliance with the maximum contaminant levels (MCL) which comprised the primary standards is compulsory and enforceable by States having approved programs or by the U.S. EPA. Secondary standards will be established to regulate parameters such as color and odor with recommendations being made as guidelines to states for the further protection of public welfare.

(2) The major impact of the Safe Drinking Water Act on waste management is the inclusion of restrictions on underground injection of wastes. All aquifers or portions of aquifers currently serving as drinking water sources are designated for protection under these regulations. In addition, any other aquifer which is capable of yielding water containing 10,000 mg/L or less of total dissolved solids also comes under these regulations. Permits will be required for all wells

which are used for the injection of wastes. Permit holders' will be responsible for maintaining injection wells in such a manner to prevent the contamination of drinking water supplies.

f. Other pertinent federal legislation.

(1) The Toxic Substances Control Act (TSCA) of 1976 requires control of chemicals which have a known adverse effect on human health. Some provisions of this Act relate specifically to the handling of polychlorinated biphenyls (PCB'S).

(2) Pesticides are specifically regulated under provisions of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) as amended by the Federal Environmental Pesticide Control Act (FEPCA) of 1972 and the FIFRA Amendments of 1975. This Act is important in that it requires registration of all new pesticide products and provides for Federal control over the use of pesticides.

(3) The Marine Protection, Research and Sanctuaries Act of 1972 regulates the transportation for dumping and the dumping of material into ocean waters. This would prohibit transporting wastewater or wastewater treatment sludge to the open seas for dumping without a permit.

(4) The Comprehensive Environmental Response, Compensation and Liability Act of 1980 establishes responsibility and penalties for discharge or release of hazardous substances into the environment. This includes release into a body of water or onto land.

4-3. The NPDES Permit System

a. Legislative authorization. The Environmental Protection Agency was authorized under Section 402 of the Federal Water Pollution Control Act to establish a national permit program to control the discharge of pollutants into the nation's waterways. The National Pollutant Discharge Elimination System (NPDES) is the primary mechanism for the Federal enforcement of effluent limitations and State water quality standards. According to NPDES regulations, discharges into navigable waters from all point sources of pollution including industrial discharges, the effluent from municipal treatment plants, and large agricultural feed lots must have an NPDES permit to lawfully discharge wastewaters. Industrial discharges to municipal treatment systems are not required to have NPDES permits; however, such dischargers are required to meet certain pretreatment standards as discussed later in this chapter. Although a Federal program, it is the intent of the program that the authority and responsibility be delegated to each State, when the States enact legislation and provide adequate staff to enforce the system.

(1) Penalties for non-compliance. The NPDES permit, in essence, is a contract between a discharger and the government. Substantial penalties for failure to comply with this permit are provided by Federal law. If a discharger violates the terms of a permit or makes illegal discharges without a permit, civil penalties up to \$10,000 per day may be levied by the permitting authority. Negligent violations may be punished by fines up to \$50,000 per day and up to two years in prison.

(2) Permit duration. Permits are issued for periods of up to five years in duration. Holders of NPDES permits must apply for reissuance of the permit at least 180 days before expiration of the current permit. Detailed regulations and procedures regarding the NPDES system have been issued by the U.S. EPA and are listed in Title 40 of the Code of Federal Regulations.

(3) Enforcement of permit. The U.S. EPA can take enforcement action against a discharger who is in violation of his permit if the appropriate State agency fails to do so. The U.S. EPA can also revoke a State's permitting authority if the program is not administered in compliance with federal requirements.

b. Permitting of Federal facilities. The FWPCA requires that all U.S. Government agencies comply with Federal, State, interstate, and local water pollution control laws and regulations. This compliance will be in the same manner and to the same extent as any non-governmental entity. As such, Federal installations discharging pollutants into water bodies are covered by the NPDES permit system and, therefore, may be permitted by the U.S. EPA and/or the State in which the facility is located. Compliance with any interstate or local water pollution regulations is required, if these regulations are different from Federal or State regulations. The compliance of federal facilities was further amplified by Executive Order 12088, Federal Compliance with Pollution Control Standards, whereby each executive agency is required to obey pollution control laws and regulations.

(1) Exemptions. The Act gives the President the authority to exempt any Federal effluent source from compliance if it is in the national interest to do so. However, no exemption may be granted from new source performance standards and effluent standards for toxic pollutants, or from compliance with pretreatment standards for wastes going directly into municipal treatment systems. The President may not grant an exemption because of a lack of funds to bring a Federal facility into compliance unless he has specifically asked Congress for the funds and Congress has

failed to appropriate the money. The Act also requires the President to report annually to Congress all exemptions granted with the reason for each exemption. In addition to exemptions from particular effluent limitations, the President may issue regulations exempting military operations, including weaponry, equipment, aircraft, vessels and vehicle operations from compliance with requirements pertaining to other Federal facilities. This exemption may serve to limit access to the military property by regulatory agencies. Such exemptions may also be granted for military operations due to lack of appropriation of the required funds.

(2) Cooperation with local agencies. Federal facilities, such as U.S. military installations are required to cooperate with local authorities in the development of area-wide wastewater management plans. In developing wastewater treatment facilities, Federal facilities must also consider utilizing innovative treatment processes and techniques. For new treatment works at Federal facilities, the use of innovative treatment processes and techniques must be employed unless the life-cycle cost of the innovative treatment alternative exceeds that of the most cost-effective alternative by 15 percent. The innovative treatment process and techniques shall include but not be limited to methods for materials recycle and reuse and land treatment. The U.S. EPA Administrator may waive this requirement if he determines it is in the public interest to do so.

(3) Foreign facilities. If Federal facilities are located outside the United States, they shall comply with environmental pollution control standards of general applicability in the host country or jurisdiction. In many countries, no appropriated water pollution control regulations exist. In such cases, water quality management principles discussed herein shall be considered as a general guide in establishing treatment requirements.

(4) Federal facilities coordinator. By executive order of the President, the U.S. EPA maintains a national Federal facilities coordinator and staff to work with Federal facilities in the implementation of the Clean Water Act. The coordinator and his staff work in the Office of Program and Management Operations of the U.S. EPA Office of Enforcement in Washington, D.C. In addition, a Federal facilities coordinator is located in each U.S. EPA regional office.

c. Content of a permit. The NPDES permit establishes specific effluent limitations which must be met by the discharger and places on the discharger the obligation to report any cases of non-compliance with these conditions to the per-

mitting authority. The elements included in the permit include the following:

(1) Effluent limitations and monitoring requirements. This section will contain the specific constituents present or suspected to be present in the wastewater, numerical effluent limitations for each constituent, and monitoring required of the discharger. Effluent limitations are usually expressed as a "monthly average" which consists of the average over a 30-day operating period and a "daily maximum" which cannot be exceeded in the monitoring period. Effluent limitations are usually expressed in mass/time units (lb/day or kg/day), although limits for some constituents are expressed in concentration-related units.

(2) Schedule of compliance. If a permit holder cannot be in compliance with the final effluent limitations at the time the permit is issued, a schedule of compliance will be established during which time the permit holder must upgrade his water pollution control facilities.

(3) Monitoring and reporting. Instructions are given for monitoring of the waste discharge, reporting of the monitoring results, retention of records, etc.

(4) Responsibilities. The permit holder is advised of additional responsibilities regarding the right of the regulatory agency to enter the premises from which the waste is discharged, transfer ownership of the facilities, and the availability of reports submitted to the regulatory authority.

(5) Management requirements. Additional conditions regarding permit compliance are enumerated in this section. The permit holder is advised to report any changes in the nature of the discharge or non-compliance with the permit conditions to the applicable regulatory agency. Additional instructions are given regarding bypassing of facilities, modification of the permit, revisions in the permit to insure compliance with toxic pollutant discharges, civil and criminal liability, oil and hazardous substance liability, compliance with State laws, etc.

d. Permit modification suspension or revocation. The NPDES permit may be modified, suspended, or revoked if terms of the permit are violated; if the permit holder made misrepresentations to the permitting authority in obtaining the permit; or if all relevant data regarding the discharge were not disclosed at the time the permit application was made. Due to the detailed nature of permit requirements, legal advice may at times be advisable in determining compliance or non-compliance with stated permit conditions.

e. Applying for a permit. Many States now have obtained the NPDES permitting authority from the U.S. EPA. Therefore, the appropriate State or U.S. EPA regional office must be first contacted in the permit application process. The basic procedure which must be followed for issuance of a permit is as follows:

(1) The applicant must obtain and complete an NPDES Application for Permit to Discharge. Completed application forms should be filed with the appropriate U.S. EPA Regional Office.

(2) After receiving the permit application, the U.S. EPA Regional Office and/or State agency will evaluate the form, request additional information if required, and may inspect the site of the proposed discharge.

(3) The State or U.S. EPA will send a copy of the permit application to other state and/or federal agencies for comments.

(4) A draft permit will be developed which will contain all the provisions proposed by the agency for the final permit.

(5) Public notice is given of the agencies' intention to issue or deny the permit. Following the public notice, a minimum of 30 days is provided to receive comments on the draft permit. Based on comments that are received, a public hearing regarding the proposed permit may be held.

(6) The final permit is issued based on information available in the "administrative record". The administrative record includes the permit application, draft permit, supporting documents, correspondence, and other information which has been received by the agency regarding the proposed permit. This record is open to the public for inspection and copying. For a period of 30 days following issuance of the final permit, interested parties including the permit holder may contest the permit by filing a request for an evidentiary or panel hearing. Uncontested permits become effective 30 days following issuance of the final permit.

4-4. Establishment of Effluent Limitations for NPDES Permits

a. Technology based limitations. Section 301 of the Clean Water Act provides for the establishment of technology-based effluent limitations. Each industrial point source category listed in table 4-1 is to have effluent limitation guidelines established which set forth the degree of reduction of applicable pollutants that is attainable through the application of various levels of treatment technology. Many of the primary industries plus other categories at present have limitations

promulgated. U.S. EPA permit writers are instructed to use “engineering judgment” in establishing similar effluent limitations for those industrial categories which have no guidelines established. For municipal dischargers, U.S. EPA has established a definition of “secondary treatment” which essentially defines a level of technology which must be applied for the treatment of these wastewaters. These effluent limitations establish a minimum level of treatment acceptable for direct discharge to waterways.

Table 4-1. NPDES primary industry categories*

Adhesives and Sealants
 Aluminum Forming
 Auto and Other Laundries
 Battery Manufacturing
 Coal Mining
 Coil Coating
 Copper Forming
 Electrical and Electronic Components
 Electroplating
 Explosives Manufacturing
 Foundries
 Gum and Wood Chemicals
 Inorganic Chemicals Manufacturing
 Iron and Steel Manufacturing
 Leather Tanning and Finishing
 Mechanical Products Manufacturing
 Nonferrous Metals Manufacturing
 Ore Mining
 Organic Chemicals Manufacturing
 Paint and Ink Formulation
 Pesticides
 Petroleum Refining
 Pharmaceutical Preparations
 Photographic Equipment and Supplies
 Plastics Processing
 Plastic and Synthetic Materials Manufacturing
 Porcelain Enameling
 Printing and Publishing
 Pulp and Paper Mills
 Rubber Processing
 Soap and Detergent Manufacturing
 Steam Electric Power Plants
 Textile Mills
 Timber Products Processing

*Effluent guidelines have been and will be established for categories in addition to the primary industries.

Source: “NPDES Permits Regulations”, 40 CFR Part 122, Appendix A.

b. Water quality limitations. In addition to meeting the minimum level of treatment established by the technology-based effluent limitations, all discharges must, according to Section 302 of the Act, be of sufficient quality to provide for the attainment or maintenance of stream water quality to protect downstream uses as established by the State regulatory agency. Portions of streams which have insufficient assimilative capacity to accept a waste discharge treated to the level required by the technology-based

effluent limitation are referred to as “water quality limited segments” and the effluent limitations determined for these discharges are referred to as water quality-based limitations.

c. Technology-based limitations for industry. The 1972 amendments to the Clean Water Act specified that industries must employ “best practicable control technology currently available” (BPCTCA or BPT) as a minimum level of treatment no later than July 1, 1977 and that wastes must be treated using “best available technology economically achievable” (BATEA or BAT) by July 1, 1984. The 1977 amendments to the Act substantially revised requirements for achieving treatment levels in excess of BPT. As of the time of this document publication, two bills were under consideration in Congress (HR 3282, Water Quality Renewal Act and S 431, Clean Water Act amendments) to reauthorize the Clean Water Act. The levels of treatment required according to the technology-based standards for industries and the dates by which these levels of treatment will be required are summarized below.

(1) Best practicable technology was required of all industries by July 1, 1977. U.S. EPA has defined BPT as “the average of the best existing performance by well-operated plants within each industrial category or sub-category”. BPT emphasizes end-of-pipe treatment technologies, but can also include alternative in-plant modifications to reduce pollutant discharges. In determining BPT requirements, U.S. EPA was instructed to strike a balance between the total cost of treatment and the benefits of effluent reductions achieved.

(a) BPT as well as BAT regulations set effluent limitations for total toxic organics (TTO) which is defined by the regulations as the summation of all values greater than 0.01 mg/L of the toxic organics listed in table 4-2. The regulations indicate that the control authority (State or Federal) may eliminate monitoring for TTO upon certification of the discharge that concentrated toxic organics have not been dumped into the wastewater and that a solvent management plan is followed. However, to eliminate monitoring requirements, the discharger must submit a solvent management plan that specifies the toxic organic compounds used, the method of disposal used instead of dumping and the procedures employed to prevent discharge into the wastewater. If monitoring is required it would be limited to the specific compounds likely to be present.

(b) At the time this manual was written, BPT Standards were available for the following point-source discharge categories of concern.

Table 4-2. Toxic organics

Acenaphthene	2,4-dichlorophenol
Acrolein	1,2-dichloropropane (1,3-dichloro- propene)
Acrylonitrile	2,4-dimethylphenol
Benzene	2,4-dinitrotoluene
Benzidine	2,6-dinitrotoluene
Carbon tetrachloride (tetra- chloromethane)	1,2-diphenylhydrazine
Chlorobenzene	Ethylbenzene
1,2,4-trichlorobenzene	Fluoranthene
Hexachlorobenzene	4-chlorophenyl phenyl ether
1,2-dichloroethane	4-bromophenyl phenyl ether
1,1,1-trichloroethane	Bis(2-chloroisopropyl)ether
Hexachloroethane	Bis(2-chloroethoxy) methane
1,1-dichloroethane	Methylene chloride (Dichloro- methane)
1,1,2-trichloroethane	Methyl chloride (Chloromethane)
1,1,2,2-tetrachloroethane	Methyl bromide (bromomethane)
Chloroethane	Bromoform (tribromomethane)
Bis(2-chloroethyl) ether	Dichlorobromomethane
2-chloroethyl vinyl ether (mixed)	Chlorobromomethane
3-chloronaphthalene	Hexachlorobutadiene
2,4,6-trichlorophenol	Hexachlorocyclopentadiene
Parachlorometacresol	Isophorone
Chloroform (trichloromethane)	Naphthalene
2-chlorophenol	Nitrobenzene
1,2-dichlorobenzene	2-nitrophenol
1,3-dichlorobenzene	4-nitrophenol
1,4-dichlorobenzene	2,4-dinitrophenol
N-nitrosodi-n-propylamine	4,6-dinitro-o-cresol
Pentachlorophenol	N-nitrosodimethylamine
Phenol	N-nitrosodimethylamine
Bis(2-ethylhexyl)phthalate	Aldrin
Butylbenzyl phthalate	Dieldrin
Di-n-butyl phthalate	Chlordane (technical mixture and metabolites)
Di-n-octyl phthalate	4,4-DDT
Diethyl phthalate	4,4-DDE (p,p-DDX)
Dimethyl phthalate	4,4-DDD (p,p-TDE)
1,2-benzanthracene	Alpha-endosulfan
(benzo(a)anthracene)	Beta-endosulfan
Benzo(a)anthracene	Endosulfan sulfate
3,4-Benzofluoranthene	Endrin
(benzo(b)fluoranthene)	Endrin aldehyde
11,12-benzofluoranthene	Heptachlor
(benzo(k)fluoranthene)	Heptachlor epoxide (BHC-hexachloro- cyclohexane)
Chrysene	Alpha-BHC
Acenaphthylene	Beta-BHC
Anthracene	Gamma-BHC
1,12-benzoperylene (Benzo(ghi) perylene)	Delta-BHC
Fluorene	(PCB-polychlorinated biphenyls)
1,2,5,6-dibenzanthracene	PCB-1242 (Arochlor 1242)
(dibenzo(a,h)anthracene)	PCB-1254 (Arochlor 1254)
Indeno(1,2,3-cd)pyrene (2,3-o- phenylene pyrene)	PCB-1221 (Arochlor 1221)
Pyrene	PCB-1232 (Arochlor 1232)
Tetrachloroethylene	PCB-1248 (Arochlor 1248)
Toluene	PCB-1260 (Arochlor 1260)
Trichloroethylene	PCB-1015 (Arochlor 1016)
Vinyl chloride (chloroethylene)	Toxaphene
3,3-dichlorobenzidine	2,3,7,8-tetrachlorodibenzo- p-dioxin(T)DD
1,1-dichloroethylene	
1,2-trans-dichloroethylene	

- Hospitals (40 CFR Part 460).
- Metal finishing (40 CFR Part 433).
- Explosives manufacturing (40 CFR Part 457).
- Photographic processing (40 CFR Part 459).

The existing regulations are summarized in table 4-3.

(c) Laundries have been exempted by the U.S. EPA from both BPT, and BAT guidelines and no national standards will be forthcoming. However, in the absence of categorical standards U.S. EPA expects to provide a guidance document.

(2) Best conventional pollutant control technology (BCT) was to be required of all industries by July 1, 1984. BCT will include levels of treatment for "conventional pollutants," usually in excess of the BPT requirements. Conventional pollutants include BOD, total suspended solids, fecal coliforms, pH, and oil and grease. The proposed Water Quality Renewal Act would change this deadline to July 1, 1987.

(3) Industries were to provide BAT treatment for the control of "toxic pollutants" no later than July 1, 1984. The list of toxic pollutants is presented in table 4-4. For these substances U.S. EPA must promulgate effluent limitations consistent with best available treatment technology. In the future, U.S. EPA may add to or delete from this list. Information relating to such additions is published in the Federal Register. In January, 1980 U.S. EPA made a proposal to add ammonia to this list. At the time this manual was written, no final decision had been made regarding the status of ammonia as a toxic pollutant. Best available technology has been defined as the highest degree of technology and treatment measures capable of being designed for plant-scale operation. BAT requirements may be developed around in-plant process changes to achieve specified effluent limitations in addition to end-of-pipe treatment.

(a) BAT Standards for hospitals had been reserved with U.S. EPA concentrating resources on more significant categories of industrial discharge with no activity foreseen in the near future.

(b) Explosives manufacturing and photographic processing have been exempted from BAT Regulations, with U.S. EPA preferring not to publish national guidelines. Such facilities or operations will be regulated on a site specific case-by-case basis. However, in the absence of categorical standards, U.S. EPA does expect to publish guidance documents for these industries.

(c) BAT Standards for the metal finishing point source category (40 CFR Part 433) are given in table 4-5. The regulations are inclusive of electroplating operations addressed separately under 40 CFR Part 413 which deals only with pretreatment standards.

(4) Compliance with BAT limitations for "non-conventional pollutants" must be accomplished within three years of promulgation, but no later than July, 1987. Non-conventional pollutants are defined as all other pollutants which are not specifically identified as conventional or toxic.

(5) New industrial facilities classified as "new sources" must meet New Source Performance Standards (NSPS) from the time the facility is placed into operation. NSPS limitations are based upon "best available demonstrated technology" (BADT). A "new source" for regulatory purposes is defined as an industrial category for which new source performance standards were issued prior to the initiation of construction of the facility. These limitations apply to grass roots facilities, significant modifications to existing facilities, and additions of new facilities at existing plant sites which function independently of an existing plant.

d. Best management practices. The 1977 amendments authorized the U.S. EPA to require best management practices (BMP) of industries to control discharges of toxic or hazardous wastes from ancillary industrial activities. U.S. EPA may prescribe regulations to control plant site runoff, leaks and spills, sludge and waste disposal practices, and drainage from raw material storage areas which are associated with industrial manufacturing or treatment operations. BMP regulations were proposed in August, 1978 and final regulations were promulgated as Subpart K of the final NPDES regulations. However, implementation of these regulations has been delayed due to a court challenge. U.S. EPA has prepared a BMP guidance document to assist in the preparation of BMP requirements for NPDES permits. As of the writing of this manual, U.S. EPA intends to withdraw the BMP regulations.

e. Secondary treatment standards for municipal dischargers. Municipal dischargers were required to achieve secondary treatment levels by July 1, 1977. U.S. EPA has defined secondary treatment as shown in table 4-6. Exceptions to these requirements may be granted for facilities which discharge to the ocean. All municipal treatment facilities were to meet best practicable treatment technology by July 1, 1983. At the time this manual was written, U.S. EPA had not defined applicable BPT requirements for municipal treatment systems.

Table 4-3. Existing BPT effluent guidelines for point sources

Point Source Discharge	Regulation	Effluent Characteristic	Limitation			
			Daily Maximum		30 Consecutive Day Average	
			Metric Units	English Units	Metric Units	English Units
Metal Finishing	40 CFR 433	Cd(T) ^a	0.69		0.26	
		Cr(T)	2.77		1.71	
		Cu(T)	3.38		2.07	
		Pb(T)	0.69		0.43	
		Ni(T)	3.98		2.38	
		Ag(T)	0.43		0.24	
		Zn(T)	2.61		1.48	
		CN(T) ^b	1.20		0.65	
		TTO ^b	2.13		--	
		Oil & Grease	42		26	
		TSS	60		31	
		pH	6.0-9.0		6.0-9.0	
Units - mg/L except pH						
^a (T) - Total						
^b (T) - Total Toxic Organics						
<hr/>						
Explosives Manufacturing Plants	40 CFR Part 457	COD	7.77	7.77	2.59	2.59
		BOD ₅	0.72	0.72	0.24	0.24
		TSS ₅	0.25	0.25	0.084	0.084
		pH	6.0-9.0	6.0-9.0	--	--
Load, Assemble, Pack Plants		Oil & Grease	0.11	0.11	0.035	0.035
		TSS	0.26	0.26	0.088	0.088
		pH	6.0-9.0	6.0-9.0	--	--
Metric Units = Kilograms/1,000 kg of product						
English Units = Pounds/1,000 lb of product						
<hr/>						
Photographic Processing	50 CFR Part 459	Ag	0.14	0.030	0.07	0.015
		CN	0.18	0.038	0.09	0.019
		pH	6.0-9.0	6.0-9.0	--	--
Regulations do not apply to facilities processing 1,600 sq ft of film/day or less						
Metric Units = kg/1,000 sq m of product						
English Units = lb/1,000 sq ft of product						
<hr/>						
Hospitals	40 CFR Part 460	BOD ₅	41.0	90.4	33.6	74.0
		TSS ₅	55.6	122.4	33.8	74.5
		pH	6.0-9.0	6.0-9.0	--	--
Metric Units = Kilograms/1,000 occupied beds						
English Units = Pounds/1,000 occupied beds						

Table 4-5. BPT and BAT standards for metals finishing (mg/L)

Parameter	BPT		BAT	
	Daily Maximum	30 Day Average	Daily Maximum	30 Day Average
Cadmium (T) ^a	0.69	0.26	0.69	0.26
Chromium (T)	2.77	1.71	2.77	1.71
Copper (T)	3.38	2.07	3.38	2.07
Lead (T)	0.69	0.43	0.69	0.43
Nickel (T)	3.98	2.38	3.96	2.38
Silver (T)	0.43	0.24	0.43	0.24
Zinc (T)	2.61	1.48	2.61	1.48
Cyanide (T)	1.20	0.65	1.20	0.65 ^c
TTO ^b	2.13		2.13	--
Oil and Grease	52	26	--	--
TSS	60	31	--	--
pH				
Cyanide (A) ^d	0.86	0.32	0.86	0.32

All values in mg/L except pH.

^a(T) = Total

^bTTO = Total Toxic Organics, which is the summation of all value greater than 0.1 mg/L for toxic organics.

^cWithin 6.0 to 9.0 standard units.

^dA means amenable to alkaline chlorination. This value is an alternative cyanide value for industrial facilities with cyanide treatment.

Source: 40 CFR Part 433.

Table 4-6. U.S. EPA secondary treatment standards for municipal dischargers

Parameter	Effluent Concentration		Minimum Removal (%)
	Monthly Average	Weekly Average	
BOD (mg/L)	30	45	85
TSS (mg/L)	30	45	85
Fecal Coliforms (organisms/100 mL)	200	400	—
pH	Value must be between 6.0 and 9.0 at all times.		

f. Water quality determined effluent limitations. The Clean Water Act contains specific provisions for the establishment of effluent limitations more stringent than technology-based guidelines where necessary for the maintenance of water quality standards in a stream. The Act also required the attainment of “fishable-swimmable” water quality

across the nation by 1985. Treatment facilities located either in areas where the number and quantity of discharges is large compared to the flow in the stream or along waterways where very stringent quality standards have been established may be required to provide a level of treatment considerably higher than that required by technology-based standards or by the U.S. EPA secondary treatment criteria. Present criteria for the establishment of these water quality determined effluent limitations are contained in *Quality Criteria for Water*. Typically, establishment of water quality determined limitations requires mathematical modeling of the stream to establish the allowable discharge at low flow conditions. Water quality modeling is not an exact science and significant room for negotiation usually ex-

ists in establishing effluent limitations which are compatible with the required stream water quality.

4-5. Pretreatment of industrial wastes discharged to municipal treatment systems

a. Pretreatment programs. The Clean Water Act authorizes the U.S. EPA to establish pretreatment standards for industries discharging wastewaters to municipal treatment systems. Municipalities receiving industrial wastes must develop local pretreatment programs which are described in the U.S. EPA pretreatment regulations.

(1) Photographic processing, explosives manufacturing, laundries, and hospitals. Photographic processing, explosives manufacturing, and laundries having been exempted from BAT Standards were also exempted from national guidelines for pretreatment standards. In addition, no pretreat-

ment standards are expected for hospitals. The U.S. EPA expects that these standards will be set by state and local requirements.

(2) Electroplating and metal finishing. Pretreatment standards for electroplating (40 CFR Part 413) and metal finishing (40 CFR Part 433) are in effect and include regulation of TTO as discussed above. The standards applicable to electroplating are presented in tables 4-7 and 4-8. The regulations indicate that after October 12, 1982, no user introducing wastewater to a POTW may change the use of process wastewater or dilute the wastewater as a partial or total substitute for adequate treatment to achieve compliance with the standard. The pretreatment standards for metal finishing are summarized in table 4-9. These standards cover both existing and new sources. Note that the only difference between the existing and new source category is the stricter limitation proposed for cadmium.

Table 4-7. Pretreatment standards for electroplating point source category, existing sources, all subcategories, discharge of 10,000 gpd or less

Parameter	Basic Standard (mg/L)		
	Daily Maximum	4 Day Average	30 Day ^a Average
CN, A ^b	500	2.7	1.5
Pb	0.6	0.4	0.3
Cd	1.2	0.7	0.5
TTO ^c	4.57		

Applicable only with consent of the controlling authority, in the absence of strong chelating agents, after reduction of hexavalent chrome, and after neutralization using calcium oxide or hydroxide.

applicable to discharges combined with regulated discharges that have 30-day average standards.

^bCN, A = Cyanide Amendable to Chlorination

^cTTO = Total Toxic Organics, standards reported are proposed.

Source: 40 CFR Part 413

Table 4-8. Pretreatment standards for electroplating point source category, existing sources, all subcategories, discharges of 10,000 gpd or more

Parameter	Basic Standard (mg/L)			Mass Based Standard (mg/sq m - operation)			Optional Standard ^a (mg/L)		
	Daily Maximum	4 Day Average	30 Day Average	Daily Maximum	4 Day Average	30 Day Average	Daily Maximum	4 Day Average	30 Day Average
CN, T ^c	1.9	1.0	0.55	74	39	21	1.9	1*0	0.55
Pb	0.6	0.4	0.3	23	16	12	0.6	0.4	0.3
Cd	1.2	0.7	0.5	47	29	20	1.2	0*7	0.5
Cu	4.5	2.7	1.8	176	105	70			
Ni	4.1	2.6	1.8	160	100	70			
Cr	7.0	4.0	2.5	273	156	98			
Zn	4.2	2.6	1.8	164	102	70			
Ag ^d	1.2	0.7	0.5	47	29	20			
Total Metals ^e	10.5	6.8	5	410	267	195			
pH								7.5-10.0	
TTO ^f	2.13						2.13		
TSS							20.0	13.4	10

applicable only with consent of the controlling authority, in the absence of strong chelating agents, after reduction of hexavalent chrome and after neutralization using calcium oxide or hydroxide.

^bApplicable to discharges combined with regulated discharges that have 30-day average standards.

^cCN, T = Total Cyanide

^dApplicable to precious metals subcategory only.

^eTotal Metals = Sum of the concentration or mass of Cu, Ni, Cr(T) and Zn.

^fTTO = Total Toxic Organics, standards reported are proposed.

Source: 40 CFR Part 413

Table 4-9. Pretreatment standards metal finishing

Parameter	Existing Sources (mg/L)		New Sources (mg/L)	
	Daily Maximum	30 Day Average	Daily Maximum	30 Day Average
Cd (T) ^a	0.69	0.26	0.11	0.07
Cr (T)	2.77	1.71	2.77	1.71
Cu (T)	3.38	2.07	3.38	2.07
Pb (T)	0.69	0.43	0.69	0.43
Ni (T)	3.98	2.38	3.98	2.38
Ag (T)	0.43	0.24	0.43	0.24
Zn (T)	2.61	1.48	2.61	1.48
CN (T)	1.20	0.65	1.20	0.65
TTO (T) ^b	2.13	--	2.13	
CN, A ^c	0.86	0.32	0.86	0.32

a(T) Means total

^bTTO = Total Toxic Organics

^cCN, A means amenable to alkaline chlorination. This limit may apply in place of Cyanide (T) for industrial facilities with cyanide treatment.

Source: 40 CFR Part 433

b. Non-compliance pollutants. The U.S. EPA regulations prohibit or control certain discharges to municipal systems. Prohibited industrial discharges which apply to all industrial users of publicly owned treatment works (POTW's) are listed in table 4-10. Categorical standards are being developed by U.S. EPA and will specify maximum quantities of non-compatible pollutants which can be discharged to municipal systems. These limitations will be equal to or greater than best available treatment limitations for specified substances. Incompatible pollutants are defined as those substances which will require pretreatment to prevent interference with the operation of the POTW, contamination of sludge, or objectionable pass-through of the substance to a receiving stream or to the atmosphere. Exceptions to categorical pretreatment standards may be

granted under certain conditions if the POTW has the capacity to handle adequately the non-compatible pollutant. The U.S. EPA has been directed to prepare categorical standards for industries which are listed in table 4-11.

Table 4-10. Prohibited industrial discharges to publicly owned treatment works (POTW'S)

1. Pollutants that create a fire or explosion hazard, such as fuels, solvents, etc.
2. Pollutants that cause corrosive structural damage, such as acids, bases, solvents, etc.
3. Any discharge with a pH less than 5 unless the POTW is specifically designed for same.
4. Pollutants in amounts that create obstructions to flow in rivers or to the operation of the POTW.
5. Any pollutant discharged in an amount or strength that interferes with the POTW.
6. Heat in an amount that interferes with the POTW.
7. Heat which causes the influent temperature to rise above 40°C.

Table 4-11. Industries for which initial categorical pretreatment standards are being written

Auto and Other Laundries*
Coal Mining
Inorganic Chemicals*
Iron and Steel*
Leather Tanning and Finishing*
Machinery and Mechanical Products
 Battery Manufacturing*
 Plastics Processing
 Foundries*
 Coil Coating
 Porcelain Enameling
 Aluminum Forming
 Copper Products
 Electric & Electronic*
 Ship Building Metal Fabrication
 Electroplating*
Miscellaneous Chemical Mfg.
 Pesticide Manufacturing
 Photographic Products
 Gum and Wood Chemicals*
 Pharmaceutical
 Explosives*
 Adhesives and Sealants
 Carbon Black
Nonferrous Metals*
Ore Mining and Dressing
Organic Chemicals
Paint and Ink Formulation and Printing*
Paving and Roofing Materials*
Petroleum Refining
Plastic and Synthetic Materials
Printing and Publishing
Pulp & Paper Products*
Rubber Processing*
Soap and Detergents
Steam Electric Power Plants
Textile Mills*
Timber Products*

*Certain subcategories of industrial categories are exempt from regulation pursuant to paragraph 8 of the NRDC v. Costle consent decree.