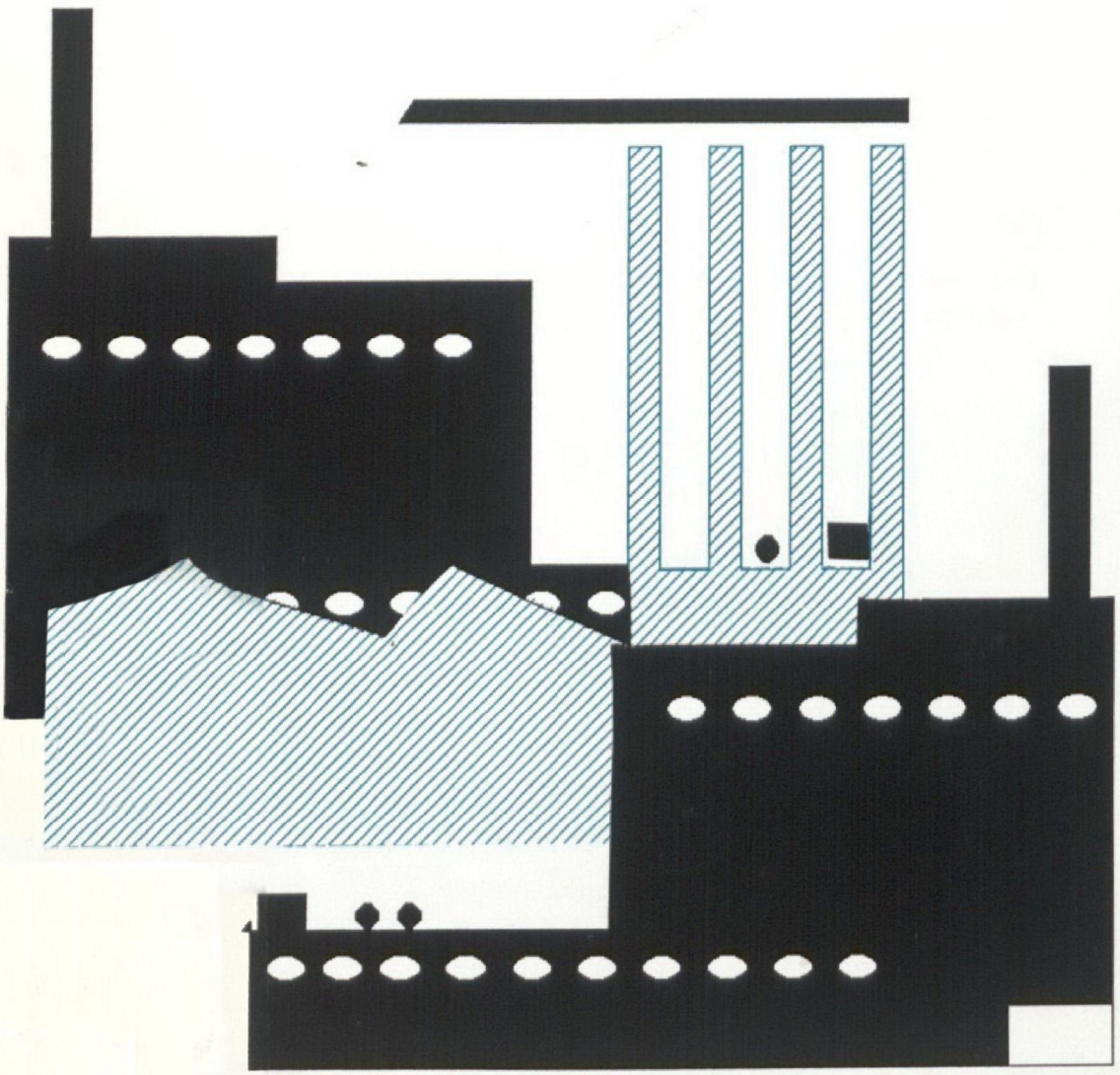
EPA

OFFICE OF WATER
INDUSTRIAL TECHNOLOGY DIVISION

CHALLENGING OPPORTUNITIES IN WATER POLLUTION CONTROL



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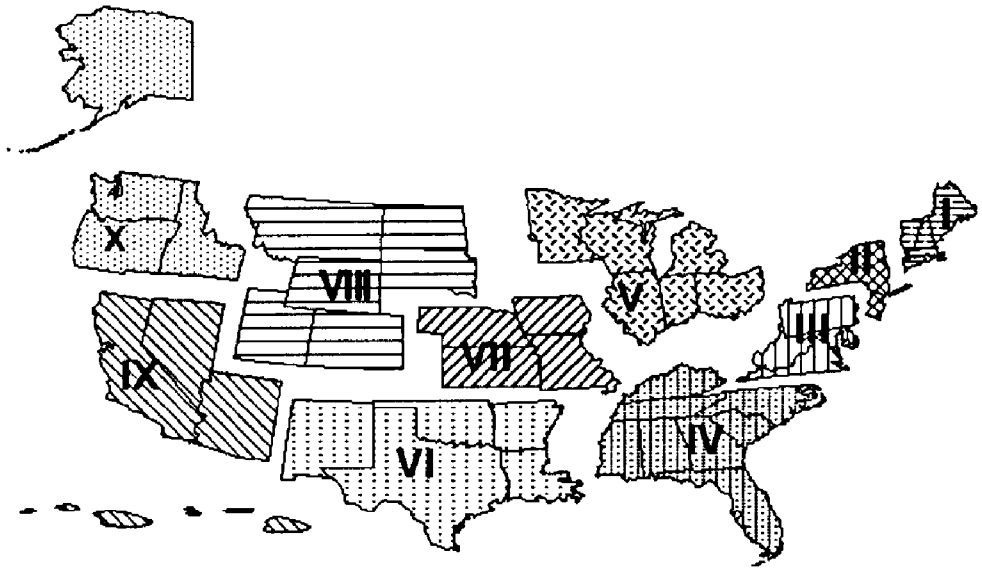


Since the beginning of this country, wastes from the nation's industry and other activities were dumped primarily into the country's waterways. It was thought that these wastes would eventually decompose and disappear harmlessly and the water would purify itself. It became clear as the country grew and industry and sewer discharge increased, the waters' ability to cleanse itself was being overtaxed.

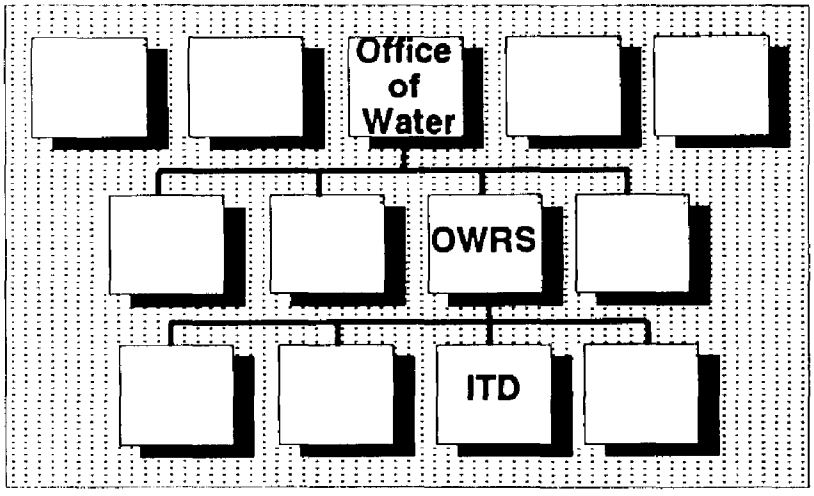
In the 1800s and early 1900s, the problem was addressed through various legislative initiatives, such as the Rivers and Harbors Act, the Public Health Service Act, the Oil Pollution Control Act, the Water Pollution Control Act, the Water Quality Act of 1965, and the Clean Water Restoration Act of 1966. These attempts at regulating the pollution problem often were ineffective since water control requirements were established by the states and were based primarily on waterbody uses, such as drinking, swimming, fishing, and navigation.

In 1972, the U.S. Congress passed the Federal Water Pollution Control Act that established clearly that pollution of the nation's waterways by either industry or municipalities was unlawful. The act also created a system of uniform control for discharge of pollutants.

Also early in the 1970s, the Federal government established the Environmental Protection Agency to control toxic pollutants, regulate industrial discharges, develop effluent guidelines, and develop technical data. EPA was organized into a headquarters group with five offices and 10 regional offices to carry out its assignment.

ITD'S ROLE IN EPA

Within the Environmental Protection Agency, the Office of Water is responsible for developing effluent guidelines and standards for industrial dischargers. This task is delegated to the Industrial Technology Division (ITD) of the Office of Water Regulations and Standards. ITD develops uniform technology-based effluent limitations for industrial facilities discharging directly into the nation's waters and for those who discharge into municipal treatment facilities. The overall objective is to eliminate pollutant discharges by establishing uniform national technology-based regulations.

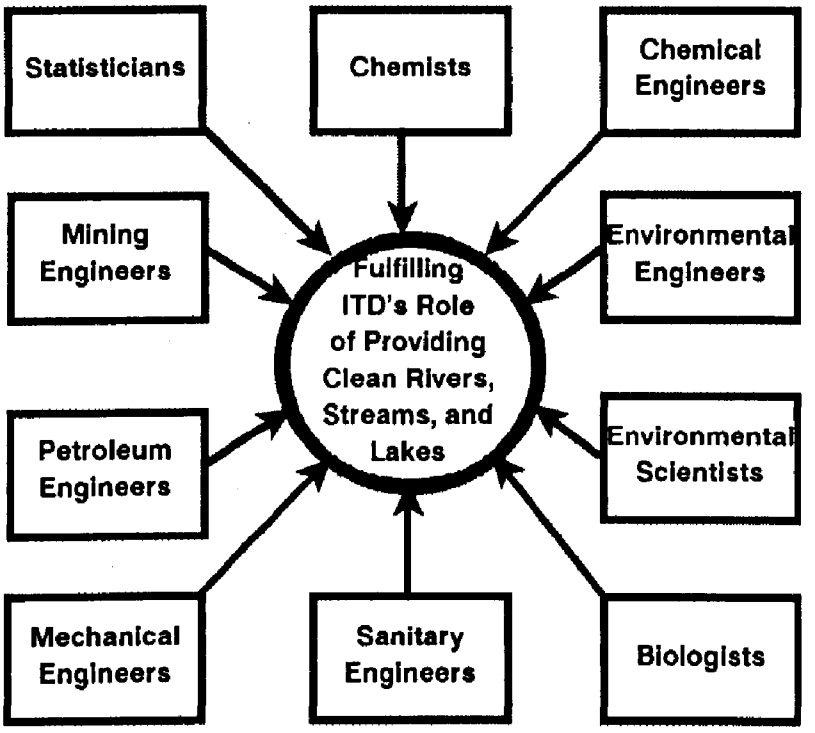


EPA Organizational Structure, Showing Office of Water, OWRS, and ITD

Over the past 15 years, regulations for 50 industrial categories have been passed and 15 additional studies are in progress. These guidelines are technology based, that is, they are established to achieve effluent pollutant reduction attainable by waste treatment technologies actually employed within an industrial category.

AN IN-DEPTH VIEW OF ITD

ITD is a group of chemical engineers, chemists, and environmental engineers dedicated to the task of developing industrial water pollution control regulations that will enhance the quality of the nation's surface waters. This division is



Many Disciplines are Involved in ITD's Mission

composed of some of the best technical experts in the field who have had a profound influence on the public policy of the United States concerning the environment. The public interest is served here through technical excellence, and the work is being accomplished by a dedicated cadre who take into consideration the nations environmental and economic concerns in establishing water pollution control regulations.

ITD utilizes the Project Management concept. Major projects are handled by a project team headed by a project manager who coordinates all aspects of the project.

As required by the Clean Water Act, effluent guidelines must incorporate a number of features to assure the equity as well as the enforcea-

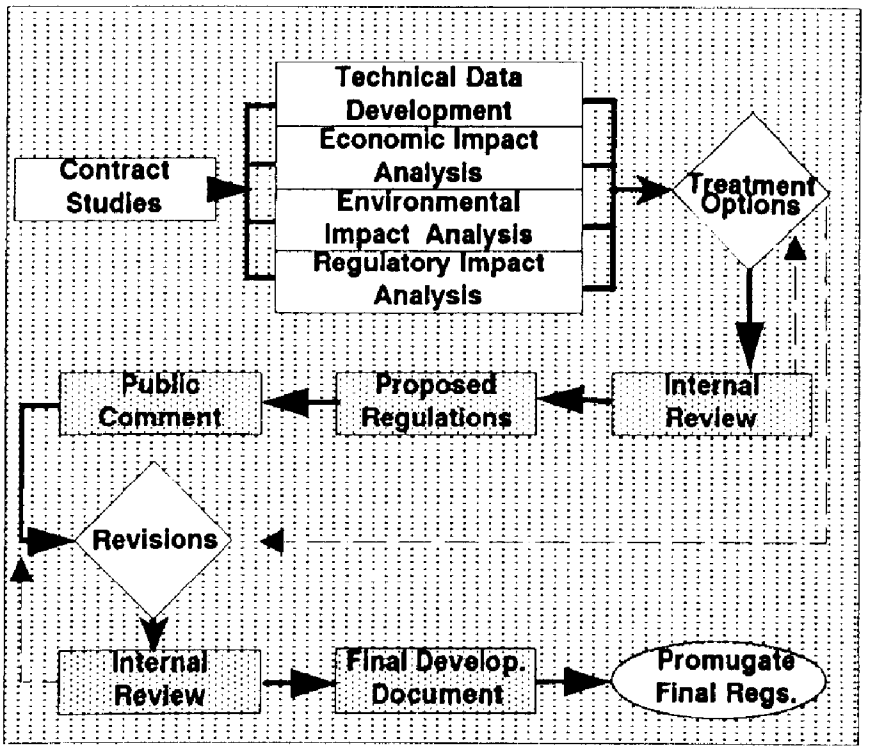
EPA Employs the Project Manager Concept with All Task Responsibility Resting with the Project Team

bility of the regulations. Many of these features are common to engineering feasibility studies in general; however, other features, such as the opportunity for public comment and the specific internal review procedures by EPA are unique to the guideline promulgation process.

EFFLUENT GUIDELINE PROCESS

Developing effluent guidelines and standards is a process that is complex and professionally challenging. Activities include engineering, chemical and economic impact studies as well as environmental impact studies.

ITD develops a detailed profile of the industry; i.e., processes that generate waste and amounts and types of pollutants discharged.



Guidelines and Standards Development Process

Pollutants of concern and technologies for treating them or process modifications to reduce or eliminate them are then selected. A determination to subcategorize or not is made so that guidelines and standards apply to all industrial processes within that industry. Full consideration is given to recycle, reuse, and waste prevention.

The Clean Water Act requires consideration of costs and the economic effects of the regulation upon the affected parties. ITD prepares an estimate of the total investment and operation and maintenance costs of complying with each technology option. In some analyses these cost estimates are provided on a model plant basis, where the models may be defined by production process, volume, size, etc. In other cases, cost estimates are based upon upgrading existing treatment on a plant-by-plant basis using a typical plant in a category or subcategory to be regulated. The cost data are input to an economic impact analysis that determines achievability of each treatment option. This analysis is conducted by the economic staff at OWRS.

EVALUATE OPTIONS

ITD Provides Rulemaking for National Environmental Regulations

Once the treatment options are identified from a technical standpoint, another important step is to evaluate economics and to select a technology as the basis of the guideline. This technology must take into consideration the selection of individual pollutant parameters for regulations.

This selection process involves a thorough analysis of literature and collected industry data, plus detailed sampling, screening, and verification programs, e.g., analyzing raw and treated wastewater streams from several operations. The analyses determine which pollutant is present, the control technologies available, and where the most effective removal can take place, in the plant or at the end of the pipe.

There are three groups of industrial pollutants for which effluent limitations, standards, and guidelines are established: conventional, toxic, and nonconventional. Conventional are the most familiar group and include biochemical oxygen demand, suspended solids, fecal coliforms, pH, and oil and grease. Toxic pollutants include 65 priority pollutants and classes of pollutants considered to be toxic. This classification has been further refined to a list of 126 specific toxic pollutants. Nonconventional pollutants include any pollutant not identified as either conventional or "toxic". (In practice this classification adds up to hundreds of pollutants.)

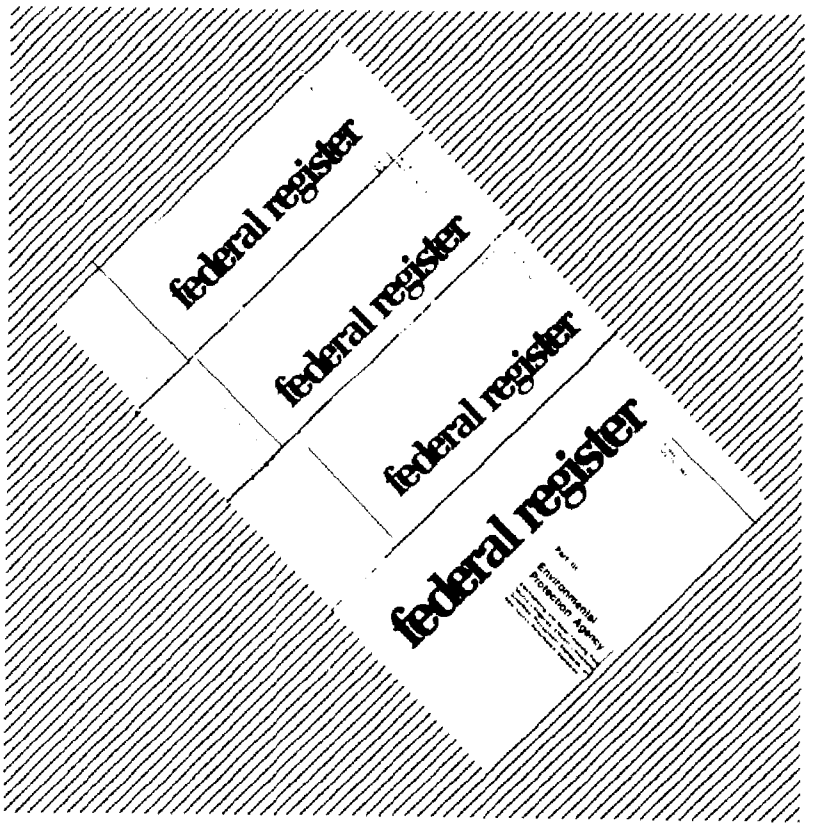
CONCEPTUAL BASIS FOR LIMITATIONS

The effluent guideline generally limits the mass of each individual pollutant that can be discharged per unit of production at an industrial facility. The production-based and concentration-based concepts have been further used to prevent the dilution of wastewater streams in order to meet concentration limits and also as a means of encouraging water reduction and recycling.

ITD creates a Database for Industrial Pollution Control

ITD also determines the numerical limits of the guidelines using the treatability data for the selected technology. Only after these steps are completed does ITD propose the guideline and standard and the process is opened up to the public for comment. After all issues are resolved, the guidelines and standards are published in the *Federal Register.*

All Promulgated Effluent Guidelines are Published in the Federal Register



To implement the final effluent limitations and standards, each direct discharger is required to obtain a National Pollutant Discharge Elimination System permit. This NPDES permit translates the limitations and standards into requirements for each direct discharger's release of treated wastewater. The pretreatment standards for indirect industrial dischargers are enforced by Publicly Owned Treatment Works(POTW), which also hold NPDES permits.

The scope of ITD's task requires highly trained technical people whose primary interest is improving the quality of the nation's water. That is why ITD focuses on people with technical know-how in its hiring process.

ITD ACCOMPLISHMENTS

Since 1972, ITD has had the lead responsibility with the Office of Water to develop effluent limitations for 50 industries, including pulp and paper, nonferrous metals forming, ore mining, petroleum refining, pharmaceutical, plastics molding, porcelain enameling, steam electric, textiles, timber, organic chemicals and plastics, and iron and steel.

In a little more than 10 years, many of the bodies of water in this country have been revived. A decade ago, science couldn't detect some of these compounds. Today they are being removed at the rate of over 800 million pounds per year.

10 Years of Progress... Cleaning up the Nation's Waters

With its technical expertise, its emphasis on scientific know-how, its ability to develop and implement new technology, ITD provides a valuable service to meet the public's desire to clean up the nation's rivers, streams, lakes and coastal waterways.

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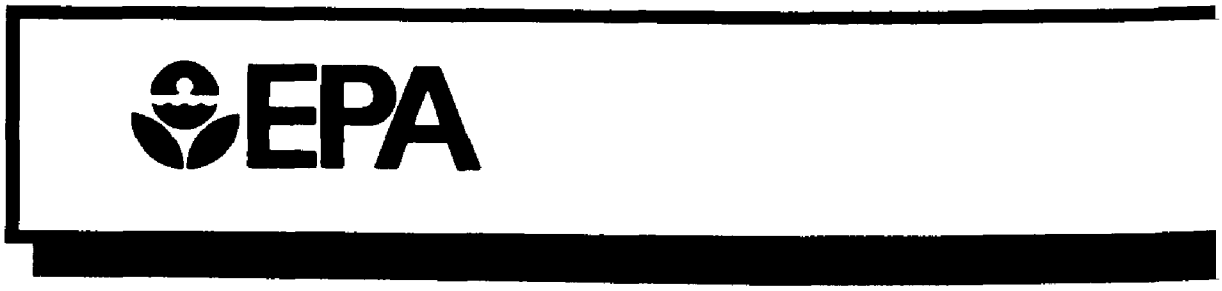
CURRENT AND FUTURE WORK

Impact of 1987 Water Quality Act

The Water Quality Act of 1987 strengthened the Clean Water Act by adding Section 304(m) which requires that the Agency publish plans to revise existing effluent guidelines and promulgate new guidelines for dischargers of toxic and nonconventional pollutants. Building on the existing national effluent guidelines program, a strategy is evolving on how to identify and select potential industrial candidates for study and for regulatory action where necessary.

These new projects will emphasize pollution prevention techniques which rely on reuse and/or recycle of chemicals that would otherwise become wastes. The program has identified 15 industrial categories for which new or revised regulations may be developed in the 1990s including: Hazardous Waste Treatment; Solvent Recycling; Machinery Manufacturing and Rebuilding; Transportation Cleaning; Paint Manufacture and Formulation; Industrial Laundries; Hospitals; Waste Oil Reclamation and Refining; Drum Reconditioners; Oil and Gas (onshore and coastal subcategories); Copper Forming; Timber Products Processing; Textile Manufacturing; Pharmaceutical Manufacturing; and Organic Chemicals, Plastics, and Synthetic Fibers (reserved priority pollutants and nonconventional pollutants).



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