UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
WATER

Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants

STATEMENT OF POLICY

To control pollutants beyond Best Available Technology Economically Achievable (BAT), secondary treatment, and other Clean Water Act technology-based requirements in order to meet water quality standards, the Environmental Protection Agency (EPA) will use an integrated strategy consisting of both biological and chemical methods to address toxic and nonconventional pollutants from industrial and municipal sources. Where State standards contain numerical criteria for toxic pollutants, National Pollutant Discharge Elimination System (NPDES) permits will contain limits as necessary to assure compliance with these standards. In addition to enforcing specific numerical criteria, EPA and the States will use biological techniques and available data on chemical effects to assess toxicity impacts and human health hazards based on the general standard of "no toxic materials in toxic amounts."

EPA, in its oversight role, will work with States to ensure that these techniques are used wherever appropriate. Under section 308 and section 402 of the Clean Water Act (the Act), EPA or the State may require NPDES permit applicants to provide chemical, toxicity, and instream biological data necessary to assure compliance with standards. Data requirements may be determined on a case-by-case basis in consultation with the State and the discharger.

Where violations of water quality standards are identified or projected, the State will be expected to develop water quality-based effluent limits for inclusion in any issued permit. Where necessary, EPA will develop these limits in consultation with the State. Where there is a significant likelihood of toxic effects to biota in the receiving water, EPA and the States may impose permit limits on effluent toxicity and may require an NPDES permittee to conduct a toxicity reduction evaluation. Where toxic effects are present but there is a significant likelihood that compliance with technology-based requirements will sufficiently mitigate the effects,

EPA and the States may require chemical and toxicity testing after installation of treatment and may reopen the permit to incorporate additional limitations if needed to meet water quality standards. (Toxicity data, which are considered "new information" in accordance with 40 CFR 122.62(a)(2), could constitute cause for permit modification where necessary.)

To carry out this policy, EPA Regional Administrators will assure that each Region has the capability to conduct water quality assessments using both biological and chemical methods and provide technical assistance to the States.

BACKGROUND

The Clean Water Act establishes two principal bases for effluent limitations. First, existing dischargers are required to meet technology-based effluent limitations that reflect the best controls available considering economic impacts. New source dischargers must meet the best demonstrated technology-based controls. Second, where necessary, additional requirements are imposed to assure attainment and maintenance of water quality standards established by the States and approved by EPA. In establishing or reviewing NPDES permit limits, EPA must ensure that the limits will result in the attainment of water quality standards and protect designated water uses, including an adequate margin of safety.

For toxic and nonconventional pollutants it may be difficult in some situations to determine attainment or nonattainment of water quality standards and set appropriate limits because of complex chemical interactions which affect the fate and ultimate impact of toxic substances in the receiving water. In many cases, all potentially toxic pollutants cannot be identified by chemical methods. In such situations, it is more feasible to examine the whole effluent toxicity and instream impacts using biological methods rather than attempt to identify all toxic pollutants, determine the effects of each pollutant individually, and then attempt to assess their collective effect.

The scientific basis for using biological techniques has advanced significantly in recent years. There is now a general consensus that an evaluation of effluent toxicity when adequately related to instream conditions, can provide a valid indication of receiving system impacts. This information can be useful in developing regulatory requirements to protect aquatic life, especially when data from toxicity testing are analyzed in conjunction with chemical and ecological data. Generic human health effects methods, such as the Ames mutegenicity test, and structure-activity relationship techniques are showing promise and should be used to identify potential hazards. However, pollutant-specific techniques are the best way to evaluate and control human health hazards at this time.

Biological testing of effluents is an important aspect of the water quality-based approach for controlling toxic pollutants. Effluent toxicity data in conjunction with other data can be used to establish control priorities, assess compliance with State water quality standards, and set permit limitations to achieve those standards.[1] All States have water quality standards which include narrative statements prohibiting the discharge of toxic materials in toxic amounts. A few State standards have criteria more specific than narrative criteria (for example, numerical criteria for specific toxic pollutants or a toxicity criterion to achieve designated uses). In States where numerical criteria are not specified, a judgment by the regulatory authority is required to set quantitative water quality-based limits on chemicals and effluent toxicity to assure compliance with water quality standards.

APPLICATION

This policy applies to EPA and the States. The policy addresses the use of chemical and biological methods for assuring that effluent discharges are regulated in accordance with Federal and State requirements. This policy was prepared, in part, in response to concerns raised by litigants to the Consolidated Permit Regulations (see 47 Federal Register 52079, November 18, 1982). Use of these methods for developing water quality standards and trend monitoring are discussed elsewhere (see 48 Federal Register 51400, November 8, 1983 and Basic Water Monitoring Program EPA-440/9-76-025). This policy is part of EPA's water quality-based control program and does not supercede other regulations, policy, and guidance regarding use attainability, site-specific criteria modification, wasteload allocation, and water quality management.

IMPLEMENTATION

State role

The control of toxic substances to protect water quality must be done in the context of the Federal-State partnership. EPA will work cooperatively with the States in identifying potential water quality standards violations, assembling relevant

---

[1] Section 308 of the Act and corresponding State statutes authorize EPA and the States to require of the owner/operator any information reasonably required to determine permit limits and to determine compliance with standards or permit limits. Biological methods are specifically mentioned. Toxicity permit limits are authorized under Section 301 and 402 and supported by Section 101.

data, developing appropriate testing requirements, determining whether standards are being violated, and defining appropriate permit limits.[2]

Integration of approaches-

The type of testing that is most appropriate for assessing water quality impacts depends on the type of effluent and discharge situation. EPA recommends that an integrated approach, including both biological and chemical techniques, be used to assess and control water quality. The principal advantages of chemical-specific techniques are that (1) chemical analyses are usually less expensive than biological measurements in simple cases; (2) treatment systems are more easily designed to meet chemical requirements than toxicity requirements; and (3) human health hazards and bioaccumulative pollutants can best be addressed at this time by chemical-specific analysis. The principal advantages of biological techniques are that (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analyses; (2) bioavailability of pollutants after discharge is best measured by toxicity testing; and (3) pollutants for which there are inadequate chemical analytical methods or criteria can be addressed.

Pollutant-specific chemical analysis techniques should be used where discharges contain a few, well-quantified pollutants and the interactions and effects of the pollutants are known. In addition, pollutant-specific techniques should be used where health hazards are a concern or bioaccumulation is suspected. Biological techniques should be used where effluents are complex or where the combined effects of multiple discharges are of concern. EPA recognizes that in many cases both types of analysis must be used.

Testing requirements-

Requirements for dischargers to collect information to assess attainment or nonattainment of State water quality standards will be imposed only in selected cases where the potential for nonattainment of water quality standards exists. Where water quality problems are suspected but there is a strong indication that complying with BCT/BAT will sufficiently mitigate the impacts, EPA recommends that applicable permits include testing requirements effective after BCT/BAT compliance and reopener clauses allowing reevaluation of the discharge.

---

[2] Under section 303 and 401 of the Act, States are given primary responsibility for developing water quality standards and limits to meet those standards. EPA's role is to review the State standards and limits and develop revised or additional standards or limits as needed to meet the requirements of the Act.

The chemical, physical, and biological testing to be conducted by individual dischargers should be determined on a case-by-case basis. In making this determination, many factors must be considered, including the degree of impact, the complexity and variability of the discharge, the water body type and hydrology, the potential for human health impact, the amount of existing data, the level of certainty desired in the water quality assessment, other sources of pollutants, and the ecology of the receiving water. The specific data needed to measure the effect that a discharger has on the receiving water will vary according to these and other factors.

An assessment of water quality should, to the extent practicable, include other point and nonpoint sources of pollutants if the sources may be contributing to the impacts. Special attention should be focused on Publicly Owned Treatment Works (POTW's) with a significant contribution of industrial wastewater. Recent studies have indicated that such POTW's are often significant sources of toxic materials. When developing monitoring requirements, interpreting data, and determining limitations, permit engineers should work closely with water quality staff at both the State and Federal levels.

A discharger may be required to provide data upon request under section 308 of the Act, or such a requirement may be included in its NPDES permit. The development of a final assessment may require several iterations of data collection. Where potential problems are identified, EPA or the State may require monitoring to determine whether more information is needed concerning water quality effects.

Use of data-

Chemical, physical, and biological data will be used to determine whether, after compliance with BCT/BAT requirements, there will be violations of State water quality standards resulting from the discharge(s). The narrative prohibition of toxic materials in toxic amounts contained in all State standards is the basis for this determination taking into account the designated use for the receiving water. For example, discharges to waters classified for propagation of cold water fish should be evaluated in relation to acute and chronic effects on cold water organisms, potential spawning areas, and effluent dispersion.

Setting permit limitations-

Where violations of water quality standards exist or are projected, the State and EPA will determine pollution control requirements that will attain the receiving water designated use. Where effluent toxicity is an appropriate control parameter, permit limits on effluent toxicity should be developed. In such cases, EPA may also require a permittee to conduct a toxicity reduction evaluation. A toxicity reduction evaluation is an investigation conducted within a plant or municipal system

to isolate the sources of effluent toxicity, determine specific causative pollutants if possible, and determine the effectiveness of pollution control options in reducing the effluent toxicity. If specific chemicals are identified as the cause of the water quality standards violation, these individual pollutants should be limited. If a toxicity reduction evaluation demonstrates that limiting an indicator parameter will ensure attainment of the water quality-based effluent toxicity requirement, limits on the indicator parameter should be considered in lieu of limits on effluent toxicity. Such indicator limits are not limits on causative pollutants but limits demonstrated to result in a specific toxicity reduction.

Monitoring-

Where pollution control requirements are expressed in terms of a chemical or toxicological parameter, compliance monitoring must include monitoring for that parameter. If an indicator parameter is used based on the results of a toxicity reduction evaluation, periodic toxicity testing may be required to confirm the adequacy of the indicator. Where biological data were used to develop a water quality assessment or where the potential for water quality standards violations exist, biological monitoring (including instream monitoring) may be required to ensure continuing compliance with water quality standards.

EPA believes that the intelligent application of an integrated strategy using both biological and chemical techniques for water quality assessment will facilitate the development of appropriate controls and the attainment of water quality standards. EPA looks forward to working with the States in a spirit of cooperation to further refine these techniques.

February 3, 1984

Date

Jack E. Ravan

Assistant Administrator
for Water