United States General Accounting Office

GAO

Report to the Ranking Minority Member, Committee on Environment and Public Works, U.S. Senate

January 1996

WATER POLLUTION

Differences Among the States in Issuing Permits Limiting the Discharge of Pollutants

GAO/RCED-96-42

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-270462

January 23, 1996

The Honorable Max S. Baucus
Ranking Minority Member
Committee on Environment
and Public Works
United States Senate

Dear Senator Baucus:

The Clean Water Act's National Pollutant Discharge Elimination System (NPDES) program limits the types and amounts of pollutants that industrial and municipal wastewater treatment facilities may discharge into the nation's surface waters. The Environmental Protection Agency (EPA), charged with administering the NPDES program, has issued national guidance and regulations to assist the states in establishing standards to protect the quality of their waters and in issuing permits to facilities to limit discharges of pollutants. Both the act and EPA's regulations give the states and EPA considerable flexibility in implementing the NPDES program.

While the Clean Water Act requires all states to adopt water quality standards, EPA authorizes qualified states to issue NPDES permits. Currently, 40 states have obtained such authority; in the remaining 10 states, the cognizant EPA regional offices issue the permits. In issuing the permits, the states' and EPA's permitting authorities may (1) impose limits on the discharges of specific pollutants, (2) require the facilities to monitor the levels of pollutants they discharge, or (3) determine that no controls are warranted.

As agreed with your office, our objectives in this review were to (1) determine whether differences exist in whether and how the states' and EPA's permitting authorities control pollutants in the discharge permits they issue, (2) identify the causes of any differences, and (3) obtain information on EPA's oversight of the states' water quality standards and policies.

Results in Brief

Controls over the discharge of pollutants into the nation's surface waters differ from state to state. Our analysis of the controls over five toxic metals in 1,407 permits for municipal wastewater treatment facilities showed that in some states, the permitting authorities consistently established numeric limits on the discharges, while in other states, the

authorities consistently required monitoring. In some states, no controls were imposed. In addition, the numeric discharge limits for specific pollutants differed from state to state and even within the same state for facilities of similar capacity. Such differences in the discharge limits, or in the standards and policies used to derive these limits, have caused concern, particularly where neighboring jurisdictions share water bodies and the variations are readily apparent to interested parties.

Differences among the states can be expected because of differences in surface waters across the country[1] and because of flexibility in the implementation of the pollutant discharge program provided for in the Clean Water Act and EPA's regulations. The permitting authorities also differ considerably in the amount and type of data they require to determine whether pollutants have a reasonable potential to violate a state's water quality standards and, if so, how extensively such pollutants need to be controlled. Differences in numeric discharge limits occur because both the water quality standards and the policies for implementing these standards in the permits differ among the states. For example, the states have adopted different implementation policies concerning several technical factors that affect discharge limits, including the size and location of the "mixing zones" where the discharges and the receiving waters mix, the potential for dilution, and the background concentration of the pollutants.

EPA's oversight of the states' water quality standards and implementation policies has some limitations. Some states do not include all of their policies for implementing their water quality standards when they submit the standards for EPA's review. In addition, EPA does not maintain national information on the states' implementation policies and, except for some regional efforts, does not assess the impact of variations among the states. In addition, EPA reviews relatively few permits. However, EPA is considering regulatory changes that could enhance the agency's reviews of the states' implementation policies. In addition, EPA believes that an increasing emphasis on controlling pollution within watersheds will also eventually lead to greater consistency in the permits issued within individual watersheds.

Background

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The

[1]Oceans, rivers, lakes, and streams differ in, among other things, size, flow, temperature, chemical makeup, and the biological life that they support.

Congress established a series of national goals and policies to achieve this objective, including what is referred to as "fishable/swimmable" water quality. That is, whenever attainable, the quality of the water should be such that it provides for the protection of fish, shellfish, wildlife, and recreation in and on the water. To help meet national water quality goals, the act established the NPDES program, which limits the discharge of pollutants through two basic approaches—one based on technology and the other on water quality.

Under the technology-based approach, facilities must stay within the discharge limits attainable under current technologies for treating water pollution. EPA has issued national minimum technology requirements for municipal facilities and 50 categories of industrial dischargers. The states' and EPA's permitting authorities use these requirements to establish discharge limits for specific pollutants.[2] In contrast, under the water-quality-based approach, facilities must meet discharge limits derived from states' water quality standards, which generally consist of (1) "designated uses" for the water bodies (e.g., propagation of fish and wildlife, drinking water, and recreation) and (2) narrative or numeric criteria to protect the designated uses.[3] Narrative criteria are generally statements that describe the desired water quality goal, such as "no toxics in toxic amounts." Numeric criteria for specific pollutants are generally expressed as concentration levels and target certain toxic pollutants that EPA has designated as "priority pollutants."[4]

In addition to adopting water quality standards, the states may also establish policies concerning certain technical factors that affect the implementation of the standards in the discharge permits. For example, many states have adopted policies for (1) establishing mixing zones (limited areas where discharges mix with receiving waters and where the numeric criteria can be exceeded), (2) determining the amount of available dilution (the ratio of the low flow of the receiving waters to the

[2]If technology standards do not exist for a particular industry, the permitting authorities consider other pertinent data and use their "best professional judgment" to establish the discharge limits.

[3]In addition, the states are required to include an "antidegradation" provision in their water quality standards to ensure that in those water bodies where the quality exceeds that required to support the designated use, the quality in general will be maintained at the existing level.

[4]As a result of a 1976 consent decree, EPA was required to publish water quality criteria to protect human health and/or aquatic life for a specified set of pollutants or classes of pollutants by 1979. The Congress later specifically designated these same chemicals as toxic pollutants under section 307(a) of the Clean Water Act, and EPA selected 126 key chemicals or classes within this group for priority status. For other, nonpriority pollutants, the states may choose to adopt either numeric or narrative criteria.

flow of the discharge), and (3) considering background concentration (the levels of pollutants already present in the receiving waters).

When the states' and EPA's permitting authorities are deciding how extensively the pollutants should be controlled in a facility's permit, they first look to the technology-based standards. If the discharge limits derived by applying these standards are not low enough to protect the designated uses of the applicable water body, the permitting authorities turn to the state's water quality standards to develop more stringent limits. To achieve the tighter limits, a facility may have to install more advanced treatment technology or take measures to reduce the amounts of pollutants needing treatment. For additional information on the role of EPA's headquarters and regional offices and the state agencies in establishing standards and implementing them in permits, see appendix I.

As agreed with your office, this report focuses on the water-quality-based approach to controlling pollution and the way the states' and EPA's permitting authorities are implementing water quality standards in the NPDES permits issued to "major" facilities.[5] As of July 1995, approximately 59,000 municipal and industrial facilities nationwide had received permits under the NPDES program, and about 6,800 of these permits were for major facilities, including about 4,000 municipal facilities and 2,800 industrial dischargers.

States' and EPA's Permitting Authorities Vary in Whether and How They Control Pollutants in Discharge Permits

Our review of the data on municipal permits for five commonly discharged toxic pollutants disclosed that decisions about whether and how to control pollutants differed both from state to state and within states. In some instances, differences in the limits themselves, or in the standards and policies used to derive the limits, have led to concerns between neighboring states.

[5]EPA classifies certain facilities as major, usually on the basis of their capacity and/or the type and quantity of pollutants they discharge.

Some Permitting Authorities Impose Discharge Limits, Others Require Monitoring Only, and Some Impose No Controls

Using EPA's Permits Compliance System database, we extracted data on the 1,407 permits issued to municipal wastewater treatment facilities nationwide between February 5, 1993, and March 21, 1995,[6] to determine what types of controls, if any, the states' and EPA's permitting authorities had imposed in these facilities' discharge permits for five toxic metal pollutants—cadmium, copper, lead, mercury, and zinc.[7] We found that when the permitting authorities decided that some type of control was warranted, some consistently established numeric discharge limits in their permits, and others imposed monitoring requirements in all or almost all cases.

For example, North Carolina issued 93 permits during our review period and, whenever it determined that a pollutant warranted controls, it always established numeric discharge limits rather than impose monitoring requirements. Other states, such as New York and West Virginia, also consistently established numeric limits for controlling the five pollutants we examined. In contrast, New Jersey issued 44 permits during our review period and, except for 1 permit that contained a limit for copper, the state always imposed monitoring requirements instead of discharge limits when the state determined that controls were warranted. Oregon, among other states, made similar decisions, as did EPA's Region VI when it wrote permits for Louisiana, a state not authorized to issue NPDES permits.

We also found that some states, such as Vermont and Arkansas, had not imposed discharge limits or monitoring requirements in the following instances in which EPA's regional officials said that such controls may be warranted.

- In Vermont, none of the discharge permits for major municipal facilities contained discharge limits or monitoring requirements for the five metals. However, at our request, the cognizant EPA regional staff (in Region I) reviewed 4 of the 15 municipal permits issued by Vermont and determined that for 2 of the facilities, limits or monitoring requirements would probably be appropriate. Vermont officials agreed to review the permits and consider additional requirements.
- Arkansas, with one exception, had not imposed either limits or monitoring requirements in its municipal permits for the toxic metals we examined.

[6]We chose this time frame because as of February 5, 1993, all of the states had water quality standards for toxic pollutants and were required to use these standards to derive discharge limits for all new permits and permits up for renewal.

[7]We selected these five pollutants for our review because, according to officials in EPA's Permits Division, they are commonly discharged by municipal wastewater treatment facilities and are likely to be found nationwide.

State officials are allowing these facilities to continue operating under "old" permits rather than reissuing them. The officials told us that if the permits were to be formally reopened, the state would be obligated to apply EPA-imposed water quality standards for the metals. Arkansas officials believe that these standards are too stringent and that the facilities would engage the state in a costly appeal process if limits were imposed. Officials from the cognizant EPA regional office (Region VI) said that the Arkansas permits should contain discharge limits but that EPA does not have the authority to impose such limits in a state authorized to issue permits when the state simply declines to reissue them. EPA's only recourse would be to take back responsibility for the program—an unrealistic option.

For facilities, both monitoring requirements and discharge limits can be costly to implement. According to officials in EPA's Permits Division, the costs of monitoring depend on the frequency of required sampling and on the types of pollutants that must be tested. The costs of installing advanced treatment equipment to meet discharge limits are usually much higher. These officials also said that because of these differences in cost, the facilities that are subject to monitoring requirements generally enjoy an economic advantage over the facilities that must meet discharge limits, all other things being equal. Furthermore, the facilities that are subject to neither type of control enjoy an economic advantage over the facilities that must comply with limits or monitoring requirements.

Overall, our analysis disclosed that for each of the five pollutants, about 30 percent of the permits contained limits or monitoring requirements, while about 70 percent contained neither type of control. According to EPA's permitting regulations and guidance, there can be legitimate reasons for imposing no controls over some pollutants: Generally, either the facilities are not discharging the pollutants or their discharges are deemed too low to interfere with the designated uses of the applicable water bodies. See appendix II for a summary of the control decisions across the nation for the five toxic pollutants included in our analysis and for additional discussion of the reasons for not imposing limits or monitoring requirements on some pollutant discharges. Appendix III presents a state-by-state breakdown of the 1,407 permits included in our analysis.

Discharge Permits May Contain Different Limits for the Same Pollutants

EPA and the states agree that differences in the numeric limits for specific pollutants can and do exist—not only from state to state, but from water body to water body. To illustrate these differences, we extracted data on

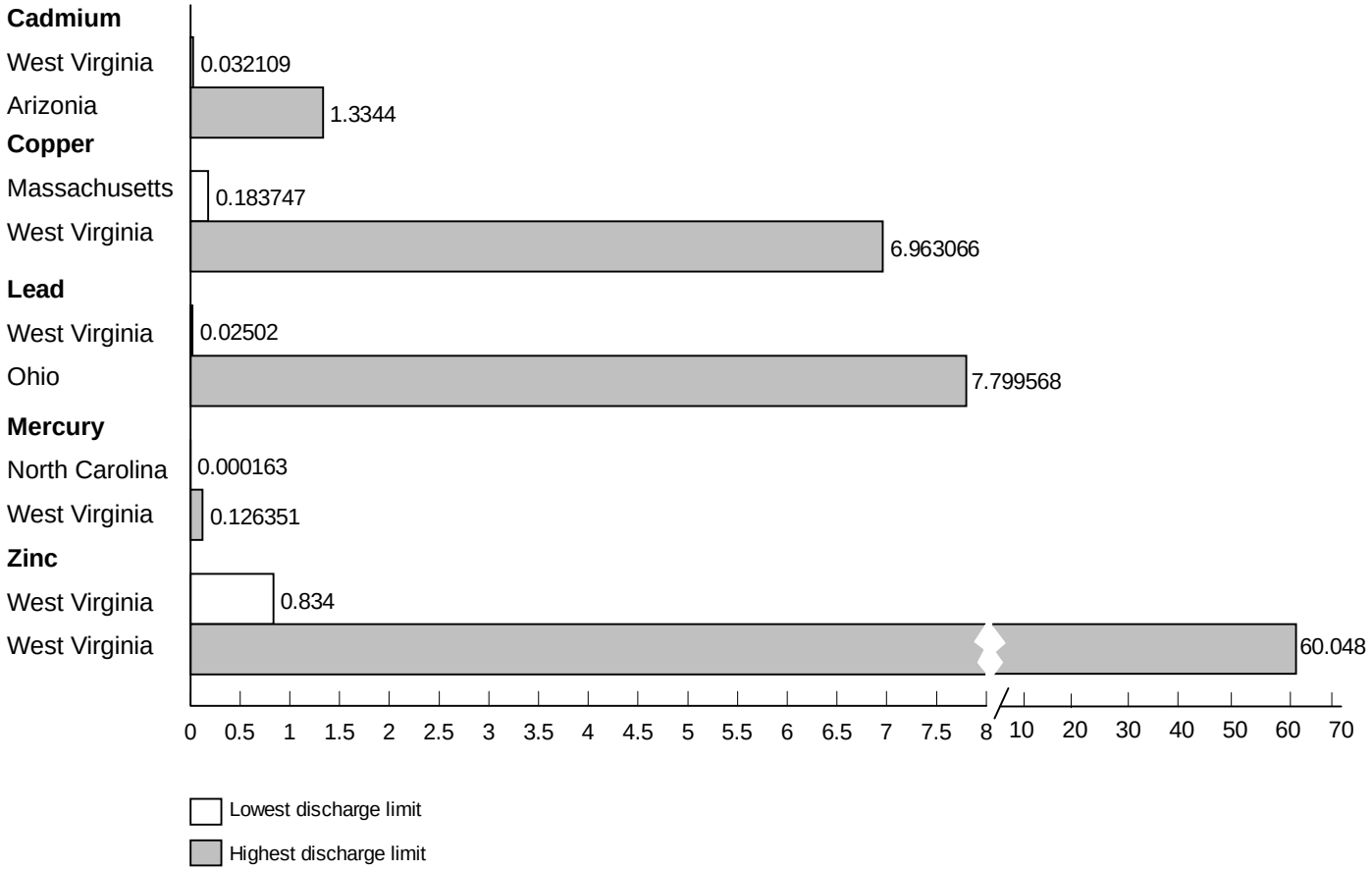
numeric limits as part of our analysis of EPA's data on municipal permits. Specifically, from the 1,407 permits for municipal facilities issued nationwide between February 5, 1993, and March 21, 1995, we identified those facilities discharging into freshwater[8] (1) whose permits contained discharge limits for one or more of the five toxic metals and (2) whose plant capacity, or design flow,[9] was included in EPA's database.

For each of the five pollutants, we found significant differences in the amounts that facilities were allowed to discharge across the nation—even for facilities of similar capacity. In the case of zinc, both the highest and the lowest limits were established in the same state. Figure 1 shows the results of our analysis.

[8]We excluded permits for facilities that discharge into marine waters because the limits derived for these facilities can be significantly higher than the limits established for facilities that discharge into freshwater. Including such facilities would, therefore, have distorted our analysis.

[9]A facility's capacity is stated in terms of average design flow, or the amount of wastewater that the facility is designed to discharge, in millions of gallons per day.

Figure 1: Range of Differences in Discharge Limits for Five Toxic Metal Pollutants at Facilities Discharging Into Freshwater



Notes: For each of the five pollutants, we selected a range for the facilities' capacity that (1) was sufficiently narrow for the facilities contained within it to be considered similar in size (e.g., a range of 1.4 to 2.5 million gallons per day) and (2) included as many permits as possible for our analysis. For the sake of consistency, we used the "daily maximum" discharge limits (i.e., the maximum amount of pollutants that could be discharged in any one day) for our analysis; some permits also contained other types of limits, such as limits on the weekly or 30-day average discharge. After applying our selection criteria, we were left with from 19 to 34 permits issued nationwide for each of the five pollutants.

The discharge limits were expressed as maximum concentrations—either as milligrams per liter or micrograms per liter. For the sake of consistency, we converted all limits to pounds per day.

As figure 1 indicates, differences in the numeric limits for the same pollutant can be significant—in the case of mercury, about 775 times greater at one facility than at another facility of similar capacity. We discuss the causes of the differences in discharge limits later in this report.

Variations in States' NPDES Programs Have Raised Concerns in Neighboring Jurisdictions

Variations in the discharge limits, or in the standards and procedures used to derive these limits, have been a source of concern, particularly when neighboring jurisdictions share water bodies and the differences are readily apparent to the permitting authorities and discharging facilities, as the following examples illustrate:

- In 1995, an industrial facility in Pennsylvania challenged a discharge limit for arsenic because Pennsylvania's numeric criterion was 2,500 times more stringent than that used by the neighboring state of New York, into which the discharge flowed.[10] Among other things, the discharger argued that having to comply with the more stringent criterion created an economic disadvantage for the company. Eventually, Pennsylvania agreed to reissue the permit with a monitoring requirement for arsenic instead of a discharge limit. The state has also revised its water quality standards using the less stringent criterion.
- Oklahoma challenged the 1985 permit that EPA issued to an Arkansas municipal wastewater treatment facility that discharges into a tributary of the Illinois River. One of the key issues in the case was Oklahoma's contention that the facility's permit, which was based on Arkansas's water quality standards, contained limits that would violate Oklahoma's water quality standards when the facility's discharge moved downstream. As a result, Oklahoma officials maintained, the river would not achieve its designation as "outstanding natural resource water," a special classification designed to protect high-quality waters. Although EPA has the authority to ensure that discharges in the states located upstream do not violate the water quality standards in the states located downstream, the agency determined that this case did not warrant such action, in part because the discharge allowed under the permit would not produce a detectable violation of Oklahoma's standards. In 1992, the Supreme Court ruled that EPA's issuance of the Arkansas permit was reasonable.[11]

[10]Pennsylvania had updated its water quality standards on the basis of current information on health effects published by EPA; the state adopted a standard of 0.02 micrograms per liter for arsenic. New York continued to rely on EPA's earlier guidance on arsenic and maintained its standard at 50 micrograms per liter.

[11]Arkansas v. Oklahoma, 503 U.S. 91 (1992).

Concerns among states about differences in water quality standards and the policies that affect their implementation may become more common in the future. According to a recent analysis by the U.S. Geological Survey,[12] many states receive more than half of their water pollution from neighboring states. While much of this pollution may be attributed to diffuse—or "nonpoint"—sources, such as agricultural runoff, according to an official from the U.S. Geological Survey, the discharges from municipal and industrial facilities allowed under permits also contribute to interstate pollution.

Several Factors Contribute to Differences in Controlling Pollutant Discharges

Both the act and EPA's regulations give the states and EPA considerable flexibility in implementing the NPDES program. The permitting authorities differ considerably in how they assess the likelihood that states' water quality standards will be exceeded, as well as in how they decide what controls are warranted. If they decide that discharge limits are warranted, these limits can differ widely because of differences in the (1) states' water quality standards and (2) implementation policies that come into play when the permitting authorities "translate" general water quality standards into limits for specific facilities in specific locations.

Permitting Authorities Differ in How They Decide on the Need for Controls Over Pollutant Discharges

We found differences in how the permitting authorities determine that a pollutant has the "reasonable potential" to violate a state's water quality standard and prevent the designated use of a water body from being achieved. In EPA's Region I, for example, the permitting officials believe that one or two samples indicating the potential for a violation may suffice to justify imposing a discharge limit. In contrast, given the same evidence, officials in EPA's Region VI generally impose requirements for monitoring in order to collect data over a longer period of time—up to the 5-year life of the permit.

Officials in the Permits Division at EPA headquarters agreed that there are differences in how the states' and EPA's permitting authorities decide whether and how to impose controls over pollutant discharges. The officials said that a key element in these differences is the amount and type of data the authorities require to determine reasonable potential; some permitting authorities are comfortable with establishing discharge limits on the basis of limited information, while others want to collect

[12]The U.S. Geological Survey issued an abstract of its findings in the spring of 1995 and plans to publish a full report by the spring of 1996.

more data and impose monitoring requirements. To assist the states and EPA's regional offices, EPA has issued national guidance,[13] including a suggested methodology and other options for determining reasonable potential. However, Permits Division officials emphasized that the law and applicable regulations provide for flexibility in decisions on reasonable potential and other aspects of the NPDES program.

Setting Discharge Limits Offers Many Opportunities for Permitting Authorities to Exercise Flexibility

The states have exercised the flexibility available within the Clean Water Act and EPA's regulations to (1) adopt different water quality standards and (2) apply different policies in implementing these standards in permits. As a result of these differences, discharge limits can vary significantly even, as illustrated earlier, for facilities of similar capacity.

Differences in Water Quality Standards

In the case of states' water quality standards, the designated use assigned to a particular water body can affect how stringent a facility's discharge limit will be. For example, if a facility is discharging into a water body designated for recreational use, the discharge limits are likely to be less stringent than they would be if the water body were designated for use as a drinking water supply.

Water quality standards also differ in terms of the numeric criteria the states adopt to ensure that the designated uses of the water will be achieved or maintained. EPA has provided guidance to the states on developing these criteria.[14] Some states have adopted EPA's numeric criteria (e.g., a human health criterion for mercury that allows for no more than 0.144 micrograms per liter) as their own, and others have developed different criteria that reflect regional conditions and concerns. For example, Texas modified EPA's criteria to account for higher rates of fish consumption in the state.

Another significant source of differences in the states' water quality standards is the cancer risk level that is selected for carcinogenic

[13]Technical Support Document for Water Quality-based Toxics Control, EPA, Office of Water (Mar. 1991).

[14]Most recently, EPA has issued new guidance on establishing numeric criteria for metals. The states will be allowed to use either of two methodologies. As a result, some states will have more stringent criteria for toxic metals than others.

pollutants.[15] For example, Connecticut typically bases its numeric criteria for these pollutants on a risk level of 1 excess cancer case per 1 million people, while Arkansas bases its criteria on a risk level of 1 excess cancer case per 100,000 people. Thus, Connecticut's criteria are 10 times more stringent than Arkansas's.

Differences in Implementation Policies

Many states have established implementation policies that can significantly affect the application of water quality standards in establishing the discharge limits for individual facilities. These policies address technical factors such as mixing zones, dilution, and background concentration.

The states differ in their policies for mixing zones—limited areas where the facilities' discharges mix with the receiving waters and numeric criteria can be exceeded. The states' policies can influence the stringency of the discharge limits by restricting where such zones are allowed and/or by defining their size and shape. In Texas, for instance, the size of mixing zones in streams is typically limited to an area 100 feet upstream and 300 feet downstream from the discharge point; other states apply different standards or do not allow mixing zones in some types of water bodies. In general, the discharge limits will be less stringent for a facility located in a state that allows mixing zones than for a facility in a state that requires facilities to meet numeric criteria at the end of the discharge pipe.

The states' policies on dilution—the ratio of the low flow of the receiving waters to the flow of the discharge—can also influence the stringency of the discharge limits. In general, the larger the volume of the receiving waters available to dilute, or reduce the concentration of, the pollutants being discharged, the less stringent the discharge limit. Thus, all other things being equal, the discharge limit for a facility located on the Mississippi River will be less stringent than the limit for a similar facility located on a smaller river. The states also use different assumptions in computing the flow of a facility's discharge (e.g., the highest monthly average during the preceding 2 years or the highest 30-day average expected during the life of the permit) and the low flow of the receiving waters (e.g., the lowest average flow during 7 consecutive days within the past 10 years or the lowest 1-day flow that occurs within 3 years).

[15]The risk level, in this context, is the probability of additional cancer cases in a population as a result of exposure to toxic pollutants. All other things being equal, a water quality standard based on a risk level of one additional cancer case per 100,000 people is less stringent than a standard based on a risk level of one additional cancer case per 1 million people. EPA issues criteria for protecting human health using risk levels ranging from one additional cancer case per 100,000 people to one additional case per 10 million people, and the states have the discretion to base their own standards on any risk level within this range. The states may use other risk levels if such levels are scientifically defensible.

The states also have different policies on background concentration—the level of pollutants already present in the receiving waters as a result of naturally occurring pollutants, permitted discharges from upstream, spills, unregulated discharges, or some combination of these sources. In general, the higher the level of the background concentration, the more stringent the discharge limit will be because the extent of the existing pollution affects the amounts that facilities may discharge without violating the water quality standards. Connecticut, for example, assumes background concentrations of zero in deriving limits, while Colorado uses actual data. All other things being equal, the discharge limits established by Connecticut will be less stringent than those set by Colorado whenever the actual background concentration is greater than zero.

EPA's Oversight of Permitting Policies Is Limited, but New Initiatives May Promote Greater Consistency

EPA, through its regional offices, periodically reviews the states' water quality standards; if it determines that the standards are inconsistent with the requirements of the Clean Water Act—because, for example, the standards do not adequately protect the designated uses of the water or are not scientifically defensible—it disapproves them. However, EPA does not consistently review policies that could significantly affect the implementation of the standards in permits, either when a state submits its standards for approval or when an EPA regional office reviews individual permits before they are issued.

As a result of an apparent inconsistency in EPA's regulations, some states are not including the relevant implementation policies when they submit their water quality standards to EPA for review and approval.[16] According to the regulations, the states must submit to EPA for review information on the designated uses of their waters and the numeric or narrative criteria for specific pollutants as well as "information on general policies" that may affect the application or implementation of the standards. However, EPA's regulations also provide that the states may exercise discretion over what general policies they include in their standards. In EPA's regions I and VI, for example, program officials believe that (1) the states are under no obligation to submit their implementation policies, such as their policies on considering background concentration, for EPA's review and (2) EPA cannot require the states to do so. Officials at EPA's headquarters and regional offices acknowledge that there is some confusion about what information the states must submit for review.

[16]According to the Chief of EPA's Water Quality Standards Branch, if EPA has an opportunity to review a state's implementation policies and determines that a policy would prevent the state's water quality standards from being achieved, the agency will disapprove the state's standards.

EPA officials maintain that even if the agency has not reviewed the states' implementation policies in the course of approving the standards, it can control the use of these policies when EPA's regional offices review individual permits and have the opportunity to disapprove those permits that do not adequately protect water quality. However, on average EPA's regional offices review only about 10 percent of the permits issued to major facilities by the 40 states authorized to issue permits. Moreover, EPA is considering a new initiative that will eliminate reviews of permits before issuance and will instead provide for postissuance reviews of a sample of permits. According to the Acting Director of EPA's Permits Division, such reviews are a better use of EPA's resources because they require less staff time and EPA's reviewers will not be pressured to meet deadlines for public comment. However, he said that, as a general rule, EPA will not reopen permits. Thus, identified problems may not be addressed until the permits come up for renewal, usually every 5 years. If EPA becomes aware of a significant problem, the regional office will work with the applicable state to attempt to remedy the situation.

Because EPA relies on its regional offices to oversee the states' implementation policies, it does not maintain national information on these policies. Moreover, except for some efforts by its regional offices, EPA has not assessed the impact of the differences among the states. EPA headquarters officials told us that although such an assessment might be useful, they have no plans to conduct one, in part because they do not have the resources or a specific legislative requirement to do so. In some instances, EPA's regional offices have tried to identify and resolve differences in the states' implementation policies because they have been concerned about the extent of these differences.[17] However, some states have resisted these initiatives on the basis that they should not be required to comply with policies that are not required nationwide.

EPA is considering regulatory changes that could enhance the agency's ability to monitor the states' implementation policies. According to a March 1995 draft of an advance notice of proposed rulemaking, EPA plans to solicit comments on, among other things, the kind of information on implementation policies that the states should be required to submit for EPA's approval. In the case of mixing zones, for example, EPA is seeking comments on whether the states should be required to describe their methods for determining the location, size, shape, and other characteristics of the mixing zones that they will allow. The Chief of EPA's

[17]For example, in 1994 EPA's Region VIII drafted a regional policy on mixing zones because it was concerned about inconsistencies in the approaches used by the states in the region and perceived inadequacies in the national guidance.

Water Quality Standards Branch told us that although other priorities could postpone the rulemaking, EPA has not revised the applicable regulations since 1983, and some changes are therefore needed.

While potential regulatory changes are as yet undefined, the Office of Water has embarked on a strategy for watershed management that could, by itself, achieve greater consistency among the states' NPDES programs, including the standards and policies the states use to derive the discharge limits for the facilities within the same watershed. Watershed management means identifying all sources of pollution and integrating controls on pollution within hydrologically defined drainage basins, known as watersheds. Under this approach, all of the stakeholders in a watershed's area—including federal, state, and local regulatory authorities; municipal and industrial dischargers; other potential sources of pollution; and interested citizens—agree on how best to restore and maintain water quality within the watershed.

In March 1994, the Permits Division of EPA's Office of Water published its NPDES Watershed Strategy to describe the division's plans for incorporating the NPDES program's functions into the broader watershed management approach. Although the strategy does not specifically discuss interstate watersheds, EPA officials believe that the states will identify such areas and, where reasonable, coordinate the issuance of NPDES permits. EPA officials believe that as a practical matter, the watershed management approach will cause the states to resolve differences in their standards and implementation policies as they attempt to issue NPDES permits consistently in shared water bodies and watersheds.

Agency Comments and Our Evaluation

We provided copies of a draft of this report to EPA for its review and comment, and on December 15, 1995, EPA provided us with comments from its Acting Director, Permits Division, Office of Water. In addition to some technical and editorial suggestions, which we incorporated as appropriate, EPA had the following two comments.

According to EPA, the results-in-brief section of the draft drew too stark a picture of the limitations of EPA's reviews of the states' programs. EPA said that its regional offices do review the states' standards and implementation policies and that they do consider the impact of variations among the states in their reviews. Nevertheless, EPA said that its reviews of the states' implementation policies could be more exhaustive and that more could be done to help ensure appropriate levels of consistency

among the states, assuming adequate resources. We revised that section of the report to better recognize the extent of EPA's reviews of the states' standards and implementation policies, and to better pinpoint the limitations of these reviews.

EPA also said that the results-in-brief section of the draft could leave the impression that the only reason for differences among the states is that the Clean Water Act provides for flexibility, when inherent differences in surface waters across the country could themselves result in different standards and water-quality-based permitting requirements among the states. We revised that section of the report to recognize this reason for differences.

We performed most of our work at the Permits Division and the Water Quality Standards Branch, Office of Wastewater Management, EPA headquarters; EPA Region I in Boston, Massachusetts, Region VI in Dallas, Texas, and Region VIII in Denver, Colorado; and state NPDES program offices in Arkansas, Colorado, Connecticut, Massachusetts, Texas, and Utah. We conducted our review from July 1994 through December 1995 in accordance with generally accepted government auditing standards. For a more detailed description of our scope and methodology, see appendix IV.

As arranged with your office, unless you announce its contents earlier, we plan no further distribution of this report until 10 days after the date of this letter. At that time, we will send copies to the Administrator, EPA; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others on request.

Please call me on (202) 512-6112 if you or your staff have any questions. Major contributors to this report are listed in appendix V.

Sincerely yours,

Peter F. Guerrero
Director, Environmental
Protection Issues

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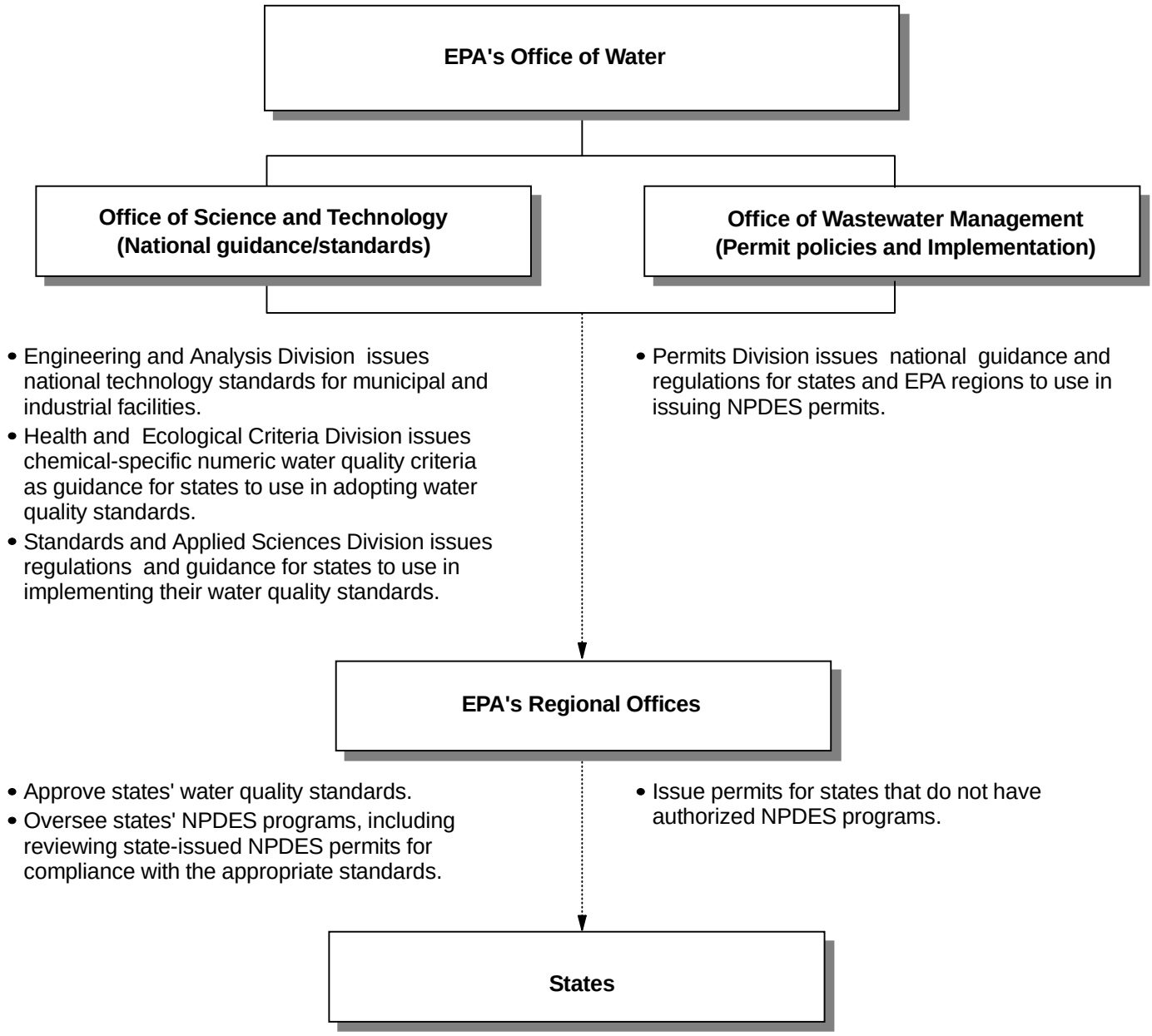
Abbreviations

EPA	Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System

EPA's and the States' Responsibilities

Figure I.1 illustrates the roles and responsibilities of the Environmental Protection Agency (EPA) and the state agencies in developing water quality standards and implementing them in the permits issued to municipal and industrial wastewater treatment facilities under the National Pollutant Discharge Elimination System program (NPDES).

Figure I.1: Roles and Responsibilities of EPA and States in Developing NPDES Discharge Limits



EPA issues guidance on water quality criteria[1] for specific pollutants that the states may use in developing numeric criteria for their water quality standards. States may also use other data to develop their numeric criteria as long as these criteria are scientifically defensible. The states' water quality standards—and any policies that affect the implementation of these standards—are subject to EPA's approval.

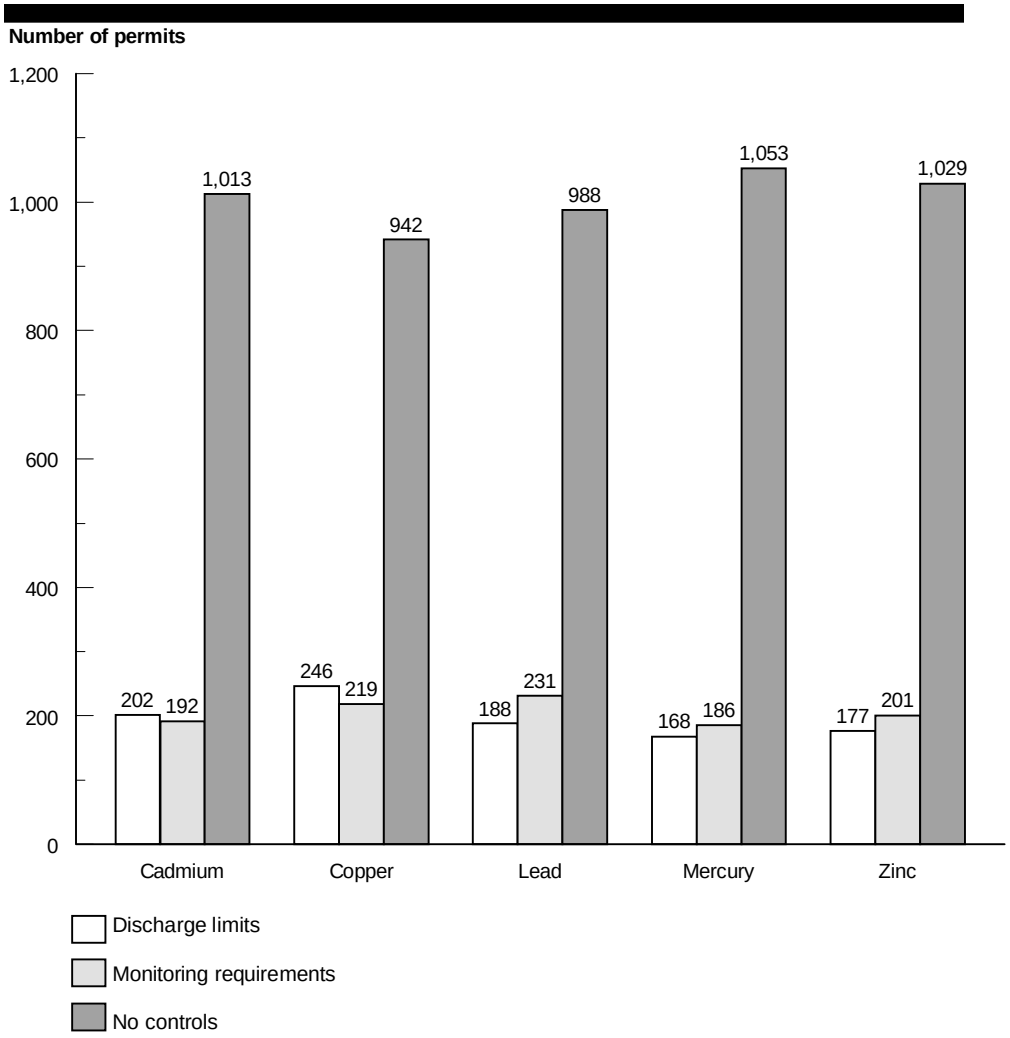
In determining whether water-quality-based controls are warranted, the states' and EPA's permitting authorities (1) analyze a facility's wastewater to identify the type and amount of pollutants being discharged and (2) determine whether these levels of pollutants will cause, have a "reasonable potential" to cause, or will contribute to causing the facility's discharge to exceed the state's water quality criteria. This assessment has one of three possible effects on a facility's permit: It may result in (1) a discharge limit, if the amount of pollutants being discharged violates, is likely to violate, or will contribute to violating the criteria that protect the receiving waters; (2) a requirement for monitoring to gather additional data in order to determine whether a limit is warranted; or (3) neither a limit nor a monitoring requirement, if the amount of pollutants being discharged will not violate, is unlikely to violate, or will not contribute to violating the criteria that protect the receiving waters.

[1]EPA's water quality criteria consist of technical information on the effects of pollutants or chemicals on water quality, including the water's physical, chemical, biological, and aesthetic characteristics. Such criteria address the effects of pollutants not only on surface waters but also on sediment, the wildlife that feeds on aquatic life within the waters, and other aspects of the water ecosystem. As we reported in 1994, EPA has issued criteria to protect human health for 91 of the 126 priority pollutants and criteria to protect aquatic life for 30 of these pollutants. For additional information on the status of EPA's efforts to develop water quality criteria, see our report Water Pollution: EPA Needs to Set Priorities for Water Quality Criteria Issues (GAO/RCED-94-117, June 17, 1994).

Additional Data on Pollutant Control Decisions

For each of the five toxic metal pollutants included in our analysis, figure II.1 shows the number of permits that contained discharge limits, the number that contained monitoring requirements, and the number that contained neither type of control.

Figure II.1: Summary of Control Decisions Nationwide for Five Toxic Metal Pollutants



Note: Our analysis included 1,407 municipal permits and determined, for each of five toxic metal pollutants, whether these permits include (1) discharge limits, (2) a requirement to monitor more than once per year, or (3) no controls. On the basis of discussions with EPA's headquarters and regional officials, we excluded permits that contained only annual monitoring requirements because such monitoring is conducted for the purpose of general toxicity testing or to examine the effectiveness of industrial pretreatment programs. We also excluded miscellaneous types of municipal permits, such as municipal stormwater permits.

Municipal wastewater treatment facilities receive wastewater from several sources, including industry, commercial businesses, and households. This

wastewater is likely to include toxic pollutants, primarily from industrial sources whose waste must be pretreated to reduce or eliminate such pollutants before it enters the municipal treatment facilities. According to officials in EPA's Permits Division, a major reason for the lack of discharge limits and monitoring requirements is the existence of effective pretreatment programs.[1] These officials believe that because such programs play an important role in reducing the level of toxic pollutants entering municipal treatment facilities, the lack of controls disclosed in our analysis is not surprising. They consider our findings to be an indication that the pretreatment programs are working as intended.

However, other factors suggest that additional controls may be warranted. First, officials from EPA's Permits Division acknowledge that in some cases, the permitting authorities have been slow to impose controls in municipal permits on the discharges of toxic metals or to adopt numeric criteria for such metals in their water quality standards.[2] In addition, the pretreatment programs primarily focus on industrial customers[3] and, as we reported in 1991, nonindustrial wastes from both commercial and residential sources can be a significant source of toxic pollutants entering municipal wastewater treatment facilities.[4] According to the most comprehensive study cited in the report (a 1979 EPA survey of municipal treatment facilities in four major cities), nonindustrial sources contribute nearly 70 percent of the copper and over 30 percent of the lead, mercury, and zinc entering the municipal facilities. Our report also cited other, more recent studies that identified significant contributions of toxic metals from nonindustrial sources.

[1]According to the Clean Water Act, the primary objectives of pretreatment programs are to (1) prevent the introduction into municipal wastewater treatment facilities of pollutants that will either interfere with treatment operations or pass through into the receiving waters and (2) improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludge. EPA's regulations require pretreatment programs at all municipal facilities with a design flow of more than 5 million gallons per day and at any smaller facilities that are receiving wastes that could interfere with plant operations or pass through into the receiving waters.

[2]The states are required to adopt numeric criteria only for those priority pollutants (1) for which EPA has issued guidance and (2) which the state has determined are discharged within its jurisdiction at levels that may hinder the designated uses of the water from being achieved. Some states have adopted numeric criteria for all of the pollutants for which EPA has issued guidance on criteria, while other states have been more selective.

[3]Pretreatment programs are also designed to address other sources of toxic wastes, including commercial sources, such as dry cleaners and radiator shops. Such programs may include restrictions, called local limits.

[4]Water Pollution: Nonindustrial Wastewater Pollution Can Be Better Managed (GAO/RCED-92-40, Dec. 5, 1991).

Summary of Decisions on Water-Quality-Based Controls for Five Metals

The following table, based on data extracted from EPA's Permits Compliance System database, shows the types of controls, if any, imposed by the states' and EPA's permitting authorities for the five toxic metals in all of the permits issued to major municipal wastewater treatment facilities from February 5, 1993 through March 21, 1995. For each of the five pollutants, the table lists (1) "Limits"—the number of permits that contained discharge limits for the selected pollutants, (2) "Monitor"—the number of permits that required facilities to monitor the level of pollutants in their discharge, and (3) "None"—the number of permits that contained no controls.

		Cadmium		
State	**Permits issued**	**Limits**	**Monitor**	**None**
Region I				
Connecticut	18	1	17	0
Maine	20	0	0	20
Massachusetts	21	1	1	19
New Hampshire	14	1	3	10
Rhode Island	3	0	1	2
Vermont	15	0	0	15
Total for Region I	**91**	**3**	**22**	**66**
Region II				
New Jersey	44	0	42	2
New York	79	8	0	71
Total for Region II	**123**	**8**	**42**	**73**
Region III				
Delaware	4	0	0	4
Maryland	14	0	0	14
Pennsylvania	79	2	10	67
Virginia	31	0	2	29
West Virginia	14	10	0	4
Total for Region III	**142**	**12**	**12**	**118**
Region IV				
Alabama	59	0	0	59
Florida	84	0	0	84
Georgia	39	0	0	39
Kentucky	28	0	2	26
Mississippi	19	0	0	19
North Carolina	93	41	0	52
South Carolina	14	9	3	2
Tennessee	50	15	0	35
Total for Region IV	**386**	**65**	**5**	**316**
Region V				
Illinois	57	4	41	12
Indiana	11	3	0	8
Michigan	35	6	7	22
Minnesota	15	1	1	13
Ohio	82	49	29	4
Wisconsin	36	2	0	34
Total for Region V	**236**	**65**	**78**	**93**

Copper			Lead			Mercury			Zinc		
Limits	Monitor	None	Limits	Monitor	None	Limits	Monitor	None	Limits	Monitor	None
9	9	0	2	16	0	0	5	13	8	10	0
4	0	16	1	0	19	0	0	20	0	1	19
10	3	8	0	3	18	0	0	21	2	0	19
3	4	7	2	4	8	0	0	14	1	3	10
0	1	2	0	1	2	0	0	3	0	1	2
0	0	15	0	0	15	0	0	15	0	0	15
26	**17**	**48**	**5**	**24**	**62**	**0**	**5**	**86**	**11**	**15**	**65**
1	40	3	0	41	3	0	41	3	0	42	2
17	0	62	11	0	68	7	0	72	10	0	69
18	**40**	**65**	**11**	**41**	**71**	**7**	**41**	**75**	**10**	**42**	**71**
0	0	4	0	0	4	0	0	4	0	0	4
0	3	11	0	2	12	0	3	11	0	2	12
6	34	39	1	26	52	1	13	65	5	22	52
1	3	27	1	0	30	0	3	28	0	1	30
10	0	4	10	0	4	10	0	4	9	0	5
17	**40**	**85**	**12**	**28**	**102**	**11**	**19**	**112**	**14**	**25**	**103**
0	0	59	0	0	59	0	0	59	0	0	59
5	6	73	2	3	79	3	6	75	1	2	81
0	7	32	0	3	36	0	4	35	2	8	29
0	2	26	0	2	26	0	0	28	0	2	26
1	1	17	0	1	18	0	0	19	1	1	17
0	0	93	43	0	50	25	0	68	0	0	93
7	4	3	9	3	2	0	0	14	5	6	3
19	1	30	14	1	35	10	1	39	14	1	35
32	**21**	**333**	**68**	**13**	**305**	**38**	**11**	**337**	**23**	**20**	**343**
10	34	13	2	38	17	2	41	14	0	34	23
3	1	7	3	0	8	1	1	9	3	1	7
6	12	17	2	5	28	3	1	31	6	7	22
1	4	10	0	3	12	1	1	13	0	4	11
67	11	4	32	47	3	52	25	5	59	19	4
4	0	32	0	0	36	2	0	34	3	0	33
91	**62**	**83**	**39**	**93**	**104**	**61**	**69**	**106**	**71**	**65**	**100**

(continued)

		Cadmium		
State	**Permits issued**	**Limits**	**Monitor**	**None**
Region VI				
Arkansas	9	0	0	9
Louisiana	41	0	2	39
New Mexico	5	0	0	5
Oklahoma	7	0	2	5
Texas	91	0	1	90
Total for Region VI	**153**	**0**	**5**	**148**
Region VII				
Iowa	25	2	0	23
Kansas	2	0	0	2
Missouri	26	4	0	22
Nebraska	22	3	10	9
Total for Region VII	**75**	**9**	**10**	**56**
Region VIII				
Colorado	21	1	0	20
Montana	6	0	0	6
North Dakota	13	0	0	13
South Dakota	11	0	0	11
Utah	13	0	0	13
Wyoming	9	0	0	9
Total for Region VIII	**73**	**1**	**0**	**72**
Region IX				
Arizona	4	3	0	1
California	72	35	5	32
Hawaii	2	0	0	2
Nevada	7	0	0	7
Total for Region IX	**85**	**38**	**5**	**42**
Region X				
Alaska	3	0	1	2
Idaho	4	0	0	4
Oregon	18	0	11	7
Washington	18	1	1	16
Total for Region X	**43**	**1**	**13**	**29**
Grand total	**1,407**	**202**	**192**	**1,013**

Copper			Lead			Mercury			Zinc		
Limits	Monitor	None	Limits	Monitor	None	Limits	Monitor	None	Limits	Monitor	None
0	1	8	0	0	9	0	0	9	0	0	9
0	6	35	0	2	39	0	7	34	0	5	36
0	0	5	0	1	4	0	1	4	0	0	5
0	1	6	0	3	4	0	4	3	0	0	7
0	1	90	2	0	89	1	3	87	0	1	90
0	**9**	**144**	**2**	**6**	**145**	**1**	**15**	**137**	**0**	**6**	**147**
6	0	19	3	0	22	3	0	22	0	0	25
0	0	2	0	0	2	0	0	2	0	0	2
5	0	21	4	0	22	2	0	24	5	0	21
3	10	9	3	10	9	0	0	22	3	10	9
14	**10**	**51**	**10**	**10**	**55**	**5**	**0**	**70**	**8**	**10**	**57**
1	0	20	1	0	20	3	8	10	0	0	21
0	0	6	0	0	6	0	0	6	0	0	6
0	0	13	0	0	13	0	0	13	0	0	13
0	0	11	0	0	11	0	0	11	0	0	11
0	0	13	0	0	13	0	0	13	0	0	13
0	0	9	0	0	9	0	0	9	0	0	9
1	**0**	**72**	**1**	**0**	**72**	**3**	**8**	**62**	**0**	**0**	**73**
3	1	0	3	0	1	3	0	1	3	0	1
36	5	31	35	4	33	35	5	32	35	5	32
0	0	2	0	0	2	0	0	2	0	0	2
0	0	7	0	0	7	0	0	7	0	0	7
39	**6**	**40**	**38**	**4**	**43**	**38**	**5**	**42**	**38**	**5**	**42**
1	1	1	0	1	2	0	1	2	0	1	2
0	0	4	0	0	4	1	0	3	0	0	4
0	11	7	0	10	8	0	11	7	0	10	8
7	2	9	2	1	15	3	1	14	2	2	14
8	**14**	**21**	**2**	**12**	**29**	**4**	**13**	**26**	**2**	**13**	**28**
246	**219**	**942**	**188**	**231**	**988**	**168**	**186**	**1,053**	**177**	**201**	**1,029**

Source: Based on information from EPA's Permits Compliance System.

Scope and Methodology

To obtain nationwide information on variations in whether and how pollutants are controlled in discharge permits, we extracted information from EPA's Permits Compliance System database on the 1,407 permits issued to major municipal wastewater treatment facilities from February 5, 1993, through March 21, 1995. We analyzed these data to determine the type of controls, if any, on five toxic metal pollutants typically discharged by municipal facilities (cadmium, copper, lead, mercury, and zinc). For the permits that contained discharge limits for the five selected pollutants, we obtained those limits to determine the range for each pollutant at facilities of similar capacity. For the permits that contained the highest and lowest limits, we verified the information in EPA's database with the applicable EPA regional office. As agreed with the requester's office, we did not attempt to determine the appropriateness of the differences in discharge limits because such an assessment would have been too complex and time-consuming.

We confined our analysis of variations in the discharge limits to municipal facilities because EPA's Permits Compliance System[1] database does not contain information that distinguishes between technology-based and water-quality-based discharge limits for industrial facilities. However, because EPA has not issued any technology-based standards for toxic pollutants that are applicable to municipal facilities, the discharge limits for such pollutants were derived from water-quality-based standards. According to EPA, water-quality-based controls are considered for virtually all major facilities, and an estimated 30 percent of the permits for these facilities nationwide actually contain limits based on water quality.

To obtain information on the causes of the variations in the states' NPDES permits, we interviewed the EPA officials responsible for the NPDES and Water Quality Standards programs at the agency's headquarters in Washington, D.C., and regional offices in Boston, Massachusetts (Region I); Philadelphia, Pennsylvania (Region III); Chicago, Illinois (Region V); Dallas, Texas (Region VI); and Denver, Colorado (Region VIII). We reviewed the applicable provisions of the Clean Water Act, EPA's regulations, and guidance on NPDES permits and water quality standards. We also interviewed state officials in Arkansas, Colorado, Connecticut, Massachusetts, Pennsylvania, Texas, and Utah and reviewed documents on these states' water quality standards, implementation policies, and NPDES permitting activities.

[1]The Permits Compliance System is a management information system that contains data on NPDES permits. The system is used to track permit conditions, the facilities' compliance, and enforcement.

To obtain information on EPA's role in monitoring the policies and procedures that the states use in deriving discharge limits, we reviewed applicable regulations and guidance, including EPA's preliminary draft of an advance notice of proposed rulemaking on potential revisions to the agency's regulation on water quality standards and EPA's NPDES Watershed Strategy. We also discussed EPA's oversight authority with officials from EPA's Permits Division, Water Quality Standards Branch, Office of General Counsel, and selected regional offices. In addition, we discussed oversight issues with selected states, environmental groups, and municipal and industrial associations.

We also obtained limited information from EPA's Office of Wetlands, Oceans, and Watersheds and Office of General Counsel; additional states and EPA's regional offices; the U.S. Geological Survey; the U.S. Fish and Wildlife Service; environmental groups, including the National Wildlife Federation and the Environmental Defense Fund; and various associations representing state regulators and municipal and industrial dischargers.

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.	Charles M. Adams, Assistant Director
Office of the General Counsel	Karen Keegan, Senior Attorney
Boston Field Office	Ellen Crocker, Core Group Manager Maureen Driscoll, Evaluator-in-Charge Les Mahagan, Senior Evaluator Linda Choy, Senior Program Analyst

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