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Report to the Chairman, Committee on Governmental Affairs, U.S. Senate

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ENVIRONMENTAL ENFORCEMENT

EPA Cannot Ensure the Accuracy of Self-Reported Compliance Monitoring Data

GAO/RCED-93-21

GAO
United States
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Resources, Community, and
Economic Development Division

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March 31, 1993

The Honorable John Glenn
Chairman, Committee on Governmental Affairs
United States Senate

Dear Mr. Chairman:

This report responds to your request that we assess the procedures established by the Environmental Protection Agency (EPA) and authorized states to ensure the accuracy of the self-reported data used to monitor compliance and detect environmental harm. The report reviews procedures in the hazardous waste and wastewater discharge programs. Specifically, it discusses efforts by EPA and authorized states to ensure that (1) facilities subject to environmental regulation identify themselves to EPA or an authorized state, (2) sampling results are representative of facilities' compliance with environmental standards, and (3) oversight of facilities collecting and laboratories analyzing sampling data is adequate to prevent error and fraud.

As agreed, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies of this report to the Administrator, EPA; the Director, Office of Management and Budget; and other interested parties. We will make copies available to others upon request.

This report was prepared under the direction of Richard L. Hembra, Director, Environmental Protection Issues, who may be contacted at (202) 512-6111. Other major contributors to this report are listed in appendix II.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

Many U.S. environmental programs depend on facilities to identify themselves as subject to regulation, to monitor their own compliance with applicable environmental standards, and to report the results of their monitoring to the Environmental Protection Agency (EPA) or to agencies in states authorized by EPA to carry out federal environmental programs. However, facilities may not identify themselves or invest the time and money needed to obtain accurate data. In addition, facilities may have incentives to hide rather than report environmental violations.

The Chairman of the Senate Committee on Governmental Affairs asked GAO to assess the potential for facilities to evade regulation or to submit inaccurate or fraudulent data. GAO reviewed efforts by EPA and authorized states to ensure that (1) facilities subject to environmental regulation identify themselves to EPA or an authorized state, (2) sampling results are representative of facilities' compliance with environmental standards, and (3) oversight of facilities collecting and laboratories analyzing sampling data is adequate to prevent error and fraud.

Background

Two programs that rely heavily on self-reported data are the hazardous waste program authorized by the Resource Conservation and Recovery Act (RCRA) and the wastewater discharge, or National Pollutant Discharge Elimination System (NPDES), program authorized by the Clean Water Act. Under both programs, facilities subject to regulation must identify themselves to EPA or an authorized state. Once identified, hazardous waste land disposal facilities must obtain permits and periodically sample the groundwater beneath their facilities to detect any contamination. Under the NPDES program, wastewater dischargers must obtain permits and collect and analyze samples of effluent to make sure that its constituents do not exceed specified discharge limits. In both programs, the permit specifies the sampling methods to be used.

Results in Brief

Because of insufficient or inconsistent controls and the generally low priority assigned to data quality assurance, EPA and many authorized states cannot ensure that all facilities subject to regulation are identified or that sampling results are representative and free of error or falsification. While EPA's RCRA program and authorized states have recently sought out and taken action against hazardous waste facilities that have not notified regulators of their activities, EPA's NPDES program and most authorized states have not tried to identify nonnotifying wastewater dischargers, believing all major dischargers have already been identified. However,

some states found smaller or minor facilities that had not applied for a permit and were harming or could have harmed the environment.

Although EPA has established a data quality assurance system that calls for statistically representative sampling, the RCRA program has not yet developed statistical techniques to specify the location for collecting samples and the NPDES program does not use statistical techniques to specify the frequency for collecting samples. Both programs rely instead on permit writers to determine what is representative.

Neither program has adequate controls to detect error or fraud in sampling data. EPA's RCRA program requires no inspections or tests of laboratories. According to responses to GAO's survey from nearly all 39 NPDES-authorized states, inspectors in over half of the states rarely examine sampling procedures during basic inspections of facilities. Moreover, neither EPA program requires inspections that are routine enough to deter fraud or complete enough to detect it, and few states require fraud detection training for their inspectors.

Principal Findings

Efforts to Locate Unregulated Facilities Are Insufficient

Although EPA considers self-reporting to be the cornerstone of the regulatory system, only the RCRA program has actively sought out nonnotifying facilities. In cooperation with authorized states, the RCRA program initiated an effort to identify nonnotifiers in fiscal year 1992 that resulted in more than 45 federal and state civil enforcement actions, several criminal enforcement actions, and the assessment of over $20 million in penalties.

In contrast, EPA's NPDES program and about two-thirds of its authorized states have not attempted to identify unregulated wastewater dischargers. EPA officials generally believe that all large facilities have already been identified and that any unregulated small facilities probably pose little environmental threat. However, 13 authorized states reported having efforts under way to locate nonnotifying wastewater dischargers. These efforts have led to the identification of more than 200 unpermitted minor dischargers, including one that discharged toxic paint sludge and solvents.

While NPDES program officials have assigned low priority to identifying nonnotifiers in view of their limited resources, EPA's Office of Enforcement has advocated a program to identify unregulated wastewater dischargers. Agency enforcement officials have argued that allowing dischargers that do not come forward to remain unpermitted and avoid the costs of pollution control penalizes those that do come forward and undermines the integrity of the regulatory system.

Sampling Data Are Not Statistically Representative

Since 1979, EPA has required its programs to have quality assurance systems for environmental sampling. Guidance for implementing these systems calls for EPA's programs to develop plans for collecting statistically representative samples. Although quality assurance officials claim that the absence of such plans is the greatest cause of misleading sampling results, neither the RCRA nor the NPDES program currently requires statistical sampling. Instead, the programs rely on regulators to use technical information about the facility and their judgment to determine either the location of groundwater wells that are likely to be representative of groundwater conditions or the frequency of sampling likely to be representative of wastewater discharges. While the RCRA program has been studying how it can develop statistical sampling, the NPDES program has not because NPDES officials believe that statistical methods would entail additional sampling and higher costs. EPA quality assurance officials pointed out, however, that statistical sampling might require fewer samples and thereby reduce costs.

EPA and State Controls Are Not Adequate to Detect Error or Fraud

EPA's quality assurance guidance calls for EPA and state regulatory agencies to inspect facilities periodically to make sure that they are collecting samples properly. However, inspectors in 21 of 33 NPDES-authorized states responding to GAO's survey did not routinely review facilities' sampling procedures during basic inspections. While 27 of the 30 RCRA-authorized states that responded indicated that they reviewed these procedures during basic inspections, EPA information shows that in a limited number of cases inspections were done poorly.

The EPA guidance also calls for EPA programs and authorized states to inspect the laboratories that analyze samples for facilities and to test their performance by requiring them to analyze blind samples. EPA's RCRA program, however, does not require inspections or tests of laboratories that analyze groundwater samples. Although the NPDES program inspects and evaluates laboratories, the inspections are not routine and EPA

regional offices use different standards of acceptability for test results. EPA plans to develop a single laboratory approval program that will include uniform standards for tests and routine inspections. The program will be available but not required for all EPA programs and states to use. EPA officials believe that centralizing laboratory oversight might be more efficient than having each EPA program conduct its own.

Overall, quality assurance officials contend, the weaknesses in quality assurance stem from competing priorities, insufficient resources, the low placement of quality assurance within EPA, and the absence of indicators for quality assurance in EPA's management accountability system. Recognizing this, the EPA Administrator identified environmental data quality as an agencywide weakness in his 1992 report to the President under the Federal Managers' Financial Integrity Act.

Data may also be compromised by deliberate falsification of sampling and laboratory results. However, some of the techniques considered most effective in detecting or deterring fraud are not being employed: Neither program inspects laboratories routinely and some NPDES-authorized states do not review supporting documentation during facility inspections. In addition, few RCRA- and NPDES-authorized states require fraud detection training for their inspectors.

Recommendations

To improve controls over self-reported data, GAO makes a number of recommendations to the EPA Administrator, including requiring the NPDES program to locate unregulated facilities, requiring both programs to work with authorized states to improve controls over data accuracy, and requiring the use of a coordinated approach to laboratory oversight.

Agency Comments

GAO discussed the factual information in this report with the heads of the offices responsible for compliance and enforcement in the RCRA and NPDES programs and with the head of EPA's Quality Assurance Management Staff. While these officials generally agreed with the facts, NPDES officials emphasized the constraints imposed by limited resources and competing priorities. We acknowledge that constraints exist but believe that some quality assurance improvements, such as using a centralized approach to laboratory oversight, can be made cost-effectively. Other agency comments have been incorporated where appropriate. As requested, GAO did not obtain written agency comments on a draft of this report.

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Abbreviations

EPA	Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System
QAMS	Quality Assurance Management Staff
RCRA	Resource Conservation and Recovery Act

Background and Methodology

The Environmental Protection Agency (EPA) and states authorized to carry out environmental programs have come to rely heavily on information that facilities themselves submit to determine their compliance with environmental laws. However, facilities may not voluntarily invest the time and money required to obtain accurate data and, in fact, have some incentive to hide rather than report environmental violations. As a result, it is EPA's responsibility to ensure that self-reported data are authentic and of sufficient accuracy to determine whether facilities are complying with environmental regulations. In a 1990 review of the drinking water program, GAO found that some self-reported sampling data at water systems were inaccurate, either because operators had made errors or because the data had deliberately been falsified.[1] In this review, we looked at the controls that EPA and the states have in place to ensure that self-reported data in two other EPA programs—hazardous waste and wastewater discharge—are not subject to error and fraud.

EPA's Use of Self-Reported Data for Monitoring Compliance

Under various federal environmental statutes, EPA is responsible for issuing regulations that set standards for managing harmful substances. Some of these statutes, including the Clean Water Act of 1972, the Safe Drinking Water Act of 1974, and the Resource Conservation and Recovery Act of 1976 (RCRA), provide for EPA to authorize states to implement and enforce the standards under state programs as long as these programs meet federal criteria and are approved by EPA. EPA regions remain responsible for overseeing these authorized states and can revoke a state's authority if the state's program fails to meet federal criteria. The regions also carry out programs in any states that do not meet federal criteria.

Under some statutes, including the Clean Water Act and RCRA, facilities are required to obtain from EPA or authorized states permits that tailor the national standards to individual circumstances. In order to monitor compliance with a facility's permit, EPA and authorized states generally rely on their direct inspections of the facility or self-monitoring and reporting by the regulated source.

Because of the high costs of inspections, EPA has historically relied extensively on self-reported data as well as on inspections. Self-monitoring allows for more frequent collection of information from a facility and therefore theoretically gives the regulatory agency a more complete picture of a facility's compliance. In addition, compliance theory holds

[1]Drinking Water: Compliance Problems Undermine EPA Program as New Challenges Emerge (GAO/RCED-90-127, June 8, 1990).

that the discipline of collecting, recording, and reporting compliance data to a responsible government agency will direct the attention of a higher level of the facility's management to achieving and maintaining compliance. Finally, EPA and the authorized states can use self-monitoring reports to select targets for inspections because the reports enable regulators to identify problems early.

Older EPA programs, including those created under the Clean Water Act, the Safe Drinking Water Act, and RCRA, depend on facilities to notify EPA or authorized states of violations, such as discharges above permit limits or the leaking of hazardous waste into groundwater. In addition, a number of more recently established environmental programs require thousands of sources, many of them small establishments, to self-report their compliance with regulations or other vital information. The underground storage tank program, for example, requires gas stations and other owners of underground storage tanks to report any leaks in their tanks as well as their plans to correct the leaks. The Emergency Planning and Community Right-to-Know Act requires businesses to report to EPA the amount of toxic waste they release to the environment, and the medical waste program requires hospitals and others to report their disposal of medical waste.

Although facilities may be required to report various types of information, many EPA programs depend on self-reported data in two critical areas. First, EPA generally relies on facilities that are subject to regulation to identify themselves to EPA or authorized states. Once facilities do so and, where applicable, obtain permits, they often continue to provide data that allows regulatory agencies to determine whether they are complying with their permits or are causing environmental harm by, for example, leaking hazardous waste to groundwater or exceeding allowable limits on discharges to surface water.

Because of the high costs of compliance and the potential penalties for noncompliance, facilities have considerable incentive to remain outside the regulatory system or to provide information that shows compliance. In a 1990 review of the drinking water program, GAO found cases in which water system operators were suspected of having intentionally falsified the results of samples they had taken from drinking water supplies to cover up results indicating contaminant levels above those allowed by the drinking water standards. EPA's drinking water program, however, had instituted few systematic efforts to detect such problems. Since the review, EPA has issued guidance to its regional offices on detecting invalid or fraudulent compliance data, revised other procedures to make the

review of records for potential falsification a standard oversight procedure, and initiated special efforts in two regions to detect suspicious test results.

Self-Reporting Under the Wastewater Discharge and Hazardous Waste Programs

The National Pollutant Discharge Elimination System's (NPDES) wastewater discharge program under the Clean Water Act and the hazardous waste groundwater monitoring program under RCRA are among the EPA programs that rely heavily on self-reported data.

Under the NPDES program, all discrete sources of wastewater that discharge into lakes, rivers, streams, or other bodies of surface water must obtain a permit that establishes limits on the pollutants in the discharge. Currently, about 3,400 major facilities and about 45,600 minor facilities are regulated either by EPA or by one of 39 authorized states and U.S. territories.[2] EPA requires discharging facilities to identify themselves by applying for permits from EPA or an authorized state.

Once a facility receives a permit, the NPDES program relies on regularly collected self-reported sampling data to determine whether the facility is complying with the discharge limits established by its permit. The permit itself stipulates how often the permittee must collect waste samples, where the samples have to be taken, what type of sample to take, and what laboratory procedures to use in analyzing the samples. Detailed records of these self-monitoring activities must be retained by the permittee for at least 3 years. Permittees are then required to submit—generally monthly or quarterly but never less than annually—the results of these analyses to EPA or an authorized state in what is termed a discharge monitoring report. The discharge monitoring report lists all the pollutant limits along with the results of the discharge monitoring, from which EPA or an authorized state can determine whether a facility has remained in compliance with its limits or exceeded them for the period covered by the report. If a report shows that a permit limit has been exceeded, EPA or the authorized state may begin an enforcement action against the facility, which may ultimately result in the assessment of a penalty.

[2]EPA defines a major municipal facility as a publicly owned treatment works that serves a population of 10,000 or more, discharges 1 million gallons or more of wastewater per day, or has a significant impact on water quality. To define a major industrial facility, EPA uses a scoring system that considers the facility's effect on water quality and potential effect on public health, plus a number of other factors. All facilities discharging into surface water that are not classified as "major" are designated as "minor" facilities.

The hazardous waste program under RCRA relies on self-reported data from regulated facilities, both for identification and for sampling information. Under the RCRA program, EPA regulates generators, transporters, treaters, storers, and disposers of hazardous waste in a system to ensure environmentally safe handling of hazardous waste from "cradle to grave." Hazardous waste handlers are required to notify EPA or state agencies of their activities. In addition to complying with this notification provision, facilities that store, treat, or dispose of hazardous waste must apply for a permit.

RCRA facilities that are land disposal facilities are also required to monitor the groundwater underlying their facilities in order to detect any contamination. After analyzing the results, facilities must report the data to EPA or an authorized state once a year, but if the analyses of samples show contamination, facilities must immediately notify authorities and begin more extensive monitoring. Contamination from hazardous waste facilities can be a serious threat to groundwater, and monitoring provides an early-warning system that allows contamination to be detected in its earliest stages. This is essential because once groundwater is contaminated, it can be difficult, costly—and sometimes impossible—to remedy. EPA and 47 authorized states and U.S. territories require groundwater monitoring at about 300 permitted land disposal facilities.

Objectives, Scope, and Methodology

Concerned about the potential for facilities to evade regulation or to submit inaccurate or fraudulent data, the Chairman of the Senate Committee on Governmental Affairs asked GAO to assess this situation. GAO reviewed efforts by EPA and authorized states to ensure that (1) facilities subject to environmental regulation identify themselves to EPA or an authorized state, (2) sampling results are representative of facilities' compliance with environmental standards, and (3) oversight of facilities collecting and laboratories analyzing samples is adequate to prevent error and fraud. This is the third review that we have conducted on enforcement and compliance monitoring across a number of EPA programs[3] —in addition to a number of reviews that included enforcement and compliance issues in individual programs.

Since we had already examined the drinking water program, we chose to focus in this review on EPA's NPDES and RCRA programs. Both are well established, having been in place for over 15 years, and both rely heavily

[3]Environmental Enforcement: Penalties May Not Recover Economic Benefits Gained by Violators (GAO/RCED-91-166, June 17, 1991) and Environmental Enforcement: Alternative Enforcement Organizations for EPA (GAO/RCED-92-107, Apr. 14, 1992).

on self-reported data for compliance monitoring. In addition, both the Clean Water Act and RCRA are due to be reauthorized in 1993, and a review therefore seemed timely.

Self-reported identification data under the RCRA and NPDES programs are discussed in chapter 2 of this report while self-reported sampling data are discussed in chapters 3, 4, and 5. To review identification data, we considered both major and minor NPDES facilities, as well as generators, transporters, treaters, storers, and disposers of hazardous waste. Because EPA's requirements for monitoring of facilities' sampling data by EPA regions or authorized states differ for different types of facilities, we focused on specific types of facilities for our review of wastewater discharge and groundwater sampling data. Under the RCRA program, we focused on land disposal facilities regulated under 40 C.F.R. 264, which are generally fully permitted facilities, rather than on facilities that are in the process of obtaining a permit. Under the NPDES program, we focused on major facilities.

To obtain information on EPA policies and programs, we interviewed officials at the EPA headquarters Office of Water, Office of Solid Waste and Emergency Response, Office of Research and Development's Quality Assurance Management Staff, Office of Enforcement, and Office of the Inspector General. In addition, we examined the practices of two EPA regions—V and VI—which together contain 2,372, or roughly 30 percent, of the major NPDES facilities and permitted RCRA land disposal facilities in the United States. Region V is located in Chicago, Illinois, and covers 6 states: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Region VI is located in Dallas, Texas, and covers 5 states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.

To obtain information about states' efforts to ensure the accuracy of self-reported data, we mailed questionnaires to the 47 states and territories authorized to administer the RCRA program and to the 39 states and territories authorized to administer the NPDES program.[4] We received responses from 42, or 89 percent, of the states for the RCRA survey and 38, or 97 percent, for the NPDES survey. In addition to the survey results described throughout the report, selected results are summarized in appendix I.

We conducted our review between August 1991 and December 1992 in accordance with generally accepted government auditing standards. We

[4]Hereafter this report will use the term "authorized states" to refer to authorized states and territories.

discussed the factual information contained in this report with the Director of the Quality Assurance Management Staff, Office of Research and Development; the Directors of the Office of Wastewater Enforcement and Compliance and of the Division of Enforcement, Office of Water; the Director of the RCRA Enforcement Division, Office of Solid Waste and Emergency Response; and their staffs. While these officials generally agreed with the facts, NPDES officials emphasized the constraints imposed by limited resources and competing priorities. We acknowledge that constraints exist but believe that some quality assurance improvements can be made cost-effectively, such as using a centralized approach to laboratory oversight. Other agency comments have been incorporated where appropriate. As requested, we did not obtain written agency comments on a draft of this report.

Efforts to Identify Unregulated Facilities Have Been Insufficient

To identify the facilities that are subject to their regulations, both the RCRA and NPDES programs require facilities to register with or to apply for a permit from EPA or an authorized state. Other programs also rely on facilities to identify themselves. This self-identification is vital to ensuring the integrity of the environmental regulatory system. First, facilities have to be identified and monitored to ensure that they have and use adequate pollution control equipment. Second, facilities have to operate under the same regulations to ensure a level playing field; if some avoid the cost of installing and maintaining pollution control equipment, they may gain an unfair competitive advantage over others that comply with environmental regulations.

EPA's hazardous waste program and some RCRA-authorized states have a successful program under way to locate and take action against facilities that have not voluntarily identified themselves. By contrast, neither the NPDES program nor many NPDES-authorized states have actively tried to locate unregulated dischargers. However, the states that have identification programs have located unpermitted wastewater discharges that, in some cases, were causing environmental harm. Moreover, because it is concerned that facilities may be evading regulation under a number of EPA programs, the Office of Enforcement is planning an agencywide effort in fiscal years 1993 and 1994 to take enforcement actions against nonnotifiers.

RCRA Has Initiated a Program to Identify Nonnotifiers

From the promulgation of the hazardous waste regulations in 1980 until 1990, the RCRA hazardous waste program did not aggressively seek out facilities subject to its requirements but relied instead on notices in trade journals and on communications with industry associations to publicize facilities' responsibility to identify themselves. According to EPA's RCRA program officials, the agency was more concerned with permitting the facilities that did identify themselves than with seeking out those that did not.

However, in EPA's 1990 RCRA Implementation Study, an agenda for the hazardous waste program in the 1990s, program officials recognized the environmental risk posed by unregulated facilities and recommended that the agency begin to seek them out. According to the Director of the RCRA Enforcement Division, EPA program officials learned through discussions with state officials during the study's development that states were beginning to discover unpermitted facilities. This led, she said, to the recognition that the RCRA program's long-standing assumption that

facilities would identify themselves to EPA or authorized states had been erroneous. Consequently, beginning in fiscal year 1992, EPA's hazardous waste program, along with hazardous waste programs in authorized states, undertook an Illegal Operator Initiative to prosecute facilities, termed nonnotifiers, that had been treating, storing, or disposing of hazardous wastes without notifying EPA of their activities.

Agency officials view this initiative as vital to the integrity of the regulatory system. In speaking about the Illegal Operator Initiative, EPA's Assistant Administrator for Enforcement noted that EPA considers reporting, such as self-identification, to be the cornerstone of its regulatory system and said that the agency will not tolerate either the failure to report or the submission of false reports. Letting nonnotifiers know that the agency is actively looking for them and will take strong enforcement actions against them serves as a strong deterrent to other would-be nonnotifiers, he explained. According to the Assistant Administrator for Solid Waste and Emergency Response, the RCRA program intends to make sure that legitimate businesses operate on a level playing field by eliminating the competitive advantage that illegal operators might gain by not, for example, incurring the costs of installing and maintaining pollution control equipment.

Under the initiative, EPA regions and the authorized states have relied on several methods to identify nonnotifiers. Our survey results revealed that many states—40 of the 42 states that responded to our survey—use one or more outreach methods to inform facilities of RCRA notification requirements, including conducting workshops for facilities. In addition to outreach, 31 of the 42 responding RCRA programs try to find suspected hazardous waste handlers by, for example, reviewing trade publications, the Department of Commerce's listing of businesses by standard industrial codes, and even the telephone company's Yellow Pages. According to state officials, these businesses are then cross-checked against the state's own inventory of regulated facilities; any unlisted facility is targeted for follow-up, such as a phone call, letter or inspection. Also, some states review a generator's hazardous waste manifest, which records the name, address, and identification number of all the handlers of a hazardous waste from generation to ultimate disposal. A handler listed in the manifest without an EPA identification number could be a nonnotifier.

The state of New Jersey, for instance, uses many of these methods for identifying hazardous waste nonnotifiers. In addition, state inspectors visit large solid waste disposal facilities that are not permitted for hazardous

waste and spot-check origin and destination forms that the state requires the facilities to complete for loads of waste entering the facilities. If the inspectors note that waste is labeled nonhazardous but have some indication that the waste may be hazardous, they sample and analyze the waste to determine whether it is hazardous. The generator is also targeted for inspection.

Through these efforts, the state has identified many small-quantity hazardous waste generators, defined by the state as generating or accumulating 220 or fewer pounds of hazardous waste per month. In addition, officials claim that about 10 large-quantity hazardous waste generators have been identified in the past 2 years. According to New Jersey officials, the state's identification efforts have been well worth the resources expended because they have frequently prevented environmental damage.

Under the Illegal Operator Initiative, EPA announced in February 1992 that more than 45 federal and state civil enforcement actions had been initiated and that over $20 million in total penalties had been assessed against nonnotifying facilities. In addition, EPA announced several federal criminal enforcement actions, including 5 guilty pleas and 6 indictments involving illegal hazardous waste activities. The nonnotifying facilities handled all types of hazardous wastes, including toxic wastes, according to EPA officials. RCRA officials plan to continue prosecuting any additional cases that are identified through EPA's and states' efforts.

According to EPA, many of these nonnotifiers mismanaged hazardous waste, releasing it into the environment. EPA and the states found hazardous waste disposed of on the ground, down sewer drains, in dumpsters with garbage destined for disposal in municipal landfills, or in leaking tanks or containers. In one case, a truck manufacturer had been dumping paint and solvent waste on the ground in back of its facility for the previous 10 years. This practice contaminated the soil and may have contaminated surface water and groundwater. In another case, a dry cleaning facility had open drums of ignitable hazardous waste, some of which had been dumped onto the ground. The facility also generated waste contaminated with tetrachloroethylene. Groundwater supplies within half a mile of the facility were found to contain traces of tetrachloroethylene and related organic contaminants.

NPDES Program's Efforts to Locate Nonnotifiers Have Been Limited

Like the RCRA program, the NPDES program requires that facilities subject to regulation identify themselves to EPA or an authorized state—in this case, by applying for a permit to discharge pollutants into surface water. However, unlike the RCRA program, the NPDES program does not have an active effort to identify unregulated facilities. According to some program officials, EPA and authorized states widely publicized the self-identification requirements through trade journals and associations in the early years of the program in the 1970s, and both the federal and state agencies continue to publicize new requirements as they are developed. However, because there have been few new requirements in recent years, program officials believe that facilities are well aware of their responsibilities to identify themselves. In fact, larger dischargers, according to these officials, have every incentive to come forward and apply for permits on their own because their operations are visible to local environmental groups and others who use surface water. And while the officials acknowledge that some facilities may not voluntarily apply for permits, they believe that these are probably very minor dischargers that do not pose an environmental threat because even minimal discharges into surface water have to be permitted under the Clean Water Act.

The NPDES program has acknowledged that it has little information on the environmental risk posed by minor facilities— permitted or unpermitted. In the summer of 1992, it set up a work group of EPA officials to study this issue. According to the coordinator of the work group, if certain types of minor facilities, such as facilities in certain industries or regional/geographic areas, are found to pose more of a risk than others, then EPA plans to study these further to determine whether the level of EPA and state oversight of these facilities is sufficient. Minor facilities are subject to the same regulatory requirements as major facilities, but EPA does not oversee them, leaving oversight and enforcement to the states.

In general, NPDES officials believe that locating nonnotifiers is of low priority, given the many competing demands on the resources available for the program. One program official said, for example, that EPA and authorized states have a backlog of 6,537 NPDES permit applications awaiting processing, all but 6 of which are for minor facilities. In addition, the program office estimates that about 15 percent of all major permits, or about 300, have expired, and 54 percent of all minor permits, or 3,906, have expired. According to the program official, although these facilities must generally abide by the requirements of their expired permits until they receive their new permits, it is likely that the new permits will contain stricter pollution limits.

Recognizing that funding has not kept pace with EPA's and authorized states' responsibilities in most environmental programs, including the NPDES program, we have in the past recommended a number of policy and management changes to help programs accomplish their missions within resource constraints. For the NPDES program, for example, we have proposed that EPA develop a pollutant-based discharger fee system for toxic pollutants that, among other things, would generate additional revenue for water pollution programs.[1]

Few Authorized States Have Programs to Identify Nonnotifiers

Many of the states authorized to carry out the NPDES program expressed attitudes similar to EPA's on the subject of nonnotifiers. Responses to our survey indicated that 25 of 38 states have no program in place to identify dischargers that have not applied for a permit. Sixteen of these states believed that it was unlikely that minor industrial facilities would be discharging waste into surface water without an NPDES permit, while no fewer than 23 of these states indicated that major facilities and minor municipal facilities would also be unlikely to be discharging wastes without a permit. Despite this belief, most of the states also reported that they were contacted at least on occasion in fiscal year 1991 by citizens' groups, and about half were also contacted on occasion or more often either by current or former employees of discharging facilities or by state and local agencies about existing facilities suspected of operating without an NPDES permit.

Of the 38 authorized states responding to our survey, however, 13 reported that they have programs under way to identify discharging facilities that have not applied for permits. Although these 13 states, like the others, have programs to publicize wastewater discharge reporting requirements, they have also taken action to locate nonnotifiers. Environmental officials in these states told us that their efforts have been worthwhile because, among other reasons, they have averted potential environmental harm that even minor discharges can cause if they remain unregulated for long periods of time. Eleven of the 13 states had located at least 1 unregulated discharger between 1990 and 1992 — 8 had identified between 3 and 20, 1 had identified about 60, and 2 had found over 100.

The states with active programs use a variety of approaches for identifying unregulated facilities. Kentucky, for example, relies on citizens educated in identifying unregulated discharges. Since 1985, the state has taught over

[1]Water Pollution: Stronger Efforts Needed by EPA to Control Toxic Water Pollution (GAO/RCED-91-154, July 19, 1991).

27,000 individuals how to spot nonnotifiers, and state officials reported that through the program over 200 nonnotifiers were identified between 1990 and 1992. All of the facilities identified have been minor dischargers, such as coal mining operations, car washes, and agricultural feedlots. One of these was a furniture manufacturing company that knowingly discharged wastewater without a permit into a ditch that flowed into a creek and eventually into a tributary of one of Kentucky's major recreational lakes. The company was discharging paint sludge and solvent that contained hazardous chemicals, including one substance suspected of causing cancer.

The state of Alabama uses a completely different approach for locating unpermitted facilities, employing a series of cross-checks with other state regulatory agencies to identify potential nonnotifiers. The state health department, for instance, issues permits to facilities in certain industries, such as food processing, that are likely to discharge to surface water. Environmental officials therefore review listings of new health department permittees against water discharge permit listings. Also, among other things, environmental officials review quarterly listings of new industrial facilities in the state, according to an environmental official.

Using these methods, the state identified 15 unpermitted dischargers in 1991 and 1992. All of these nonnotifiers were minor facilities, and many were foreign-owned facilities that were not aware of the requirements to identify themselves under the NPDES program. State officials believe that unpermitted minor facilities represent more of an environmental threat than permitted major facilities because they are subject to fewer environmental controls. In fact, 2 of the 15 unpermitted facilities identified through the state's effort are known to have caused some harm to the environment. In one case, a discharge of wastewater from a seafood-processing plant reduced dissolved oxygen in stream water, causing a small fish kill. In the other case, enough of a petroleum product was released into a stream to require cleanup.

Although NPDES program officials do not believe that locating nonnotifiers is a priority, EPA's Office of Enforcement has advocated a program for identifying nonnotifying water dischargers. In its 4-year strategic plan for enforcement issued in 1991, the Office of Enforcement identified nonnotification as an issue because regulating all facilities is important to ensure the integrity of the regulatory system. In this report, the Office of Enforcement recommended a specific technique that the water program could use to locate unpermitted facilities—reviewing the Toxic Release

Inventory, which lists the amounts of toxic waste that facilities release into the environment annually. However—according to officials from the NPDES program, the Office of Enforcement, and the Office of Policy, Planning, and Evaluation—this recommendation had not yet been implemented as of November 1992.

In addition, the Office of Enforcement is developing a national initiative for fiscal years 1993 and 1994 that will use enforcement actions as a means to improve the integrity of self-reported compliance data across all EPA programs. Among other things, the initiative will focus on more vigorous enforcement of regulatory evasion. The Office of Enforcement noted that the number of nonnotifiers found through RCRA's 1992 enforcement initiative may reflect a broader agencywide problem with evaders.

Besides the RCRA and NPDES programs, other EPA programs rely on self-identification, including the chemical premanufacture and significant new use program under the Toxic Substances Control Act, the asbestos removal and disposal program under the Clean Air Act, and the underground storage tank program under RCRA. In 1992, we found that in one of these programs—the asbestos removal and disposal program—several delegated states and localities and one EPA region had made little effort to identify nonnotifiers even though EPA considers failure to notify to be one of the most common, and serious, violations of the asbestos regulations.[2]

Conclusions

The arguments used by the RCRA program and the Office of Enforcement to justify the establishment of a nonnotifier initiative are compelling and apply with equal force to all EPA programs that rely on facilities to identify themselves, including the NPDES program. In the RCRA program, as elsewhere, a facility that is not required to use pollution control equipment or to be monitored by a regulatory body can pose a greater risk to the environment than a regulated facility. Furthermore, all programs have an interest in correcting any inequities in the regulatory system so that a facility that does not abide by environmental requirements cannot gain a competitive advantage over one that does. Finally, in any program, demonstrating that a nonnotifier will probably be caught is essential to ensuring a high rate of voluntary compliance with the notification requirement.

[2]Asbestos Removal and Disposal: EPA Needs to Improve Compliance With Its Regulations (GAO/RCED-92-83, Feb. 25, 1992).

Moreover, according to our state survey, 13 states have shown that they are concerned enough about nonnotifiers to initiate programs to locate them, and 2 of these states have each found over one hundred unpermitted minor dischargers, some of which were causing environmental harm. Even the many state NPDES programs without active nonnotifier programs have indications that they may have nonnotifiers, since most were contacted at least on occasion in fiscal year 1991 by citizens' groups and others about facilities suspected of discharging without a permit.

We acknowledge the validity of EPA's concern that increasing the number of NPDES permit applications may simply add to an already difficult burden, given the backlog of applications awaiting processing. We also appreciate the resource constraints that might limit the ability of EPA and the states to support additional identification efforts. We therefore continue to advocate a pollutant-based permit fee system as one means to mitigate resource constraints.

Nevertheless, we agree with EPA enforcement officials that allowing dischargers that do not come forward to remain unpermitted and avoid the costs of pollution control equipment penalizes those that do come forward and undermines the integrity of the regulatory system. Viewed from this perspective, identification efforts should be a basic component of all environmental regulatory programs, not just of RCRA. We therefore believe that all EPA programs that depend on facilities to register with or apply for permits from EPA or an authorized state—including the NPDES program—should have active programs to identify and take action against facilities that do not identify themselves voluntarily.

Recommendations

We recommend that the Administrator, EPA, direct the Assistant Administrator for Water to undertake a joint effort with authorized states and the Office of Enforcement to develop a program to locate and take appropriate enforcement actions against unregulated facilities that are discharging waste to surface water.

Recognizing that there should be a consistent agencywide policy for identifying unregulated facilities, we also recommend that the Administrator direct the Assistant Administrator for Enforcement to work with other program offices to determine which programs would benefit from a similar effort to identify unregulated facilities.

RCRA and NPDES Programs Are Not Obtaining Statistically Representative Samples

EPA depends on self-reported sampling results to determine whether RCRA facilities are contaminating groundwater and whether NPDES facilities are in compliance with effluent limits.[1] Yet errors during any part of the sampling and analysis—from the design of the sampling to the collection and analysis of the samples—can render these results incorrect and misleading. To limit error, EPA has developed a system of quality assurance under which programs are supposed first to design a sampling strategy that sets standards for accuracy and requires statistically representative sampling and then oversee the collection and analysis of samples at facilities and laboratories through inspections, tests, and reviews.

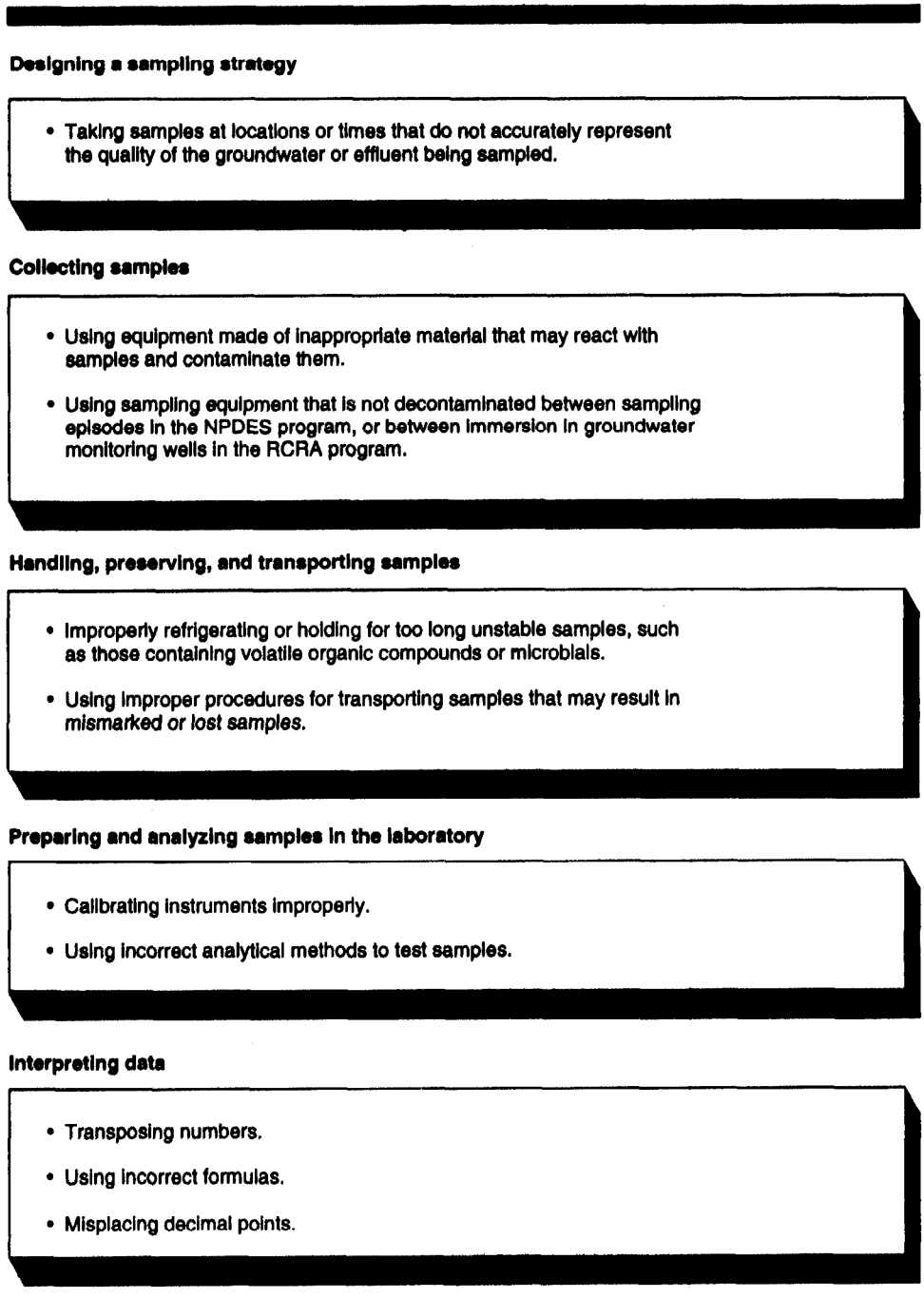
To date, although the RCRA program is working towards it, neither the RCRA nor the NPDES program have implemented one of the first steps of the agency's quality assurance system—requiring statistically representative sampling at regulated facilities to ensure that sampling results present a true picture of the effluent or groundwater. As a result, the data reported cannot tell regulatory officials with any statistical level of certainty whether a RCRA facility is contaminating the groundwater beneath RCRA facilities or whether an NPDES facility has been in compliance with its pollutant discharge limits.

EPA Requires Programs to Have Quality Assurance Systems

Because regulators depend on the results of sampling to assess environmental conditions and facilities' compliance, EPA in 1979 required every EPA program to establish a quality assurance system to ensure that environmental sampling data are of the quality needed and claimed. Recognizing that errors can occur at any point during sampling and analysis, as figure 3.1 shows, EPA's quality assurance system specifies the planning elements and oversight needed to ensure data quality during sample collection and analysis at regulated facilities. In addition, the system includes oversight mechanisms to ensure that regulatory agencies carry out quality assurance tasks.

[1]To review self-reported sampling data, which are discussed in this chapter as well as in chapters 4 and 5, we focused on permitted RCRA land disposal facilities (those regulated under 40 C.F.R. 264) and major NPDES facilities. In contrast, to review identification data, which are discussed in chapter 2, we included a larger range of facilities: major and minor NPDES facilities as well as those generating, transporting, treating, storing, and disposing of hazardous waste.

Figure 3.1: Potential Errors in Sampling and Analysis

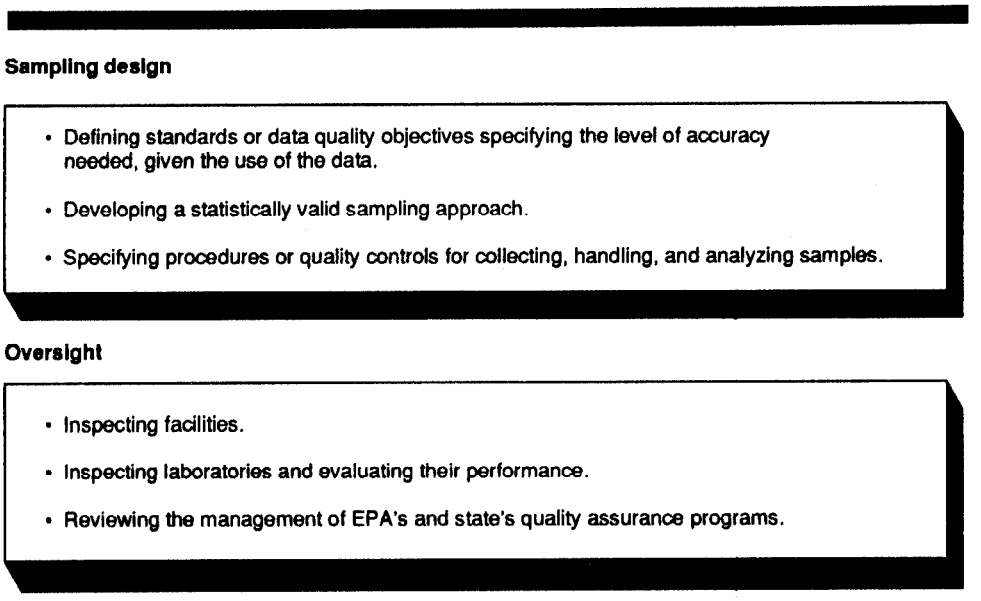


The Assistant Administrator for Research and Development oversees quality assurance throughout the agency and carries out this responsibility through the Quality Assurance Management Staff (QAMS). QAMS is responsible for developing agencywide quality assurance guidance and overseeing the agency's implementation of quality assurance. The assistant administrators of EPA's program offices, the regional administrators, and the directors of program components in authorized states are all responsible for implementing quality assurance both at regulated facilities and within their own organizations.

The RCRA and NPDES programs are responsible for developing quality assurance techniques, guidance, and technical support for permit writers in EPA regions and authorized states to use in incorporating specific sampling and analysis procedures into a facility's permit. The program officials are also generally responsible for developing the oversight mechanisms that EPA regions and authorized states then implement to ensure that facilities carry out sampling and analysis properly.

As figure 3.2 shows, the first step in EPA's quality assurance system is setting standards, called data quality objectives, for a facility that define the degree of accuracy needed in sampling data on the basis of how the data will be used. For example, in a sensitive environmental area, such as near a drinking water source, an EPA or state regulator, when writing a permit, may require a higher degree of confidence in sampling data than in an area where the environmental or health risk is lower. In the sensitive area, the permit writer may want to know that such samples will provide an estimate of a regulatory parameter, such as a permit limit on a pollutant being discharged, that will not differ from the actual value by more than a specified amount in 99 out of 100 times. On the other hand, in the less sensitive area, there may be less need for confidence, and it may therefore suffice to have estimates within prescribed bounds of the real parameter in only 85 of 100 times. In other words, in the first case, the confidence level is 99 percent, whereas in the second it is 85 percent.

Figure 3.2 EPA's Quality Assurance System for Sampling and Analysis



Once standards or data quality objectives have been defined, QAMS guidance specifies that statistical methods are to be used by the permit writer in developing a sampling design for a facility. The sampling design specifies the number and location of samples and the frequency at which samples are to be taken to ensure that they are representative of the effluent or groundwater from which they are drawn—that is, that they have the same type and concentrations of chemical or physical constituents. To be statistically valid, the sampling design must provide for the degree of certainty specified by the data quality objectives.

Next, permit writers are required to specify procedures for collecting and analyzing the samples—or quality controls—that the facility must implement to ensure that the specified level of accuracy is achieved and documented. These controls might include, for example, requirements for recalibrating instruments or for handling samples in the laboratory. Finally, to ensure that facilities are collecting and analyzing samples in accordance with the sampling design and procedures, EPA or the authorized state periodically inspect facilities where the sample is taken and inspect and test laboratories where the sample is analyzed.

In addition to facility or project level controls and oversight, EPA's quality assurance system includes certain mechanisms for overseeing quality assurance within the regulatory agencies themselves. Annually, EPA's

programs and regions must prepare quality assurance management plans that spell out who will be responsible for quality assurance and how quality assurance will be integrated into daily activities. Then, to determine how well an organization is implementing its plans, managers are required periodically to review their quality assurance programs and take corrective action as needed.

The RCRA and NPDES Programs Do Not Require Statistically Representative Samples

According to QAMS officials, although it is important to limit error in all steps of sampling and analysis, the lack of statistically valid sampling plans is the single greatest cause of misleading sampling results. Although the RCRA program is taking steps to develop such designs, the RCRA and NPDES programs currently rely on the permit writer to determine, on the basis of technical information about a facility's location and conditions, what is likely to be representative.

RCRA Program Is Determining the Feasibility of Statistically Representative Groundwater Sampling

Although the RCRA program has developed guidance and requirements for facilities to use in collecting and analyzing groundwater samples, it has not yet defined data quality objectives for statistically valid, representative groundwater sampling at hazardous waste facilities. Currently, owner/operators are required to install at least one well upgrade and several wells downgrade of the facility. Permit writers use engineering and scientific information obtained from, among other things, subsurface drilling and geophysical measurements, to develop a conceptual model of the site's hydrogeology. Working with this model, permit writers identify well locations that are likely to yield a representative view of groundwater conditions. Agency officials believe that this approach takes quality concerns into account and is the best available, given the current understanding of hydrogeology. However, they recognize that they need to develop a better understanding of actual groundwater conditions in order to develop statistically representative sampling.

We first reported the absence of data quality objectives for RCRA's groundwater monitoring in 1988, when we pointed out that EPA needed such objectives to ensure the quality of groundwater monitoring data. We found that groundwater monitoring data being submitted to EPA and state regulatory officials varied considerably in terms of completeness and quality and was generally less than adequate for regulatory decision-making.[2]

[2]Hazardous Waste: Groundwater Conditions at Many Land Disposal Facilities Remain Uncertain (GAO/RCED-88-29, Feb. 18, 1988).

Since then, EPA has developed guidance and requirements for facilities to use in collecting and analyzing groundwater samples and has made some effort to establish statistical sampling and data quality objectives. In 1990, the RCRA program began to work with EPA's Office of Research and Development on a project to develop methods that would allow permit writers to predict all the ways that contamination would move through groundwater in any type of subsurface geology. Understanding this variability is a prerequisite to establishing a statistically representative approach for determining where to locate groundwater wells. According to agency officials, the research is being implemented by a multidisciplinary group of scientists and engineers well known for their contributions to the hydrogeologic sciences. The project has drawn participants from three universities and from other federal agencies, including the U.S. Geological Survey and the Department of Energy.

According to program officials, research thus far has raised the concern that in many settings with complex subsurface geology, it may not be practical or possible to determine all routes of contamination. As a result, program officials are not yet sure that it will be feasible to develop standards for statistically representative groundwater monitoring. With further research, they expect to be able to determine the feasibility by 1994. If characterization is feasible, they estimate that it will be another 2 years, or 1996, before the program develops the standards of accuracy and the guidance needed to set data quality objectives and conduct statistically representative monitoring.

Despite delays in developing a more rigorous design for groundwater monitoring, RCRA officials say that they remain committed to the project. The Director of the RCRA Enforcement Division noted that having a monitoring plan that is based on objective standards for accuracy, rather than on judgment, will make it easer to defend the number and location of groundwater monitoring wells at a facility in an enforcement action. According to strategy documents for the project, data quality objectives would provide performance standards that could be used both to optimize the number and location of monitoring wells required at a facility and to assess the performance of the network of wells in detecting releases of contaminants.

NPDES Program Does Not Require Statistically Representative Sampling

Like the RCRA program, the NPDES program has in place requirements and an approach for sampling but does not require statistical sampling. Rather, it relies in part on specific regulatory requirements and in part on the

permit writer's judgment to determine what will yield a representative sample.

According to NPDES headquarters officials, the sampling design specifies where and how often samples are to be taken, as well as what type of sample is to be taken—whether a composite (a combination of individual samples obtained at intervals over a period of time) or a grab (an individual sample collected in less than 15 minutes). The location for sampling is dictated by agency regulations, which specify that samples are generally to be taken at the end of the discharge pipe. The regulations also dictate which types of pollutants require which types of sampling. Permit writers generally have to use their own knowledge of the facility's operations to determine how to tailor the frequency of sampling to a specific facility in order to come close to a representative sample.

Although the program's guidance on data quality objectives notes that statistical methods may be used to specify the frequency of sample collection, it does not require that they be used. According to NPDES officials, the program's approach for obtaining accurate and representative samples is not as rigorous as the one prescribed by QAMS, but they believe that their approach yields adequate and representative sampling results from NPDES facilities. The NPDES program does not require statistically representative samples because it believes that such a requirement would increase the number of samples that facilities would have to take, adding unnecessarily to the cost of sampling without increasing the representativeness. Regulatory agencies would also incur additional costs to develop statistical sampling plans. However, these officials acknowledged that they have never looked into the relative costs and that it might be worthwhile to do so.

According to QAMS officials, there is benefit to using a statistical approach to sampling in the NPDES program. QAMS guidance advises programs to use statistical sampling because a judgmental approach to wastewater discharge as well as to other types of sampling may capture only episodes or areas of pollution that may or may not be indicative of a facility's overall pollution pattern. Thus, samples could be taken at times when concentrations were usually low, so that the facility would look as if it were in compliance when it might not be. Statistical sampling, however, would eliminate any systematic exclusion of high or low concentrations, according to QAMS officials.

In addition, contrary to the NPDES program officials' belief, requiring statistical sampling would not necessarily increase the number of samples that each facility would have to take. In fact, because statistical sampling requires only as many samples as are necessary to provide a desired level of accuracy, some facilities—those with little variation in process or effluent, for example—might have to take fewer samples and could therefore reduce costs for sampling and analysis. Changes in the sampling frequency specified in a facility's permit could be incorporated during permit renewals, which are required every 5 years.

Moreover, without using a statistical approach, the regulatory agency limits its objective basis for assessing the accuracy of the samples it has taken. A compliance monitoring sample should be sufficiently accurate to assess the likelihood that these facilities are in compliance with their permits. Under current approaches, NPDES program officials have no statistical basis for assessing how often samples are likely to indicate that a facility is in compliance, when, in fact, the facility is exceeding its permit levels. The use of statistical methods permits the design of a sampling plan that will produce samples with a known likelihood of avoiding this type of error.

Finally, by setting data quality objectives, regulators can take into account important differences in risks and in the need for precision, according to QAMS officials. For example, for a stream whose pollutant levels are already high, a regulator might want to be 99 percent certain that the sampling design would catch any discharge that exceeded permit limits because such a discharge might indicate problems with a facility's operations that would require EPA's or the state's attention. For water bodies under less stress, however, identifying 90 percent of all permit violations might be sufficient. Under the current approach, for which there are no quantitative measures of accuracy, regulators could be collecting either fewer data than they need to determine compliance or more data than they need and, hence, causing facilities to incur higher costs than necessary.

Conclusions

The RCRA and NPDES programs are missing a fundamental component of EPA's quality assurance system—statistically representative sampling. Because the samples are not statistically drawn, they can only be presumed to reflect overall groundwater or effluent conditions. As a result, EPA cannot have any statistical basis for confidence in its evaluation

of whether a RCRA facility is contaminating groundwater or whether an NPDES facility is in compliance with effluent limits.

The RCRA program has begun to determine whether statistically representative sampling is feasible, given the current level of scientific knowledge about hydrogeology; we encourage their efforts. The NPDES program has not undertaken such an effort. NPDES program officials have assumed that statistical sampling would be more costly than relying on permit writers' judgment, although they have acknowledged that the methodology might be worth examining. We urge them to go beyond examining the methodology and begin to develop statistical sampling plans. For one thing, they may find that in some cases, statistical sampling will be less costly. More importantly, without assurance that the samples now taken are statistically representative, NPDES officials may be basing compliance decisions on inaccurate data.

Recommendation

To ensure that discharge monitoring data are accurate and statistically representative, we recommend that the Administrator, EPA, direct the NPDES program to work with QAMS staff to develop data quality objectives and statistical sampling designs. These methods should then be incorporated into new permits as well as into those that come up for renewal.

Inspections and Reviews to Oversee Data Quality Are Not Conducted or Are Incomplete

As noted in chapter 3, once data quality objectives and sampling designs have been developed, EPA and authorized states are required to conduct periodic inspections and tests at facilities and laboratories to ensure that sampling and analysis requirements are being met. However, in surveying authorized states, which account for over three-fourths of all state RCRA and NPDES programs, we found that authorized states' inspections of NPDES facilities do not always include a review of sampling procedures. In the RCRA program, we found that these checks were being made but that in some cases they were done poorly.

Laboratory checks are even more spotty: No laboratory inspections or tests are done under the RCRA program, and no consistent performance standards exist or routine inspections occur under the NPDES program. Although EPA plans to institute a single national accreditation program for environmental laboratories conducting environmental work, the agency does not currently plan to require programs or states to use the program.

Finally, despite QAMS guidance that EPA and authorized state agencies assess their quality assurance programs to uncover and correct problems such as those described above, few management reviews have been conducted, not only in the NPDES and RCRA programs but, as EPA itself has recognized, across the agency. These quality assurance weaknesses are due to a lack of resources, competing priorities, and a lack of incentives for ensuring quality, according to EPA officials.

States' Inspections of Sampling Procedures at Facilities Are Incomplete or Poorly Done

Inspectors in over half of the NPDES-authorized states rarely reviewed facilities' sampling procedures, according to our survey. While most of the RCRA-authorized states that responded said that they routinely reviewed sampling procedures, we found that in one of the two regions we reviewed, the quality of the inspections was poor. Moreover, in both programs, a number of authorized states do not require inspectors to be trained in quality control procedures and sample collection techniques.

Inspections of Procedures for Collecting Wastewater Samples Are Often Incomplete

NPDES inspection guidance calls for reviewing sampling procedures during inspections that are designed, among other things, to verify self-reported monitoring data. According to this guidance, a review of sampling procedures should verify the proper operation of equipment used to collect and preserve samples and review the facility's written sampling procedures.

Three types of NPDES inspections intended to verify sampling data include a review of sampling procedures at the facility. The compliance evaluation inspection is designed to verify a facility's compliance with permit requirements and to review overall operation, maintenance, and sampling procedures. EPA's policy is to conduct compliance evaluation inspections—or another inspection that includes the elements of this inspection—at major facilities each year. Compliance sampling inspections include the same elements as compliance evaluation inspections but also include sampling by inspectors to directly verify the facility's sampling data. According to EPA policy, compliance sampling inspections are not scheduled regularly but rather are targeted at facilities that show permit violations or unusual trends or patterns in discharge monitoring reports suggesting invalid data. Performance audit inspections also include the elements of a compliance evaluation inspection but in addition require an in-depth review or observation of sampling procedures at the facility as well as a review of the laboratory conducting the analysis. Like compliance sampling inspections, performance audit inspections are not scheduled regularly but are targeted at facilities that show evidence of permit violations or unusual trends or patterns in discharge monitoring report data or at laboratories that show evidence of poor performance. According to our survey results, in state fiscal year 1991, 30 of the 36 responding NPDES programs reported conducting at least one of these three types of inspections at each major facility during state fiscal year 1991.[1]

EPA's NPDES Compliance Inspection Manual states that without proper procedures for collecting samples, the results of monitoring programs are neither useful nor valid, even with the most precise and accurate analytical measurements. Experienced EPA inspectors told us that they review sampling procedures in their inspections and believe that omitting this task increases the possibility that sampling errors will go undetected and that facilities will submit incorrect data. In addition, officials whom we contacted in two states that routinely review sampling procedures said that, without conducting such tasks during inspections, they could not ensure the accuracy of the discharge monitoring reports.

However, according to the results of our survey, although the majority of the authorized states responding to this question generally reviewed sampling procedures in some manner during performance audit inspections, they did not routinely do so during compliance sampling and compliance evaluation inspections. Of the 33 NPDES programs that provided information on how often they reviewed field sampling

[1]State fiscal years differ somewhat from state to state.

conditions and procedures during compliance evaluation inspections at major facilities during state fiscal year 1991, 21 indicated that they conducted these activities occasionally or seldom, if ever. In addition, 14 of these 21 states responded that they occasionally or seldom, if ever, reviewed sampling conditions and procedures during compliance sampling inspections for major facilities during state fiscal year 1991.

When we questioned officials in 3 of these 14 states, they said that not routinely reviewing sampling procedures was a deficiency in their states' compliance evaluation and compliance sampling inspection programs. These officials also believe that this deficiency had increased the possibility that facilities' sampling errors were going undetected and that sampling data could be incorrect. However, they added that limited resources would not allow their states to complete these tasks and still perform the number of inspections that EPA requires. Consequently, officials in these states said that inspectors had not reviewed sampling procedures at some facilities for several years, and in one state, an official said that inspectors might never have reviewed sampling procedures at a few facilities. The officials point out that EPA stresses the number rather than the quality or content of the inspections performed. EPA officials in headquarters took issue with this last point and said that they emphasized the quality as well as the quantity of inspections.

Some RCRA Inspections of Sampling Procedures Are Inadequate

Unlike states authorized for the NPDES program, according to our survey, most RCRA-authorized states report that they routinely review sampling procedures during their inspections. The RCRA program has two inspections that are designed, among other things, to verify sampling procedures and techniques at the facility. According to EPA policy, all RCRA land disposal facilities are required to receive one of these two inspections at least once every 3 years. The operation and maintenance inspection is designed to determine the ongoing adequacy of the groundwater monitoring system to produce accurate data. The comprehensive groundwater monitoring evaluation reviews the groundwater monitoring system in more depth and often includes sampling. Of the 30 state RCRA programs providing information on how often they reviewed field sampling conditions and procedures for operation and maintenance and comprehensive groundwater monitoring evaluations during state fiscal year 1991, 27 responded that they conducted this activity very often for operation and maintenance inspections while 28 reported that they

conducted this activity very often for comprehensive groundwater monitoring evaluations.[2]

Although our survey showed that most authorized states were reviewing sampling procedures during the RCRA inspections, we found that in Region VI, one of the two regions we reviewed, regional officials who observed state inspections found problems with their quality. For example, EPA Region VI conducted an oversight inspection in Oklahoma in 1990 and found that the state inspector did not have proper sampling equipment, did not have sufficient knowledge of the facility's sampling and analysis plan, and did not adequately review the facility's hydrogeology or site characterization information. In addition, a 1991 quality assurance report from the Oklahoma state laboratory, which analyzes samples collected during inspections, explained that the laboratory had difficulty analyzing samples properly because some inspectors had collected samples improperly and had not preserved the integrity of samples en route from the field to the laboratory.

EPA oversight inspections in Texas, Louisiana, and Arkansas during 1989 and 1990 revealed similar problems with the quality of inspections. According to regional officials, inspectors in these states conducted improper sampling at facilities, were unfamiliar with facilities' sampling and analysis plans and other basic information about facilities, or did not perform thorough reviews of facilities' procedures for collecting and analyzing samples. Region VI officials stated that the deficiencies found in these oversight inspections could affect the ability of state inspectors to detect errors in both the procedures used and the data reported by the facilities.

Despite the problems found in the fiscal year 1989 and 1990 inspections, the region did not increase its number of oversight inspections. Region VI RCRA officials claimed that other activities took priority, such as multimedia inspections, which involve inspectors from several programs in joint inspections. They added that they plan to review some state inspection reports but recognize that review of written reports is less thorough than on-site inspections.

According to RCRA officials, because of problems such as those cited above, the RCRA program decided to emphasize oversight inspections in its guidance to the regions for fiscal year 1993, and the fiscal year 1993 RCRA

[2]Although we received responses from 42 of 47 RCRA-authorized states, only 37 states reported having one or more land disposal facilities regulated under 40 C.F.R. 264. As a result, for questions about sampling data, we used results from only these 37 respondents.

implementation plan states that regions should generally oversee 10 percent of the states' inspections.

Not All States Require Sampling and Quality Assurance Training for Inspectors

Although state inspections of facilities are incomplete or improperly performed, EPA does not require states to train inspectors in key areas. As a result, not all states are conducting such training. Of the 37 state RCRA programs providing survey information on this issue, 21 indicated that they did not require training in facility/laboratory quality assurance/control procedures for inspectors conducting operation and maintenance and comprehensive groundwater monitoring evaluation inspections. In addition, eight programs said that they did not require training in sample collection techniques for inspectors conducting operation and maintenance inspections, and nine programs reported that they did not require this training for inspectors conducting comprehensive groundwater monitoring evaluations.

In the NPDES program, of 38 state programs providing information on this question, 25 did not require training in facility/laboratory quality assurance/control procedures for inspectors conducting compliance evaluation inspections, and 22 did not require it for inspectors conducting compliance sampling inspections. In addition, 17 state programs did not require training in sample collection techniques for compliance evaluation inspections, and 12 did not require it for compliance sampling inspections.

In follow-up discussions with four states that require training in quality assurance/quality control and sample collection techniques for either the RCRA or the NPDES program, state officials told us that this type of training was important to ensure that inspectors knew how to validate data by reviewing and observing facilities' sampling and analytical procedures. It was also important to ensure that inspectors could take their own valid samples during sampling inspections, they said.

In contrast to the states, EPA has required its inspectors since 1988 to complete basic training courses that, according to program officials, include training in all of the sampling techniques mentioned above. However, EPA has not required the same training for state inspectors because the agency wanted to see how its own agency programs would implement the directive before pressing programs to require authorized states to follow it. According to an Office of Enforcement official, EPA plans to evaluate the training requirement in fiscal year 1993 and will consider extending the order to states as part of its evaluation.

The RCRA and NPDES programs have offered their own inspector training classes to state inspectors, and officials estimate that in most of their classes, the majority of students come from states. However, these officials also note that their courses do not by any means provide training for the majority of state inspectors. To improve training for state inspectors, the RCRA office has begun to develop interactive videos for training. Training software for comprehensive groundwater monitoring evaluation and operation and maintenance inspections is in the development stage, and the program is trying to encourage states to invest in the hardware needed to run the program. According to a RCRA enforcement official, the states would each have to invest about $5,000 to obtain the hardware but would then have access to a number of training videos that the RCRA program plans to develop. The NPDES program enforcement officials have noted that they are also developing this type of training for state inspectors, including video tapes on sampling and performance audit inspections.

According to the Director of the RCRA Enforcement Division, the RCRA program prefers to take a "carrot rather than a stick approach" with states by making training readily available to states rather than requiring them to train their inspectors. This approach is preferable to simply requiring the training, she says, because the only means to enforce the requirement—threatening to withdraw program approval—is not a realistic sanction, since EPA does not have the resources to take over the programs and run them itself. However, according to a QAMS official, states that are financially strapped may not invest the $5,000 required for video equipment unless EPA specifically requires them to train inspectors as part of their state authorization.

Inspections and Tests of Laboratories Are Insufficient

To analyze the groundwater or surface water samples that they have collected, facilities either use their own laboratories or hire commercial laboratories. At these laboratories, regulatory agencies should conduct two types of oversight, according to the Director of QAMS. The first is an inspection to determine whether analytical requirements and controls are in place at a laboratory. Such an inspection would review, among other things, the accuracy of calibration records, the general cleanliness of the laboratory, the condition of equipment and facilities, the completeness and accuracy of maintenance and repair records, and other related items. The inspection's goal is to determine whether the laboratory is operating in a manner conducive to the reliable analysis of data.

The second oversight mechanism is a performance evaluation that is intended to indicate roughly whether the laboratory can, in fact, produce reliable analyses. To conduct a performance evaluation, EPA or an authorized state prepares samples of known content and quantity and generally sends the samples to the facility. The facility, which does not receive any information about the content or quantity of the "blind" samples, sends the samples to the laboratory that it usually uses for analysis. The laboratories know that the samples come from EPA or an authorized state and are part of a performance evaluation. After the laboratory analyzes the samples, the state or EPA compares the laboratory's test results with the known values to determine the laboratory's performance in analyzing the samples.

Despite the QAMS guidance, neither EPA nor the states routinely inspect or test the laboratories that analyze groundwater samples under the RCRA program. While the NPDES program currently conducts laboratory inspections and tests, it does not conduct inspections routinely, and regions differ in their definition of acceptable test results. EPA plans to begin developing a national environmental laboratory accreditation program sometime in fiscal year 1993 that would include requirements and standards for both laboratory inspections and tests. EPA will not require programs or states to use the accreditation program but will make it available for them if they wish.

EPA and States Do Not Inspect or Test Laboratories That Analyze RCRA Groundwater Samples

Although an internal RCRA study indicated a need for overseeing laboratories analyzing RCRA groundwater samples as early as 1988, the program has yet to implement any mechanisms to oversee laboratory performance. In 1988, EPA's RCRA Groundwater Task Force found that laboratories analyzing groundwater data did not have quality assurance/quality control procedures and did not always use correct analytical methods. Consequently, the task force recommended that the agency develop the resources and expertise to conduct inspections at these laboratories for use by both EPA and authorized states.

The RCRA program agreed to implement this recommendation and in 1988 developed guidance for a new inspection called the laboratory audit inspection, which is similar to the inspection that QAMS calls for. According to the guidance, the laboratory audit inspection was necessary to ensure accurate analysis of groundwater monitoring data. The laboratory audit inspection was designed to detect the use of improper procedures, identify violations, provide a mechanism to investigate anomalies in

owner/operator groundwater data sets or other concerns over the quality of data generated by individual laboratories, and determine whether laboratories were capable of generating high-quality analytical data.

Despite the issuance of this guidance, the RCRA program never required regions and authorized states to conduct laboratory audit inspections at RCRA facilities because program managers wanted to focus first on improving inspections of groundwater sampling at facilities. According to program officials, their experience indicated that opportunity for error was greater during sampling because many detailed steps were involved at this stage. A RCRA official said that a few states and regions might have begun using the laboratory audit inspection on their own, but because the program did not require the inspections, it did not keep track of the number.

According to our survey, however, only 13 out of the 37 RCRA state programs providing information on this subject conducted laboratory audit inspections or certified laboratories in connection with the RCRA program. Only one state indicated that it had conducted a laboratory audit inspection in state fiscal year 1991. In addition, 12 states indicated that they had certification programs for laboratories. Certification could include, among other things, inspections of laboratories, performance evaluations, and qualification requirements for laboratory personnel. Similarly, we found that the two regions we reviewed, V and VI, had never conducted any laboratory audit inspections.

Besides not requiring an inspection program, the RCRA program has never required performance evaluations at laboratories used by RCRA land disposal facilities. In the few cases in which laboratories were tested, a significant number of laboratories produced inaccurate test results. According to a regional official, in 1991 and 1992, EPA's Region V evaluated the performance of 12 laboratories that RCRA facilities in the region had planned to use to analyze groundwater monitoring data. The region conducted the evaluations because the facilities were going to begin cleanup actions and the region was unfamiliar with the laboratories they planned to use. According to their evaluations, 4 of the 12 laboratories accurately identified or quantified fewer than 80 percent of the analytes in the test samples. The regional office generally did not permit the RCRA facilities to use the laboratory if the laboratory's performance did not improve. Region III began to implement similar tests in fiscal year 1992 and conducted performance evaluations at three laboratories. Two of the three laboratories performed even more poorly than the Region V

laboratories, correctly identifying and quantifying fewer than 20 percent of the sample components.

The program's rationale for not developing performance evaluations is the same as that for not implementing laboratory inspections: Officials said that the potential for error is greater during sampling at the facility than during analysis of the samples at the laboratory, and they have therefore focused their attention there. In addition, conducting performance evaluations in the RCRA program would require the program to develop a complex set of samples for use in performance evaluations—a task that is beyond the RCRA program's current resources. Nevertheless, many EPA officials with whom we talked believe that the program needs to institute controls over its laboratories, including inspections and performance evaluations. As discussed later in this chapter, these officials believed that a centralized or single program for laboratories that all EPA programs could use might be the most efficient.

NPDES Performance Evaluations and Laboratory Inspections Have Weaknesses

In contrast to the RCRA program, the NPDES program runs a national performance evaluation program and requires regions and authorized states to inspect laboratories that analyze sampling data for NPDES facilities. These controls are important because, although some states have laboratory controls beyond those required by the NPDES program—16 of 38 reported that their state certifies laboratories that analyze wastewater discharge samples[3] —the remaining 22 states generally depend on the NPDES controls to ensure data quality at laboratories analyzing samples for NPDES facilities.

The NPDES Program Evaluates Laboratories' Performance

The NPDES program annually conducts a national performance evaluation of all laboratories used by major facilities. An EPA laboratory prepares samples with known constituents and concentrations and sends the samples to major permitted facilities. The samples contain constituents in quantities commonly found in industrial and municipal wastewater. The facilities then send the samples to the laboratories that they normally use to analyze their discharge samples. The laboratories are supposed to analyze these test samples using the same analytical methods and personnel they use for NPDES wastewater discharge samples. EPA requires laboratories to analyze and report only those pollutants specified in the facility's NPDES permit. Because EPA holds the permitted facility responsible for the quality of the discharge monitoring reports that it

[3]According to our survey results, laboratories are often certified on a program-specific basis. For example, some states certify laboratories that analyze wastewater samples under NPDES but do not certify those that analyze groundwater samples under RCRA.

submits, including the accuracy of laboratory analyses, EPA sends facilities a statistical evaluation of the results of their laboratories' performance evaluations and encourages regions or authorized states to follow up on the evaluations with the facilities when problems are identified.

According to an NPDES report on the results of the tests, the performance evaluation serves as a primary tool to ensure the quality of the NPDES self-monitoring data by evaluating the facility's ability to analyze and report accurate laboratory data. It also allows permittees to uncover laboratory problems and correct them voluntarily, according to an NPDES enforcement official. Over the 10 years that the national performance evaluation has been carried out, the NPDES program reports the percent of all correct analyses improved from 74 percent in the first year to 87 percent in the 10th.

Standards for Acceptable Performance Differ

Although the NPDES program office encourages follow-up on the results of performance evaluations, it has not set consistent standards for acceptable performance, leaving the regions to decide when follow-up actions should be taken. Regions must ensure that authorized states follow up with facilities whose laboratories perform poorly on the test, while in unauthorized states, the regions themselves conduct the follow-up. For minor concerns, such as values only slightly outside the acceptable range, the follow-up generally consists of a telephone call or letter. For more serious problems, a laboratory inspection is used.

We found, however, that EPA regions differ in their definition of acceptable performance. In EPA's Region V, which oversees six states authorized for the water program, if a laboratory performs fewer than 80 percent of all analyses correctly for 2 to 3 years, the region requires states either to watch the laboratory closely for further problems or, if necessary, to inspect the laboratory. EPA's Region VI, which has direct regulatory authority for enforcing the NPDES program in four of the five states in the region, primarily targets for inspection those laboratories that score 50 percent or lower on the test and have a history of violations. Region VI officials explained that the region does not have the resources to conduct more inspections, although it has asked for them, because it has focused on other priorities. NPDES program officials noted that Region VI might be anomalous because it has direct responsibility for a large number of states in its jurisdiction and therefore is likely to have more demands on the resources available for inspections. However, we found that the standard for a third region differs from that of both Regions V and VI; Region III

targets for inspection those laboratories that score 70 percent or lower on the performance evaluation.

The NPDES program has not set consistent criteria for follow-up because it wants regions and states to have the flexibility to focus on correcting problems at laboratories that show the most significant problems. For example, a state may choose to focus on a laboratory that has achieved an 85-percent rating but is performing analyses for 10 facilities rather than on a laboratory that has scored 75 percent but is conducting work for only 1 facility.

However, other EPA programs and states have adopted a different approach, and some experts have argued that the NPDES program should be more in line with these others. Four officials whom we talked to on EPA's Committee on National Accreditation of Environmental Laboratories, who are considered experts on water sample analysis, advocated the establishment of some criteria in the water program to ensure equal treatment at all laboratories and some consequences for poor performance on the tests.

For example, the state of New Jersey certifies laboratories to analyze specific analytes. In performance evaluations, if a laboratory does not correctly quantify an analyte for which it is certified, the laboratory must take the test again. If the laboratory fails a second time, it is suspended from analyzing that analyte for 6 months. Taking another approach, EPA's Superfund program—which has a certification program for laboratories under contract to EPA that analyze soil and water samples—uses an algorithm that considers not only whether a laboratory correctly identified and quantified analytes in the sample but also whether it incorrectly identified some constituents that were not in the sample. If a laboratory scores below 75 percent, EPA considers its performance unacceptable and may take a number of actions, including suspending or reducing the number of samples sent to the laboratory or conducting a site visit.

In any case, many officials thought that performance standards should be set high because laboratories know when the samples for the performance evaluations are coming and can assign their best technicians to the analysis rather than using their everyday practices. Since laboratories are given this test under such ideal conditions, some critics believe that the current average performance score of 87 percent is too low. Although NPDES officials agree that sending the samples to laboratories without informing the laboratories that the samples came from EPA might provide a

more representative test of the laboratories' abilities, they believe that administering such a test would be prohibitively costly because of the extra effort involved in masking the source of the samples.

Inspections Are Not Routine

In addition to calling for performance evaluations, QAMS guidance calls for routine inspections of laboratories, according to the Director of QAMS. During these types of inspections, inspectors are able to observe laboratories' operations and check laboratories' routine performance on actual discharge monitoring report samples by randomly selecting reports and reviewing the results against documentation supporting the analysis of the samples. As noted earlier, however, the water program's performance audit inspections are not scheduled regularly. The water program's policy is for states to target inspections at laboratories performing poorly on the performance evaluations or at facilities that show evidence of permit violations or unusual trends or patterns in discharge monitoring report data. Our survey results showed that most states follow EPA's guidance and target laboratory inspections rather than scheduling them on a regular basis. Of the 38 states that responded to our survey, only 4 of the 22 without laboratory certification programs scheduled performance audit inspections routinely—that is to say, at least once every 2 years.[4]

However, members of EPA's Committee on National Accreditation of Environmental Laboratories whom we contacted and QAMS officials said that routine inspections of laboratories were preferable to targeted ones because laboratories expecting regular visits were much more likely to maintain correct practices at all times. An official in one of the four states that conducted routine inspections noted that routine inspections were a key control to ensuring the quality of laboratory work at NPDES facilities. The water officials with whom we spoke said that they agreed that more routine laboratory inspections would be preferable but that they had not pressed the states to conduct routine inspections because of the shortage of inspection resources.

A National Laboratory Accreditation Program Is to Be Developed

EPA's Environmental Monitoring Management Council, which was instituted in 1990 to recommend coordinated agencywide policies concerning environmental monitoring issues, formed the Committee on National Accreditation of Environmental Laboratories in 1991 to study the feasibility of developing a national accreditation program for all EPA programs that use laboratories. The study was motivated by concerns

[4]Of the 16 states that reported having state certification programs, only 4 reported conducting performance audit inspections at least once every 2 years; these states may conduct additional types of routine laboratory inspections as part of their certification programs.

about the duplicative and conflicting requirements faced by laboratories that conduct analyses under more than one EPA program.

The committee recommended that EPA adopt a single national laboratory accreditation program and make it available for states and EPA programs to use if they wished. The model it recommended was a national uniform program that would be implemented by states and/or private sector third parties (such as organizations that set standards for laboratories) in accordance with standards set by a consensus group, whose members would come from the states, the laboratory community, and the federal government. The group would set uniform standards for laboratory performance, processes, facilities, equipment, staff, and quality assurance programs, and would require periodic inspections and testing of laboratories' performance, as well as standardized follow-up for poor performance. The federal government would oversee implementation of the accreditation program. In October 1992, the agency accepted the committee's recommendation and plans to start developing the program in fiscal year 1993. Current estimates for completion of the accreditation program range from 2 to 6 years, according to an EPA official.

While all EPA programs and states may participate in the national accreditation program, EPA does not plan at this time to require participation. Members of the accreditation committee with whom we talked, however, believe that a national accreditation program for laboratories would fill many of the gaps in controls over NPDES and RCRA laboratories. For the NPDES program, in addition to providing uniform standards for laboratories and their staff, an accreditation program would set standards for uniform follow-up of performance evaluations and routine inspections. For the RCRA program, a national certification program would eliminate the need for RCRA to develop its own laboratory oversight program. A RCRA-specific oversight program would likely only add to the problem of duplicative and frequently conflicting requirements for laboratories among EPA programs and authorized states, according to one RCRA official. The Director of the RCRA Enforcement Division agreed that having a centralized program would be more efficient than having the RCRA program develop performance evaluations and implement laboratory inspections on its own. NPDES program officials also agreed that a single laboratory inspection program for the agency seemed more efficient than having each program develop its own, since many of the programs use the same laboratories.

A centralized approach would ensure the review of all laboratories while eliminating inefficient multiple reviews of some laboratories, according to EPA officials. Currently, some laboratories may be inspected and tested a number of times if they conduct work in a state that requires certification or if they conduct work for programs, such as Superfund, that require routine oversight of laboratories. However, other laboratories may not be reviewed at all if they are in states with no certification program and are doing work for a program, such as RCRA, that does not oversee laboratories.

Besides the gaps we observed in the oversight of laboratories under the RCRA and NPDES programs, the EPA Inspector General has identified weaknesses in the agency's controls over laboratories analyzing pesticide data.[5] In March 1992, EPA's Inspector General found, among other things, that about 600 of the approximately 800 laboratories performing pesticide studies under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) had never been inspected, that only about 1 percent of the approximately 220,000 studies performed by the laboratories had ever been audited, and that the FIFRA program did not require performance evaluations or other types of proficiency testing of laboratories. In addition, a 1990 GAO report found that EPA had failed to inspect most of the laboratories performing disinfectant efficacy studies and that EPA inspectors generally did not observe disinfectant tests in progress.[6] The Inspector General therefore recommended that the FIFRA program consider developing a laboratory accreditation program and advocated a centralized program for all of EPA.

Programs Have No Management Reviews of Quality Assurance Programs

As noted in chapter 3, in addition to requiring inspections and tests to review how well quality assurance requirements are being carried out at facilities and laboratories, EPA's quality assurance system calls for management reviews to evaluate how well quality assurance is being carried out across an organization. However, we found that neither QAMS nor the EPA programs and regions have conducted reviews of their quality assurance programs—generally, because such reviews are not considered a high priority.

[5]Alternatives for Ensuring Accurate Laboratory Data (Report No. E1EPG1-11-0028-2400032, Mar. 31, 1992).

[6]Disinfectants: EPA Lacks Assurance They Work (GAO/RCED-90-139, Aug. 30, 1990).

Few Management Systems Reviews Have Been Conducted

According to QAMS training materials for quality assurance, a management systems review—a comprehensive, systematic evaluation of an organization's quality assurance program—is crucial. In such a review, individuals with knowledge of quality assurance techniques review management plans and budgets for quality assurance as well as data quality objectives, standard operating procedures, and quality assurance aspects of field and laboratory inspections. EPA sees these reviews as a key feature of the agency's quality assurance program because they assure top management that quality assurance plans are being implemented effectively, identify problems with quality assurance, and provide a mechanism to suggest corrective action.

EPA's 1984 order on quality assurance calls for reviews of quality assurance programs by both program offices and regions as well as by QAMS. Program offices and regions are supposed to conduct audits, which would include reviews of authorized state programs, every 2 to 3 years or have the audits conducted by QAMS. Despite these requirements, the NPDES national program office has not conducted management systems reviews of its own programs in the regions because it was unaware that it needed to do so. NPDES program officials said that their office performs other audits, such as permit reviews and midyear enforcement reviews, of the water program divisions in EPA's regional offices. However, we reviewed these audits and found that they were not intended to review quality assurance and did not focus on quality assurance concerns of management systems reviews, such as planning for quality assurance. Similarly, the RCRA office has not performed management systems reviews, although it did request QAMS' assistance in conducting a joint review of the RCRA program in early 1991. In addition, a RCRA permit review in 1990 included one element that would be covered in a management systems review—evaluation of the adequacy of the sampling and analysis plans incorporated in the permits. According to the Director of QAMS, the NPDES and RCRA program offices are not unique, and very few program offices have conducted quality assurance management reviews.

Moreover, QAMS has not reviewed the NPDES and RCRA programs, and it has not reviewed many other programs. QAMS has conducted only five management systems reviews in the past 7 years—one each in Regions IV and V, one in the FIFRA program, and two in the Superfund program. In the reviews of the regions, QAMS cited some of the problems discussed earlier in this chapter, such as weaknesses in inspections in the NPDES and RCRA programs, and recommended changes. The QAMS review of Region V

also pointed out the absence of laboratory performance assessment in the RCRA program.

The Director of QAMS recognized that the number of reviews conducted by her office fell short of requirements set forth in the program guidance. She added that, ideally, EPA programs should be audited by QAMS at least every 5 years. Since EPA currently has about 45 data collection offices—including headquarters programs, laboratories, and regions—QAMS should conduct about 9 management reviews per year. However, she said that QAMS has focused on its technical support role rather than on its management oversight role and that quality assurance training, data quality objective development, and contract management have taken priority over management systems reviews. She added that the QAMS staff has been reduced to six people, leaving few staff available for auditing.

In the regions we visited—V and VI—quality assurance offices have never conducted management systems reviews of the RCRA programs, and only Region VI has recently audited its water program, in 1990. In addition, neither region has ever conducted management systems reviews for RCRA and NPDES programs in the 10 states for which they have responsibility. Although quality assurance officials in both regions stated that they should be performing more reviews, they have not done so because the audits have been assigned a low priority. In addition, Water Management Division officials in both regions and the Assistant Director of the Region VI RCRA Management Division were unaware that their offices were required to provide the resources for these management reviews. According to the Director of QAMS, across EPA regions, management reviews have not been broadly conducted, although some regions have conducted reviews of some or all of their programs since 1990.

EPA's top management is aware that the agency's program for management oversight of quality assurance is not being implemented throughout the agency. In 1991, the Assistant Administrator for Research and Development identified "incomplete quality assurance documentation" as an agencywide material weakness under the Federal Managers' Financial Integrity Act. According to QAMS documentation, 16 of 48 EPA offices did not have approved plans, and at least 12 plans were more than 5 years old. The Director of QAMS said that although QAMS has requested the plans, EPA offices that do not submit management plans are not penalized, and many offices do not understand the importance of quality assurance. According to the Director of QAMS, the management plans are a necessary first step for defining and organizing quality assurance tasks. Once management

plans are in place, QAMS, as well as the programs and regions, can complete management systems reviews using the plans as the benchmark to evaluate whether quality assurance is being adequately carried out. As a result of this reported material weakness, QAMS requested the program offices to submit their management plans by the end of 1991. However, the Director of QAMS reported that, as of November 1992, only six additional offices had submitted their quality assurance management plans.

EPA management indicated that it was still concerned about quality assurance weaknesses when the EPA Administrator identified environmental data quality as a material weakness in his 1992 annual report to the President under the Federal Managers' Financial Integrity Act. The report notes that EPA does not perform any of the major functions of a quality assurance program adequately, including developing management plans and conducting management systems reviews. The agency plans to convene a task force to define the characteristics of a control system by mid-1993 and to correct all deficiencies by 1994.

In addition, the Office of Enforcement has also become concerned about the quality of self-reported data. As mentioned in chapter 2, the Office of Enforcement plans to begin a national initiative to focus on the integrity of self-reported data across all EPA programs. This initiative, which is to be implemented in fiscal years 1993 and 1994, is expected to include enforcement actions against facilities submitting inaccurate reports. The Office notes that data integrity is important because the attainment of nearly all of EPA's regulatory and enforcement goals relies on the submission of accurate data by the regulated community. These data are used to detect noncompliance as well as to develop rules, reduce pollution, and target enforcement actions.

EPA Officials Cite Many Reasons for Weaknesses in Quality Assurance Oversight

As previously noted, EPA program officials have often cited competing program priorities and, especially in the NPDES program, insufficient resources as the reasons for current weaknesses in quality assurance. As we have reported in the past, the costs of environmental protection have been steadily increasing over the past decades while the federal and state resources available to pay for the higher costs have remained constant or increased only slightly. As a result, EPA and states are experiencing funding shortfalls.[7]

[7]Water Pollution: Stronger Efforts Needed by EPA to Control Toxic Water Pollution (GAO/RCED-91-154, July 19, 1991).

In addition, some officials noted that quality assurance offices are often placed too low in EPA's organizational structure to gain the attention of program offices and regions. For example, at headquarters, agencywide responsibility for quality assurance is housed within an office within the Office of Research and Development. Hence, the Director of QAMS, who is responsible for overseeing data quality across EPA's headquarters and regions, is several layers removed from the EPA Administrator.

Still other officials have noted that an underlying cause of the relatively low priority accorded to quality assurance may be the lack of incentives in the agency for ensuring the quality of environmental data. A 1984 order on quality assurance cites the need to hold management accountable for quality assurance. Nevertheless, according to the Director of QAMS, EPA's major system for ensuring accountability and driving agency work in the field—the Strategic Targeted Activities for Results System (STARS)—has not had indicators for quality assurance for at least 5 years. Since managers respond to the indicators, not having quality indicators has contributed to the low emphasis on quality assurance, according to this official. We have reported on the lack of incentives for quality in the agency before, finding that the agency's accountability system largely measures the number of activities the agency completes, such as enforcement actions or permits issued, but not the quality or the environmental results of these activities.[8]

Conclusions

Given the importance of groundwater monitoring data and wastewater discharge monitoring data to the RCRA and NPDES programs, the weaknesses we found in the mechanisms for overseeing quality assurance in these programs are of great concern. Although, as mentioned in chapter 3, the programs are not taking statistically representative samples, the programs have guidance for facilities to use in collecting and analyzing samples. However, without adequate inspections at facilities and laboratories, EPA has little assurance that sampling and analysis are being carried out properly and yielding accurate information. Moreover, EPA's management systems reviews, which are intended to detect and correct the kinds of quality assurance problems discussed in this report, are not working—not only in the RCRA and NPDES programs but across the agency. Problems not only go unnoticed but, even when management reviews are conducted, as in the QAMS reviews of Regions V and VI, some problems are left uncorrected.

[8]Environmental Protection Agency: Protecting Human Health and the Environment Through Improved Management (GAO/RCED-88-101, Aug. 16, 1988).

In view of the reasons officials have given us for the problems with inspections and reviews—competition among program priorities, insufficient resources, the low placement of quality assurance in the agency's organization, and the absence of incentives for quality—we believe that more management attention to quality assurance is warranted. In acknowledging the problem, the Administrator's identification of quality assurance as an agencywide weakness and the Office of Enforcement's initiative on the integrity of self-reported data are important first steps. Still needed are actions to improve EPA's and the states' abilities to detect errors at laboratories and facilities.

We recognize that with limited resources and a large number of programmatic and legislative requirements, EPA has to assign priorities to activities and limit funding for some programs, with the result that some programs cannot receive the funding they need. And we can understand why quality assurance is relatively easy to pass over—its effects, unlike permits or enforcement actions, cannot easily be counted, and it does not produce an immediate environmental result, such as the cleanup of a contaminating spill.

However, in some cases, improvements in quality assurance could be made by employing cost-effective techniques that the agency has already begun to develop. For example, training to the states could be extended through interactive videos already being developed by both programs, although states may not take advantage of these videos if they are not required to train their inspectors. Laboratory oversight could be improved—and efficiencies gained—if EPA were to adopt a more uniform, centralized approach, such as a national accreditation program, that would cover not only the NPDES and RCRA programs but also other EPA programs and states authorized to administer the programs.

Moreover, as an EPA orientation manual for quality assurance asserts, while a functioning and rigorous quality assurance program is not particularly attention-grabbing, the lack of one can be. Important decisions are based on environmental data and those based on inaccurate data can lead to greater risks to health and the environment or unnecessary or inappropriate expenditures. And each time these mistakes are made, EPA and the regulatory system it oversees lose credibility.

Recommendations

As EPA itself has noted in its call for quality assurance management plans and reviews in all programs, all EPA programs that depend on self-reported

sampling data for monitoring compliance with environmental regulations and the quality of the environment should have in place a rigorous system for ensuring the reliability and accuracy of such data. To implement such a system, we recommend that the Administrator, EPA,

- work with the states to ensure that their inspections of facilities in the NPDES and RCRA programs include complete and effective reviews of sampling procedures;
- require that state inspectors in the NPDES and RCRA programs be trained in quality assurance and sample collection techniques, and continue to develop training for states to use;
- develop a coordinated approach to laboratory inspections and performance evaluations, either through a national accreditation program or through some other agencywide program, and require its use by the NPDES and RCRA programs, as well as by other programs that EPA identifies as appropriate; and
- direct the NPDES and RCRA programs, as well as other programs and regions that EPA identifies as appropriate, to work with QAMS to schedule management systems reviews and correct any problems found.

Because the ultimate success of quality assurance depends on attention to quality at all levels, we also recommend that the Administrator include data quality as a performance measure for which senior management is held accountable.

Controls to Prevent and Detect Fraudulent Data Are Insufficient

The reliability of data may be compromised not only by error but also by deliberate falsification of the results of sampling and laboratory analysis. Although EPA program officials and inspectors generally believe that this falsification is rare, the agency is pursuing some cases in the RCRA program and has prosecuted some in the NPDES program. To detect irregularities, regulatory officials can take a number of steps, such as conducting regular inspections at facilities and laboratories and reviewing documentation that supports sampling results. However, our state survey results indicate that some authorized states do not routinely employ these techniques to detect fraud at either major NPDES facilities or permitted RCRA land disposal facilities. As a result, these states may not be detecting as many falsification problems as could be detected by routine measures.

Facilities Have Incentives and Opportunities to Falsify Data

EPA officials acknowledge that both NPDES and RCRA facility operators have incentives to falsify sampling results. In the RCRA program, evidence of contamination means that facilities have to monitor groundwater more extensively and may have to pay for remediation. In the NPDES program, evidence of discharge above permit levels triggers enforcement actions that can result in penalties and adverse publicity. The incentive for falsification may be particularly great if the problem is caused by a flaw in the design of a facility's wastewater treatment system, which can be very expensive to fix. Some EPA enforcement officials mentioned that they were especially concerned about falsification at municipally owned facilities because these facilities have constraints on funding and in the last few years federal grants for these plants have been cut back. In addition, these plants must not only keep their wastewater treatment facility running but also keep their collection systems working properly. If the collection systems are not monitored and kept in working order, the wastewater treatment systems may not be able to treat wastes properly before discharging them.

Commercial laboratories used by facilities to process samples also have incentives for falsification. Headquarters program officials do not know exactly how many permitted RCRA land disposal facilities and major NPDES facilities use commercial laboratories to analyze some or all of their monitoring samples, but they believe that a large number do. These commercial laboratories may falsify data—with or without the knowledge of the facility owners/operators—in order to save money or handle more work.

Facility or laboratory owners/operators have opportunities to falsify data during at least three points in sampling and analysis: while collecting the samples, while analyzing the samples in the laboratory, and after receiving the results of the analysis from the laboratory. According to program officials, data can be falsified in several ways at each of these points, as table 5.1 shows.

Table 5.1: Opportunities for Falsifying Sampling Results

Step in process	Falsification methods
Collecting samples at the facility	Not using a preservative as required, not refrigerating an unstable sample, or keeping a sample too long before beginning analysis and allowing the sample to alter naturally.
	Diluting a sample with tap water before analyzing it.
	Taking samples of wastewater when a facility is discharging less waste than usual or at a location past which the discharge does not flow.
	In groundwater, taking some samples before purging the monitoring well to lower measurements of constituents that float on water.
Analyzing samples at the laboratory	Recording false results without ever analyzing the sample ("dry-labbing").
	Changing dates on calibration results to avoid recalibrating instruments.
	Calibrating instruments incorrectly.
Reporting results	Reporting plausible test results without ever actually sampling the groundwater or effluent.
	Changing results received from the laboratory.

While most officials we spoke to in EPA Regions V and VI said that they believed data falsification in the RCRA and NPDES programs was rare, some noted cases in which fraud was strongly suspected and follow-up action was taken. When falsification of information is suspected, cases with strong evidence may be prosecuted criminally, according to EPA Office of Enforcement officials. Cases without strong evidence of criminal activity are subject to enforcement actions that range from closer scrutiny through inspections and follow-up on data submissions to civil litigation, including administrative penalties.

The agency is currently working on some cases involving potential falsification of groundwater monitoring data. In addition, according to EPA, 15 Clean Water Act criminal cases have been concluded in fiscal years 1989-92 involving falsification of discharge monitoring reports. Moreover, although the number of such cases is not readily available, NPDES officials believe that some suspected falsifications have been prosecuted as civil cases. According to EPA's Office of Enforcement officials, these cases were generally discovered through anonymous calls or tips to inspectors from disgruntled employees.

For example, in a case under investigation as of January 1993, employees taking NPDES samples at an electrical power plant allegedly diluted some of the samples with clean water and took other samples from a holding pond that had allegedly been diluted with clean water just before the sampling. According to a company document, analysis of these samples showed lower pH and sulfate levels than were actually occurring. According to state officials, the power plant, which opened in 1990, has had equipment failures that may have caused the facility to exceed its permit limits. An employee reported the incident to officials at the plant, who then notified EPA. The company is currently investigating the charges of falsification, and EPA may investigate after the company's investigation is complete.

In another 1991 case, two managers of a small city wastewater treatment plant directed workers to falsify laboratory results so that the results would fall within a certain range. The supporting documentation, including laboratory bench sheets, was likewise falsified to corroborate the data as reported on the discharge monitoring reports. When a sampling inspection by the state showed inconsistencies between the state's and the facility's results, the state inspected the laboratory. When asked during an inspection about the discrepancies between the results, two of the staff confessed to falsifying the data and admitted that the practice had been going on for at least 9 years.

Techniques Are Available to Detect and Deter Falsification

According to enforcement theory, facility operators are deterred from violating the law if they believe that their violations will be detected and that punishment will be swift and will outweigh the benefits of the crime. According to EPA criminal enforcement officials, programs can take a number of actions to prevent and detect falsification of groundwater and surface water sampling results. First, regulatory agencies must inspect facilities and laboratories routinely enough to persuade them that if they falsify data, they will probably be caught. During inspections of facilities

and laboratories, inspectors can compare sampling reports to supporting documents to validate the sampling data. For example, inspectors can check the sampling results against sampling records—noting the date, time, and location of sampling—and against laboratory records—noting the time and dates of analysis, instrument calibration records, and results of quality control samples. Such reviews could reveal discrepancies that could be investigated further to determine whether they were due to error or falsification. Moreover, if a facility is submitting fraudulent sampling results, a review may show that some backup documentation is missing altogether. Most EPA regional and state officials we talked to about fraud believe that conducting such reviews is one of the most effective mechanisms for detecting falsification during inspections.

Also, during a facility inspection, an inspector can take an independent sample or split a sample that the facility has taken and have it analyzed in a state or EPA laboratory. Any discrepancies between the regulatory agency's and facility's results indicate problems during either sampling or analysis. However, independent and split sampling have their limitations as tools to identify errors or falsification, according to EPA regional officials. First, if discrepancies are found, further investigation is needed to determine what caused the problem—not only the facility's but also the state's or EPA's sampling and/or analysis could be incorrect. Second, in the NPDES program, sampling may not always show falsification that is occurring. For example, if a facility exceeds its permit limits only during peak production periods and only falsifies reports during peak times, the inspector's own sampling will not detect the falsification if he or she samples on an off-peak day. Because of these limitations, both the RCRA and NPDES programs generally require a review of documentation for initial indications of problems and use independent or split sampling to confirm these indications.

In the NPDES program, direct inspections can be supplemented by reviews of a facility's data over time. Although an inspector may compare a sample report to all backup documentation, if a facility is also falsifying the documentation, this approach might not detect the falsification. However, a review of trends in the facility's sampling reports against results expected from such a facility might reveal irregularities that an inspection could not. In the RCRA program, this type of review would not be as useful because groundwater monitoring is not concerned with discharge patterns but with a single event—leakage from a RCRA facility.

EPA officials cautioned that many types of fraud, especially falsification during sampling at the facility, may be difficult to detect even if all of the above techniques are used. For example, if a facility chooses to hold a sample before sending it to the laboratory so that some unstable compounds are destroyed and the facility does not record the correct sampling time in log books, the fraud may be impossible to detect by routine measures. Only a witness, usually a disgruntled current or former employee, can provide evidence for an enforcement case in such circumstances.

Detection and Deterrence Techniques Are Not Conducted in All States

Our survey of authorized states indicates that one of the techniques discussed above, taking independent or split samples, is generally being carried out by the majority of authorized states in both programs. All of the 34 NPDES-authorized states and 28 of the 31 RCRA-authorized states responding to these questions reported that their inspectors very often or occasionally took independent samples, analyzed split samples, or performed both tasks during facility inspections that included sampling among the required tasks. However, three RCRA-authorized states responded that they seldom if ever took independent samples and seldom if ever analyzed split samples during these inspections. In addition, we found that most NPDES-authorized states routinely compared incoming to prior discharge monitoring reports to assess the consistency of the results—28 of the 38 responding states indicated that they made this comparison at least often.

However, as noted in chapter 4, neither program requires routine inspections of laboratories and, not surprisingly, we found that a number of states were not conducting routine laboratory inspections. We also found that some states in the NPDES program did not routinely trace sampling results back to supporting documentation during facility inspections. Moreover, although EPA provides fraud training to some state inspectors, neither EPA nor many authorized states require state inspectors to have fraud awareness training.

Lack of Routine Laboratory Inspections Hinders Fraud Detection

As mentioned in chapter 4, the RCRA program does not require, nor do its authorized states generally conduct, inspections of laboratories performing analyses for RCRA facilities. Moreover, because inspection resources are limited, the NPDES program and its authorized states conduct inspections on a targeted rather than a routine basis. The lack of routine laboratory inspections not only affects quality assurance but also reduces

the states' ability to detect and deter fraud. According to EPA officials and officials on EPA's Committee on National Accreditation of Environmental Laboratories, routine laboratory inspections with reviews of supporting documentation are the most effective method to detect fraud. During such a review, inspectors compare records of when, where, and how the analysis was done, of bottle numbers, of dilution factors used, of calibration records, and of the results of quality control samples.

In the NPDES program, such inspections could be used, among other things, to detect fraud in the performance evaluations that EPA conducts annually at facility laboratories. For example, three officials on EPA's Committee on National Accreditation of Environmental Laboratories whom we talked to were concerned that some laboratories did not analyze performance evaluation samples themselves but rather sent the samples to other laboratories for analysis and then fraudulently reported the results to EPA as their own. Under EPA's current policy, such facilities might not be targeted for inspections because their performance evaluation results would be acceptable. However, if the program were requiring routine laboratory inspections, including reviews of supporting documentation, inspectors would be more likely to discover this type of fraud.

Moreover, one of the few states that routinely inspects NPDES laboratories has often found cases of fraud through these inspections. In part because of the importance of these inspections to fraud detection, the state of Maryland attempts to inspect laboratories every 18 months for major facilities and about every 3 years for minor facilities, according to state officials. Since 1989, the state has completed or had under way prosecutions of close to 30 cases of alleged laboratory fraud involving the falsification of discharge monitoring report data by contract laboratories, certified wastewater treatment plant operators, and municipal laboratories performing analyses for a municipality. Many of the laboratories served minor dischargers, but a few also served major dischargers. Because a single laboratory usually served several facilities, the cases actually involved about 90 NPDES facilities in Maryland.

For example, according to a Maryland inspector, one commercial laboratory that analyzed samples for 60 different facilities in the NPDES, RCRA, and drinking water programs had only one analyst. Because he could not handle this volume of work, he fabricated sample results rather than analyzing the samples. In another case, the inspector witnessed a laboratory analyst falsify a month's worth of supporting documentation without being observed by the analyst. When the inspector asked the

analyst to provide supporting documentation that did not exist, the analyst went into the next room, took a form, and started writing in the numbers.These cases, as well as most of the other Maryland cases, were discovered during laboratory inspections by tracing discharge monitoring reports back to supporting documentation. According to the inspector responsible for uncovering the alleged fraud, this review is the single most important task to perform during a laboratory inspection and, although time-consuming, should never be slighted. According to this inspector, if other states are not conducting routine laboratory inspections during which they trace reported data to supporting documentation, they could be missing a substantial amount of fraud.

In addition, officials of at least one EPA regional laboratory have had concerns about the quality of data validation carried out during NPDES laboratory inspections conducted by EPA or state officials in the region. Officials in the regional laboratory have noticed that because laboratory inspections are time-consuming, inspectors do not spend enough time tracing discharge monitoring reports to supporting documentation. Hence, the laboratory is developing a new type of inspection, called a data audit inspection, that will focus in more depth on validating data. The Region III laboratory is currently writing the standard operating procedures for such an inspection.

Documentation Is Reviewed During RCRA but Not Always During NPDES Inspections of Sampling

Tracing sampling results against supporting documentation is important during facility inspections as well as laboratory inspections. This is necessary, according to RCRA and NPDES officials, because while many facilities use independent laboratories to analyze their samples, some have their own laboratories on-site to analyze some portion of their samples. As a result, during facility inspections, inspectors can check sampling results against supporting documentation for these analyses. Moreover, at NPDES facilities, a number of common characteristics or constituents that are limited by the permit, such as pH, chlorine, and dissolved oxygen, are unstable and must be analyzed on-site. EPA inspection guidance in both the RCRA and the NPDES programs recognizes these situations and calls for tracing sampling results against supporting documentation during all facility inspections used to verify self-reported data.

According to our survey, inspectors in most state RCRA programs routinely trace groundwater monitoring reports back to supporting documentation during facility inspections. Of the 30 states responding to this question, 27 said that they compared groundwater monitoring reports to supporting

documentation very often for operation and maintenance inspections in state fiscal year 1991. In addition, 31 of 32 responding states indicated that they did likewise on comprehensive groundwater monitoring evaluations.

In contrast, however, in a number of the states authorized for the NPDES program, officials said that inspectors did not routinely trace discharge monitoring reports back to supporting documentation during a facility inspection. Twelve of 35 responding programs said that they occasionally or seldom, if ever, checked discharge monitoring reports to supporting documentation for compliance evaluation inspections at major facilities conducted in state fiscal year 1991. For compliance sampling inspections, 15 of 34 programs indicated that they conducted this activity on occasion or seldom, if ever.

Yet, as we found for laboratory fraud, most regional inspectors mentioned that checking reports against supporting documentation is the single most effective means of detecting fraud during facility inspections, and regional inspectors have detected fraud in such cases. After hearing about this finding, NPDES program officials said that they plan to pay more attention to this issue in midyear audits of the regions.

Few States Require Fraud Awareness Training

Few RCRA- and NPDES-authorized states require their inspectors to take fraud awareness training, according to our survey results. Of the 37 RCRA programs responding to this question on our survey, 5 reported that they required training in fraud awareness for inspectors conducting operation and maintenance inspections, and 4 said that they required such training for comprehensive groundwater monitoring evaluations. For the NPDES program, 3 of the 38 responding state programs reported that they required fraud awareness training for inspectors conducting compliance evaluation inspections and compliance sampling inspections, while 4 state programs indicated that they required such training for performance audit inspections. In one state whose resources did not support fraud awareness training, an official believed that such training was needed because a few cases of fraud in both programs had been reported in the last few years by facility employees rather than by inspectors.

Although the Federal Law Enforcement Training Center in Glynco, Georgia, provides a course in fraud investigation for some state inspectors and law enforcement officials, it does not cover all inspectors in all states. According to the EPA investigator who teaches the course, about 45 to 60 inspectors from various states take the course each year.

In contrast to the states, EPA requires its inspectors to take a basic course on the fundamentals of environmental compliance inspections. This course provides information on fraud, according to EPA officials, including information on criminal authorities as well as on how to note irregularities when conducting file reviews and how to find corroborating evidence for any irregularities found. However, according to the program analyst responsible for evaluating the training requirement, when the inspector training curriculum is revamped during 1993, more emphasis on fraud detection, including specific examples of how fraud has occurred in the past, may be added to the EPA program.

The problems of data falsification are not unique to the RCRA and NPDES programs, and other programs are taking steps to enhance fraud detection. For example, in the Superfund program, which hires laboratories to analyze soil and groundwater samples from Superfund sites, four laboratories have been convicted, 18 individuals have been indicted for fraud, and many more laboratories are being investigated. These cases have typically involved false statements or claims, most of which relate to altering documentation for samples that were not processed within the required period of time. To avert these problems, the Superfund program is developing more complete methods of reviewing for fraud during laboratory inspections and has proposed regulations to ensure more consistent handling of investigations once fraud is suspected.

In its 1991 report of material weaknesses under the Federal Managers' Financial Integrity Act, EPA found, among other things, that EPA inspectors of laboratories performing analyses of pesticides for registration purposes were not trained in fraud awareness. The pesticide program responded, according to the 1992 report, by initiating an inspector training program in September 1992 that included fraud detection. As mentioned earlier in this chapter and in chapter 1, the drinking water program found falsification of sampling data reported by public water systems and has, as a result, initiated changes to its program, such as making the review of records for potential falsification a standard oversight procedure. And finally, the Office of Enforcement has recognized the findings of some of these programs and plans to take enforcement actions against those that falsify self-reported data as part of its agencywide initiative, also discussed in chapters 2 and 4, to improve the integrity of self-reported data.

Conclusions

While most facilities may be honest, we believe that—in view of the incentives that facilities have to falsify records and the importance of

detecting and deterring fraud to the integrity of a self-reported sampling system—EPA needs to have more complete and consistent methods to detect fraud. Currently, the NPDES program does not routinely inspect laboratories, and the RCRA program does not inspect laboratories at all. As a result, regular comparison of laboratory results to backup documentation, which officials believe is a key means of detecting fraud, is not occurring. Moreover, some states in the NPDES program are not routinely tracing discharge monitoring reports back to supporting documentation during facility inspections. Finally, limited fraud awareness training for state inspectors in both programs raises questions about the effectiveness of current inspections in detecting fraud.

Although the improvements to EPA's quality assurance system that we recommend in chapter 4 will not necessarily protect the agency against fraud, they will require review of sampling procedures during facility inspections, establish a more regular inspection program for laboratories, and provide for better-trained inspectors. Beyond these steps, both programs need to ensure that states routinely compare data to supporting documentation during laboratory inspections and, in the case of the NPDES program, during facility inspections. Both programs also need to ensure that inspectors are trained in fraud awareness as well as in quality assurance and sample collection techniques.

Recommendations

To better detect and deter fraud in self-reported sampling data, we recommend that the Administrator, EPA, require the RCRA and NPDES programs to

- ensure that routine laboratory inspections in both programs, as called for in chapter 4, and inspections of facilities in the NPDES program include a review of supporting documentation and
- require that training for state inspectors, as called for in chapter 4, include fraud awareness training.

Selected Results of Surveys of Authorized States

As described in chapter 1, we obtained information about state efforts to ensure the accuracy of self-reported data by surveying the 47 states and territories authorized to administer the RCRA program and the 39 states and territories authorized to administer the NPDES program. We received responses from 42, or 89 percent, of the RCRA-authorized states and 38, or 97 percent, of the NPDES-authorized states. However, each responding state did not answer every question on the survey. Moreover, in the RCRA program, because only 37 of the 42 responding states reported having one or more land disposal facilities regulated under 40 C.F.R. 264, we used only the survey results from these 37 respondents for questions about sampling data. The tables that follow present selected results from these surveys; these results are discussed in chapters 4 and 5 of this report.

Table I.1: Number of RCRA-Authorized States That Reported Reviewing Field Sampling Conditions and Procedures (State Fiscal Year 1991)

	Number of states that reported reviewing for	
Frequency of review	Operation and maintenance inspections	Comprehensive groundwater monitoring evaluations
Very often	27	28
On occasion	3	2
Seldom, if ever	0	0
Missing	7	7
N=37		

Table I.2: Number of NPDES-Authorized States That Reported Reviewing Field Sampling Conditions and Procedures (State Fiscal Year 1991)

	Number of states that reported reviewing for	
Frequency of review	Compliance evaluation inspections	Compliance sampling inspections
Very often	12	17
On occasion	12	14
Seldom, if ever	9	5
Missing	5	2
N=38		

Table I.3: Number of RCRA-Authorized States Reporting No Inspector Training Requirement for Selected Procedures

Inspection type	Number of states reporting no training requirement for: Sample collection techniques	Facility/laboratory QA/QC[a] procedures
Operation and maintenance	8	21
Comprehensive groundwater monitoring evaluation	9	21
Laboratory audit inspection	27	29
N=37		

[a]QA/QC=quality assurance/quality control

Table I.4: Number of NPDES-Authorized States Reporting No Inspector Training Requirement for Selected Procedures

Inspection type	Number of states reporting no training requirement for: Sample collection techniques	Facility/laboratory QA/QC procedures
Compliance evaluation inspection	17	25
Compliance sampling inspection	12	22
Performance audit inspection	19	16
N=38		

Table I.5: Number of RCRA-Authorized States That Reported Conducting Laboratory Audit Inspections (State Fiscal Year 1991)

	Number of states
Conducted inspections[b]	1
Did not conduct inspections	17
Missing	19
N=37	

[b]Twelve states also reported having state laboratory certification programs. Although none of these 12 reported conducting laboratory audit inspections, these states may conduct additional types of routine laboratory inspections as part of their certification programs.

Table I.6: Number of NPDES-Authorized States That Reported Conducting Routine Performance Audit/Laboratory Inspections at Least Once Every 2 Years

	States conducting routine inspections	Total number of states
States with laboratory certification[c]	4	16
States without certification programs	4	22
Total	**8**	**38**

[c]States with laboratory certification programs may conduct additional types of routine laboratory inspections as part of their certification programs.

Table I.7: Number of RCRA-Authorized States That Reported Comparing Groundwater Monitoring Reports to Supporting Documentation (State Fiscal Year 1991)

	Number of states that reported making comparisons for	
Frequency of Comparison	**Operation and maintenance inspections**	**Comprehensive groundwater monitoring evaluations**
Very often	27	31
On occasion	3	1
Seldom, if ever	0	0
Missing	7	5
N=37		

Table I.8: Number of NPDES-Authorized States That Reported Comparing Discharge Monitoring Reports to Supporting Documentation (State Fiscal Year 1991)

	Number of states that reported making comparisons for	
Frequency of comparison	**Compliance evaluation inspections**	**Compliance sampling inspections**
Very often	23	19
On occasion	10	8
Seldom, if ever	2	7
Missing	3	4
N=38		

Table I.9: Number of RCRA-Authorized States Reporting No Inspector Training Requirement for Fraud Awareness

Inspection type	**Number of states reporting no training requirement**
Operation and maintenance	32
Comprehensive groundwater monitoring evaluation	33
Laboratory audit inspection	36
N=37	

Table I.10: Number of NPDES-Authorized States Reporting No Inspector Training Requirement for Fraud Awareness

Inspection type	**Number of states reporting no training requirement**
Compliance evaluation inspection	35
Compliance sampling inspection	35
Performance audit inspection	34
N=38	

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