United States General Accounting Office

GAO

Briefing Report to the Chairman, Subcommittee on Environmental Protection, Committee on Environment and Public Works, U.S. Senate

June 1992

WATER POLLUTION MONITORING

EPA's Permit Compliance System Could Be Used More Effectively

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1992

GAO/IMTEC-92-58BR

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B-248721

June 22, 1992

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
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CHARLESTON, SC 29405-2413

The Honorable Max Baucus
Chairman, Subcommittee on
Environmental Protection
Committee on Environment and
Public Works
United States Senate

Dear Mr. Chairman:

To assist you in your efforts writing proposed amendments to the Clean Water Act, we reviewed specific capabilities of the Environmental Protection Agency's (EPA) Permit Compliance System (PCS). PCS is the information system that supports the National Pollutant Discharge Elimination System (NPDES), a Clean Water Act program that issues permits and tracks facilities that discharge pollutants into our navigable waters.

You expressed concern that PCS may not have adequate capabilities to maintain various data elements or perform analyses, and that it does not include detailed data[1] on all facilities, both major and minor,[2] regulated under NPDES. Without these capabilities and data, a clear picture of what is being put into our waters cannot be formed.

As agreed with your office, we determined (1) whether PCS had capabilities to maintain various data elements and perform analyses, (2) if EPA had assessed any alternative technologies to the existing data entry process, (3) the number of facilities in PCS with detailed data, particularly minors, (4) the estimated resource expenditures for minor facility data entry and update, and (5) the approximate operating costs of PCS.

We provided the results of our work in a formal briefing to your office in May 1992, and agreed to prepare this report containing the charts used in the briefing (see app. I).

[1]Detailed data are all data that are required to monitor a facility's water discharge. Detailed data consist of facility name and location, permit discharge limits, discharge monitoring report information, and related enforcement action and inspection data.

[2]EPA classifies a facility as either a major or minor discharger depending on established criteria such as the flow of the discharge or the potential impact the facility will have on a water body or public health.

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Background

The NPDES program regulates facilities that discharge pollutants into our navigable waters. Implementation authority lies with EPA's 10 regional offices and 39 delegated states. The regional offices also retain implementation authority for nondelegated states in their region. Delegated authorities issue permits, set effluent limits and monitoring requirements, track compliance, and carry out enforcement actions.

According to EPA records, there are approximately 7,100 major and 57,000 minor facilities regulated under NPDES nationwide. To monitor compliance, delegated authorities conduct inspections and screen facility-submitted discharge monitoring reports (DMR) that include pollutant discharge measurements. When a facility discharges above a permitted limit or does not report all required data, enforcement actions may follow.

PCS was developed in 1974 to support the NPDES program. It resides on a mainframe computer at EPA's National Computer Center (NCC) in North Carolina. Data are entered into PCS by states or EPA regional offices either by direct entry or batch updates. Delegated authorities are required to enter and maintain detailed data on all major facilities in PCS. For minor facility dischargers, EPA only requires the facility name and address, permit event data, and inspection data to be maintained in the system, although some authorities choose to enter detailed data. PCS is used to monitor compliance for major facilities and can be used for minor facilities if detailed data are in the system. EPA uses PCS to produce reports of major facility discharge and compliance activities under the NPDES program.

Summary

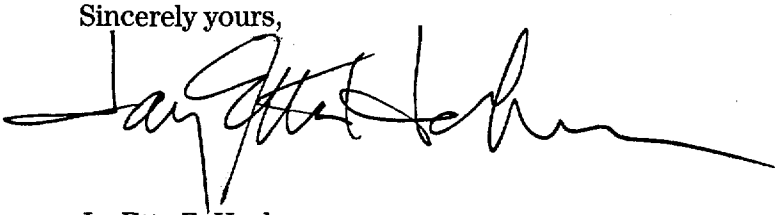
PCS has capabilities that enable EPA to monitor and track compliance of permitted facilities. However, many PCS users said that some of the capabilities are difficult to use because the system is not user-friendly. In addition, use of PCS varies among delegated authorities. Of the 64,227 NPDES facilities, we found that all major facilities (7,139) and 21,187 minor facilities have detailed data in PCS. EPA is considering using new technologies to facilitate more efficient data entry. We estimate that currently 76 full-time equivalents (FTE) are required to enter detailed data for the 21,187 minor facilities in PCS. We also determined the total operating cost for PCS, including state data entry costs, to be approximately $5.9 million in fiscal year 1991.

As agreed with your office, we did not obtain official comments on a draft of this report. However, we discussed this information with the Acting Chief of the Information Management Section within the Office of Wastewater Enforcement and Compliance (OWEC). We have incorporated her comments where appropriate.

We performed our work in accordance with generally accepted government auditing standards between February 1992 and May 1992. We interviewed system managers and coordinators responsible for maintaining and overseeing use of PCS at headquarters, regional, and state levels. We spoke with officials responsible for 27 of the 39 delegated state environmental offices across the country and all 10 EPA regional offices. We also met with personnel in EPA Region 1 and state environmental personnel in Rhode Island, Pennsylvania, and Ohio. We observed use of PCS at two of these locations and EPA headquarters. In addition, we evaluated system documents and output reports from the system.

We are providing copies of this report to the Administrator of EPA; interested congressional committees; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others on request. Should you have any questions, please contact me at (202) 512-6416. Major contributors are listed in appendix III.

Sincerely yours,



JayEtta Z. Hecker
Director, Resources, Community, and Economic
Development Information Systems

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Abbreviations

DMR	discharge monitoring report
EDI	electronic data interchange
EPA	Environmental Protection Agency
FTE	full-time equivalent
GAO	General Accounting Office
GSC	General Sciences Corporation
IMTEC	Information Management and Technology Division
NCC	National Computer Center
NPDES	National Pollutant Discharge Elimination System
OCR	optical character recognition
OWEC	Office of Wastewater Enforcement and Compliance
PCS	Permit Compliance System
REI	Recognition Equipment Incorporated

Briefing Slides and Explanatory Narrative

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Permit Compliance System - Capabilities Assessed

PCS can maintain:
- previous permit data
- terminated discharge data
- detailed data
- noncompliance status until final correction

Related applications can:
- track trends
- calculate total loadings and basic statistics
- produce graphics

PCS Capabilities Assessed

You questioned whether PCS could perform various functions, such as maintaining: (1) individual entries for each NPDES permit issued, including data concerning any permit renewals or permits previously issued for the same discharge; (2) data concerning any permitted facility that no longer discharges for a period of 5 years; (3) essential permit information, including the holder of the permit, the location of the discharge, the water body receiving the discharge, the nature of the discharge, and the limits placed on the discharge; (4) permit compliance data, including the date of any inspection, the date and nature of any violation, and the nature and schedule of any corrective action; and (5) a facility's noncompliance status until final corrective action is implemented. In addition, you wanted to know if PCS has the ability to do analyses, such as tracking compliance trends over time.

Through observations of PCS and conversations with PCS users, we found that all the capabilities and analyses stated above do exist. However, since EPA does not require detailed data to be maintained on minor facilities, compliance and discharge data for all NPDES facilities are not available. Therefore, nationwide NPDES reports reflect major facility activities only.

A separate application developed by EPA Region 2 uses PCS data to perform analyses such as calculating total discharge loadings on water bodies and tracking trends. This application resides on the mainframe computer at NCC and is available through the PCS menu. Some states have also developed additional applications to further enhance their ability to obtain and use information from PCS. Some of these enhancements include making PCS reports easier to read and analyzing data in ways PCS does not.

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Potential Added Data to PCS

Sludge disposal data
- about 16,000 current permits affected
- about 3,000 new permits required

Stormwater runoff data
- about 100,000 to 300,000 new permits may be required

Potential Added Data to PCS

Because of provisions added to the Clean Water Act in 1987, EPA is considering whether to add stormwater runoff and sludge disposal data to PCS. However, when we met with EPA, no decisions had been made on either issue.

Currently there are about 16,000 NPDES permits that include sludge data. In addition, an enforcement official in OWEC told us she anticipates that about 3,000 new sludge permits will be issued as a result of legislative provisions. In 1991 EPA conducted a sludge feasibility study to determine what to do with sludge data. However, the study assumed that existing PCS hardware and software would be used. Several state environmental officials told us they do not want to add sludge disposal data to PCS because sludge is already regulated by state solid waste programs. If required to enter this data into PCS, some states may have to rekey data that are already entered into a state sludge system.

Four states included in the sludge feasibility study wanted to use a separate sludge monitoring report rather than including sludge disposal data in DMRs. However, this issue was not addressed. According to the study, it is likely that sludge monitoring information will be reported through facilities' existing DMRs. In providing comments on the facts contained in this report, EPA informed us that an automated system for sludge tracking was being tested for implementation into PCS. It is scheduled to be available to users in June 1992, although specific reporting requirements have not been determined.

Headquarter's consideration of building a separate system for data on stormwater also runs opposite to several state officials' opinion on what to do with the data. According to some state environmental officials, stormwater seems to be a natural addition to a data base, such as PCS, that tracks discharges into water. In addition, many of these officials agreed that stormwater may be amenable to use of a general permit,[3] thus reducing the data entry impact of an estimated addition of 100,000 to 300,000 permits. EPA will be conducting a feasibility study to determine the permitting and compliance needs for a stormwater system. The study will examine different system options such as using PCS or PC-based systems.

[3]A general permit can be used when two or more facilities have the same effluent limits and monitoring requirements. Thus, one permit is written, but by appending the facility name and address, it can be issued to any number of permittees.

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PCS Use Varies

PCS use varies among delegated authorities due to differences in:

- enforcement and environmental priorities
- user knowledge
- resource levels

PCS Use Varies

While PCS has many useful reporting capabilities, it is not consistently used by delegated authorities. A major reason for this is that EPA does not require detailed data on minor facilities to be maintained in the system. In addition, there are other causes for the inconsistency, including differences in priorities, and in levels of user knowledge and resources.

Differences in enforcement and environmental priorities among states and regions allow some authorities to focus on specific geographic areas and enter detailed data on minor facilities. However, other states only monitor compliance of major facilities and do not have the time to focus on special geographic initiatives or enter detailed minor facility data. Many authorities we spoke with said that it would be beneficial to have data for all facilities in PCS. They agreed that without all the data, a complete picture of what is being discharged into our waters cannot be formed.

Differences in PCS use also occur because of differing levels of user knowledge. PCS is difficult to use primarily because users must know some 500 field name codes and acronyms in order to put data in the system accurately and to retrieve reports. For example, we observed one query that required 18 acronyms to identify facilities in the District of Columbia that had been in noncompliance since October 1991. Many officials noted that the codes and acronyms in the system are cumbersome and that PCS and the analytical application developed by Region 2 are not user-friendly. Although PCS is difficult to use, EPA recommends that users have some experience with the system prior to attending training. In addition, official training on the Region 2 application has not been given because it was regionally developed and is an option for PCS users. One user we spoke with was unaware that the Region 2 application exists. Another user told us that PCS documentation is inadequate.

Resource levels also influence PCS use, especially at the state level. States that designate more resources to PCS activities typically spend more time using the system and enter detailed data for at least some minor facilities. States with limited resources generally devoted most of their time maintaining data for major facilities. Many authorities, including those with minimal resources, developed applications on personal computers to make their use of PCS easier and to manipulate PCS data further.

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Optical Character Recognition (OCR)

OCR study completed in 1991
- only one system evaluated
- focus on automating data entry
- no cost/benefit analysis

EPA is moving away from OCR

States free to use OCR

Optical Character Recognition

You asked us to determine what data entry alternatives EPA has considered for PCS. Optical character recognition (OCR) is one alternative the agency has studied. OCR allows printed data to be entered into a computer without manually keying in the data. Text and numeric information on paper is scanned electronically and converted to an electronic format by a computer program that interprets each character. Federal agencies that use OCR include the U.S. Postal Service and the Internal Revenue Service.

While OCR primarily reduces data entry effort, data entry via OCR is not an error-free process. Read success rates per character can be high for typed and computer-printed information, but can vary with print quality, character alignment, and other factors. Read success rates are also significantly lower for hand-printed information. As a result, any data entry method involving OCR would still require human operators to review scanned information and correct errors.

EPA has formally considered OCR as an option for entering DMRs into PCS for several years. The agency first examined the technology in 1985. However, the state-of-the-art technology at that time would have increased the size of the DMR from one to eight pages, so the method was not pursued. More recently, EPA identified a system produced by Recognition Equipment Incorporated (REI) that had potential to meet its data entry needs.

EPA contracted with General Sciences Corporation (GSC) to perform a study of OCR. However, GSC's analysis, completed in 1991, was not comprehensive. First, the study only examined the REI system, instead of studying several systems and comparing their costs and capabilities. Second, the study focused only on automating the PCS data input process rather than attempting to improve the process by which facilities submit DMRs. Last, the study did not present any cost/benefit analysis of OCR comparing it to manual or other data entry methods and EPA cannot show that any such analysis was performed.

EPA is moving away from OCR as a data entry alternative for PCS. However, state regulatory agencies are free to implement OCR systems if they choose to. For example, Ohio's Environmental Protection Agency currently uses an OCR system to input DMRs into its state permit system. Other authorities we spoke with are also considering OCR as a DMR data entry option.

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Electronic Data Interchange (EDI)

EPA is studying EDI

- 1990: Agencywide policy statement
- 1991: EDI alternatives study for PCS
- 1992: PCS pilot studies

Electronic Data Interchange

In addition to OCR, EPA has considered electronic data interchange (EDI) as a data entry alternative for PCS. EDI is a means of transferring information from one computer to another without printing out and rekeying information. It involves the direct transfer of information between computers via telecommunication links or magnetic storage media. Potential benefits of EDI include increased data accuracy, reduced data entry costs, reduced mailing costs, more rapid availability of data, and reduced paperwork.

Many businesses in the private sector have implemented EDI as a means of exchanging information, and the General Services Administration and Office of Management and Budget already give preferred status to EDI businesses. While the transition to EDI has not been painless for most businesses, the benefits are often significant. These businesses' experiences emphasize the need for proper planning, reasonable goals, and commitment to change throughout all levels of an organization.

EPA is leaning toward EDI as a method of DMR data entry for PCS and other programs. In 1990 the agency issued an agencywide policy statement on standards that EPA programs must follow if they use EDI. In 1991 EPA OWEC completed a study of EDI as a data entry alternative for PCS. The OWEC report identified four components necessary in an EDI system: (1) a data format, (2) a data transmission method, (3) a data certification method, and (4) a security protocol. The report examined multiple alternatives for the first three components and provided cost and ease of use data for those alternatives. The report recommended a base scenario for implementing EDI, but did not contain a total cost figure for implementing that scenario. As a result, the specifics of the alternatives proposed by the base scenario and how they are implemented need further clarification before an accurate and comprehensive EDI cost figure can be developed. The report also contained no cost/benefit analysis that examined current data entry methods and costs.

EPA has used EDI on a limited basis with at least one NPDES facility that wanted to submit its data electronically. EPA OWEC has also planned at least three NPDES pilot implementation studies to begin in Spring 1992. However, these pilot studies have not been designed to provide cost/benefit data on the use of EDI for PCS.

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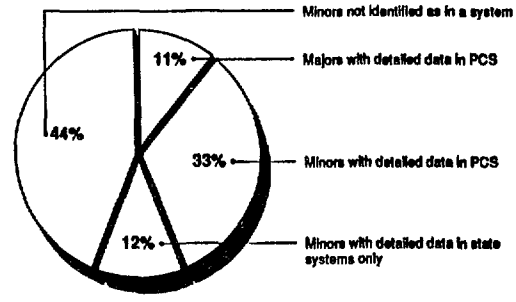
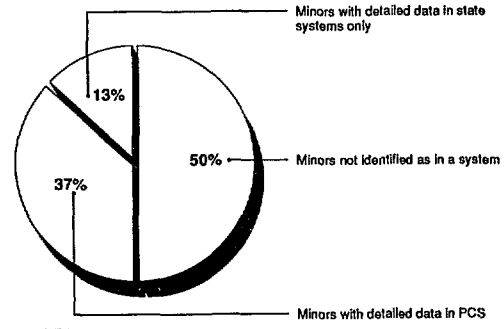
Number of Facilities Tracked in PCS

NPDES Permitted Facilities



Minor Facilities Only



Number of Facilities Tracked in PCS

At the time of our review, EPA OWEC officials said they could not provide us with the number of minor facilities with detailed data in PCS although they estimated it was around 25 percent. As a result, we conducted a survey of officials responsible for PCS in all 10 EPA regional offices and 27 of the 39 delegated state environmental offices. In providing comments, EPA informed us that they had recently determined the number of minor facilities with detailed data in PCS. Both sets of numbers are presented below (see tables I.1 & I.2).

Based on our survey, we estimate that 44 percent of all major and minor NPDES dischargers have detailed data in PCS. The survey showed that 37 percent of the minor facilities had detailed data in PCS. The survey also confirmed that 90 percent of major facilities have detailed data in PCS. We assumed that the remaining major facilities are also maintained in the system, since EPA requires this information.

Table I.1: Survey Results

	Majors	Minors	Total
Total number of NPDES permits as of April 1992	7,139	57,088	**64,227**
Facilities covered in survey	6,412	50,925	**57,337**
Facilities having detailed data in PCS	7,139	21,187	**28,326**

Table I.2: EPA Reported Data

	Majors	Minors	Total
Facilities having detailed data in PCS	7,139	14,386	**21,525**

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Differences in PCS Data

Major facilities typically have more data to enter than minors

Quality control checks on minor data not as rigorous

Some states enter detailed minor data into their own systems, but not into PCS

Differences in PCS Data

There are several differences between data for major and minor facilities in PCS. Major facilities generally have more detailed data to enter than minor facilities. On average, DMRs for major facilities cover more water discharge points and monitored substances than DMRs for minor facilities. This requires a greater proportion of resources be devoted to entering monitoring information for major facilities.

Because EPA requires detailed data on major facilities to be entered into PCS, these data are more rigorously checked for quality.[4] However, the extent of quality control checks of minor facility data varies among different authorities. Consequently, the quality of all the minor facility data currently in PCS is probably not equal to that of major facility data. Some state agencies do not differentiate between major and minor facilities and therefore quality check minor facility data to the same extent as major facility data. Some delegated authorities are in the process of reviewing their minor facility data.

We found that several state agencies enter detailed major and minor facility data into their state systems, but only upload their major facility data. Minor facility data in state systems account for approximately 13 percent of all minor facilities. Before the minor facility data in state systems can be submitted to PCS, the data must be in a format compatible with PCS and should be complete.

[4]In this context, quality control checks consist of making sure all necessary fields on DMRs submitted by facilities have been completed and that the values in the fields fall within logical ranges (e.g., pH values cannot physically exceed 14, so verification activities would identify a value of 15).

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Estimated Data Entry Resource Requirements

76 FTEs to enter detailed data for minor facilities

109 additional FTEs at an estimated cost of $3.3 million needed to enter remaining facilities not in PCS

Cautions and assumptions should be noted with the estimates

Estimated Data Entry Resource Requirements

On the basis of our discussions with state and regional officials, we estimate that it takes approximately 76 full-time equivalents (FTE) to enter detailed data for minor facilities and 54 FTEs to enter detailed data for major facilities into PCS. We also estimate that 109 additional FTEs at a cost of $3.3 million would be needed to enter detailed data for the remaining minor facilities we identified as not in PCS. (See app. II for the methodology used to determine these figures.)

We believe our estimate of 109 additional FTEs to enter detailed data for the remaining minor facilities is on the high side for several reasons:

- our estimate may significantly overemphasize the effort required to enter minor facility data,
- data for other minor facilities that we did not identify may already be in PCS,
- alternative data entry methods could reduce data entry resource requirements, and
- the remaining facilities are all minors and should require less total data entry effort than those in PCS.

Several cautions should be kept in mind when interpreting these estimated resource requirements. The quality of any estimate is only as good as the data used in developing the estimate. We were not able to independently verify the accuracy of the data because it would have required extensive examination of data at the facility level for thousands of permits. This was not possible given the time constraints of the job.

These estimates also assume the quality of all minor facility data currently tracked is acceptable. This may not be the case due to differences in states' efforts to ensure the quality of minor facility data. If authorities are required to enter discharge monitoring data of additional minor facilities, EPA will need to assess the quality of minor facility data already in PCS and take action to "clean up" any data that are not acceptable or complete. This may result in a one-time FTE expenditure and additional FTEs on a regular basis for maintaining the information in the proper form.

In comments provided after our audit work was completed, EPA reported that 14,386 minor facilities have detailed data in PCS. Using this number and our data entry resource requirement estimate, we calculated that approximately 130 additional FTEs would be needed to enter the 42,702 minor facilities that EPA reported are not in PCS.

GAO PCS Operating Costs (dollars in thousands)

Regional data entry and report generation: $974

Enhancements, operations, and maintenance: $842

Training and headquarters user support: $134

State data entry and other: $3,940

PCS Operating Costs

We estimate the total operating cost for PCS in fiscal year 1991 to be approximately $5.9 million. This includes EPA's reported expenditures for PCS data entry, maintenance, and other items as identified in table I.3 below. In addition, included as the first line item is the state data entry cost we estimated. The total cost will be higher, however, because states also allocate funds for operations and maintenance to support their use of PCS. We did not obtain estimates for this number.

Table I.3: PCS Operating Costs (dollars in thousands)

Activity	Expenditures
State data entry	$3,270
Data entry including user support by EPA regions and report generation	974
PCS system enhancements, operations, and maintenance	842
Training and headquarters user support	134
EDI procedures and pilots	180
Latitude and longitude coordinates	150
Data quality procedures	150
Permit-writers' software	80
Quality assurance guide	60
Public access	50
Total	**$5,890**

EPA OWEC officials also reported a total of 15.6 FTEs that it provides to regional offices for data entry, user support, and report generation. These 15.6 FTEs are included in the 130 FTEs that we estimated. Additionally, OWEC supports the activities in items 3 through 10 above with a total of 5.5 FTEs, which are not a part of our estimated 130 FTEs.

GAO Conclusions

PCS is not user-friendly

EPA does not know cost savings of data entry alternatives

PCS can provide a more comprehensive picture

Conclusions

PCS has many capabilities to monitor and track compliance of permitted facilities. However, these capabilities are not fully utilized because the system is difficult to use and all available data are not included in nationwide compliance reports. As a result, some states have developed their own systems and specialized applications.

EPA has assessed OCR and EDI as ways to improve DMR data entry into PCS. However, its analyses did not include cost/benefit studies. It is necessary to compare the costs of the existing method of entering data to the costs of an alternative entry method in order to decide which is the best option. Without knowing how much it currently costs to enter data, EPA cannot determine whether the costs of implementing OCR or EDI would be reasonable.

Although EPA does not require detailed permit and discharge data to be in PCS for minor facilities, we found that detailed data for approximately 50 percent of all minor facilities are maintained in PCS and state systems. Without discharge data on all NPDES facilities, a clear picture of what is being put into our nation's waters cannot be formed. Approximately twice the number of resources currently expended on PCS data entry would be needed to enter detailed data for all facilities.

Methodology for Estimating Data Entry Resource Requirements

In order to estimate the data entry resources required to enter detailed data for the remaining minor facilities, we needed to estimate the data entry resources (represented in FTEs) allocated to the entry of detailed data for minor facilities. This is straightforward for majors because we had data from authorities that enter detailed major facility data only. Calculating this number for minors is difficult because no NPDES authority enters only minor facility data; all authorities enter either majors only or majors and some minors. Because detailed data are generally greater for majors than for minors, we hypothesized that less effort (FTEs) is needed to enter detailed minor data. We therefore needed to estimate the average effort devoted to the entry of detailed minor facility data.

We used the following procedure to estimate the average effort used to enter detailed minor facility data and the total number of additional FTEs required to enter detailed data for the remaining minor facilities:

(1) We estimated the average number of major facilities that could be entered by one FTE. We did this by dividing the total number of major facilities (530) by the total number of FTEs (3.8) for offices that enter detailed data for major facilities only.[5] This figure produced an estimate of 141.3 major facilities per FTE.

(530 majors)/(3.8 major FTEs) = 141.3 majors/FTE

(2) For offices that entered detailed data for both major and minor facilities, we estimated the amount of their total FTEs expended on entry of their major facility data. We determined the total number of affected major facilities (2,813) and divided this number by our estimate of the number of major facilities that could be entered by one FTE (141.3). This figure produced an estimate of 19.9 FTEs.

(2,813 majors)/(141.3 majors/FTE) = 19.9 major FTEs

(3) On the basis of the resources allocated to data entry for major facilities, we estimated the remaining FTEs attributable to only entry of minor facility data for those authorities that enter both major and minor facility data. We subtracted the FTEs for entry of majors (19.9) from the total FTEs expended by the affected authorities (77.6). The result was 57.7 FTEs.

[5]Of the 37 data points we obtained, we excluded 16 from use in estimating additional resource requirements because the data were not comparable due to special circumstances (i.e. nonmanual data entry methods, inexperienced data entry personnel, etc.).

(77.6 total FTEs) - (19.9 major FTEs) = 57.7 minor FTEs

(4) We then estimated the average number of minor facilities that could be entered by one FTE. This was done by dividing the total number of minor facilities (19,032) by the estimated number of FTEs allocated to the entry of minor facility data (57.7). This figure produced an estimate of 329.9 minor facilities per FTE.

(19,032 minors)/(57.7 minor FTEs) = 329.9 minors/FTE

(5) Using this average number of minor facilities per FTE (329.9) and the total number of uncovered minors (35,901), we estimated that those uncovered minor facilities could be entered with approximately 109 additional FTEs. Assuming an average cost of $30,000 per FTE, we calculated the total cost for the additional FTEs to be approximately $3.3 million.

(35,901 minors)/(329.9 minors/FTE) = 109 FTEs

(109 FTEs)*($30,000/FTE) = $3.27 million

(6) On the basis of our interviews with state and regional authorities, we calculated that they spend a total of approximately 130 FTEs entering detailed data for major and minor facilities. Using the effort levels from (1) and (4), we calculated the theoretical number of FTEs for both major and minor facilities.

(6,412 majors)/(141.3 majors/FTE) = 45.4 major FTEs

(21,187 minors)/(329.9 minors/FTE) = 64.2 minor FTEs

This results in 110 total FTEs which is less than the 130 FTEs reported because of the excluded data points. Therefore, we calculated the relative effort of the 110 FTEs and applied it to the 130 FTEs reported. This yielded 76 FTEs required to enter detailed data on minor facilities and 54 FTEs required to enter detailed data on major facilities.

(45.4 major FTEs/110 FTEs)*(130 FTEs) = 54 FTEs

(64.2 minor FTEs/110 FTEs) * 130 FTEs = 76 FTEs

(7) After EPA provided us with their estimate of the number of minor facilities currently not in PCS (42,702), we calculated how much effort would be required to enter the data into PCS. Based on our estimate of 329.9 minors/FTE, we found that approximately 130 FTEs would be required to cover this many minor facilities.

(42,702 minors)/(329.9 minors/FTE) = 130 minor FTEs

We believe our estimate of 109 additional FTEs to enter detailed data for the remaining minor facilities is on the high side for several reasons:

(1) Our estimate may significantly overemphasize the effort required to enter minor facility data. One state that enters detailed data for all its major and minor facilities found that the amount of detailed minor facility data was approximately 20 percent of the detailed data for major facilities. Our estimates were 141.3 majors/FTE and 329.9 minors/FTE, which indicate that detailed minor facility data require approximately 42 percent of the effort that major facilities require. We therefore assume that more effort is required to enter detailed minor facility data than a certain state authority assumes.

(2) Other minors that we did not identify may already be in PCS. States we did not speak with cover 6,163 minor facilities, so a maximum of 11 percent of all NPDES facilities could have detailed data in PCS in addition to the 44 percent currently covered.

(3) Alternative data entry methods could reduce data entry resource requirements. The FTEs reported are based on manual data entry for most offices. In addition, the projected FTEs required to cover all currently uncovered facilities are based strictly on the assumption that manual data entry will be used. As OCR, EDI, and other nonmanual data entry techniques are used, both the current and projected data entry resource requirements could decline. For example, Ohio implemented an OCR system and reduced its data entry requirements from 9 to 4 FTEs. There will be an initial investment cost for converting to OCR or EDI, but if either method requires less overall effort than the current manual data entry method, that cost would be recovered over a period of time.

(4) The remaining facilities are all minors and should require less total data entry effort than those in PCS. Currently, 44 percent (almost half) of all

facilities are maintained with approximately 130 FTEs. A significant portion of those facilities tracked are major facilities, which require more effort to maintain. As a result, it is expected that additional FTEs required to cover the remaining 56 percent of the facilities should not exceed the current 130 FTEs expended on data entry. The 109 additional FTEs calculated meet this condition.

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