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ASSESSING EPA'S LONG RANGE INFORMATION
SYSTEM NEEDS

FINAL REPORT
OF THE
LONG RANGE ADP USER REQUIREMENTS TASK FORCE

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Office of Information Resources Management,
Office of Administration and Resources Management
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EXECUTIVE SUMMARY

A. Study Objectives

Long term trends in program direction and management are among the most significant factors in determining the ADP capabilities required by the Agency. This report presents the findings of a study conducted by a task force within the Office of Administration and represents the first step in a long term ADP planning process. The objectives of this study were to:

- Identify long term trends in agency program direction, with an emphasis on new initiatives, potential shifts in program direction or priorities, and potential changes in the roles of program offices at headquarters, regional offices, ORD laboratories and state agencies; and
- Define the information management needs resulting from these trends and their implications for ADP support.

The task force was not charged with providing technical recommendations for the Agency's future hardware, software and telecommunications network. Also, the study was not intended to document current ADP needs and deficiencies of existing data bases, information systems and computerized models.

B. Key Findings

1. Strategic planning and ADP evaluation functions are essential to effective ADP support.
 - An enhanced strategic planning process for Agency programs and better communication of program plans is needed to provide a foundation for long term ADP planning.
 - The Agency should conduct more audits of major ADP systems to ensure that they are responsive to user needs.
2. Continued delegation of environmental programs to state agencies will cause major growth in information exchange with states.
 - EPA will have an increasing need to obtain programmatic information from state agencies.
 - EPA will increasingly be called on to provide technical and research information to state agencies.
3. There is a critical need to improve the quality of and integrate data.
 - Program managers need more complete, current and accurate data to support analysis and decision-making.
 - Managers need much more integration or linkage of systems and data bases across programs and functions.

- The Agency will be handling confidential data for several new programs (e.g., NESHAPS) and in supporting data systems and must provide adequate security against unauthorized access and disclosure.

4. There will likely be an explosion in demand for ADP services. The components of this explosion will include:

- **Development, enhancement and expansion of major applications:**
 - Several major new and replacement systems for mature and evolving programs
 - Significant growth for several existing data bases
 - Increasing size and complexity of environmental models.
- **Increasing automation of office and laboratory functions:**
 - Widespread growth in development and use of localized applications
 - Continuing automation of laboratories
 - Need for expanded electronic mail network to include state organizations.
- **High demand for user-friendly ADP "tools":**
 - Retrieval software
 - Statistical analysis software
 - Automated graphics
 - Automated mapping
 - Optical character recognition
 - Software development tools.
- **High demand for general and technical ADP orientation and training.**

C. Next Steps

The Agency ADP organization will be coordinating the findings of this study with the ADP network modernization program and with other ADP planning activities, and will be working with other Agency offices and states to refine and update the long term ADP plans reflected in this study.

I. INTRODUCTION

A. Objectives

Long term trends in program direction and management are among the most significant factors in determining the automated data processing (ADP) capabilities required by the Agency. This report presents the findings of a study conducted by a task force within the Office of Administration to help support the design of the Agency's future ADP network and the acquisition of the needed computer hardware, software and communications capabilities by the Agency's ADP organization. This study represents the first step in a long term ADP planning process and has two overall objectives:

- To identify long term (i.e. 3-5 years) trends in program direction, with particular emphasis on new initiatives, potential shifts in program direction or priorities, and potential changes in the nature of program operations at headquarters, regional offices, ORD laboratories, and state agencies;
- To define the information and information management needs resulting from these trends, and consequent implications for ADP support.

The task force recognizes that ADP technology and costs are changing significantly. However, this study is not designed to provide technical recommendations for EPA's future computer hardware, software and telecommunications network. The Agency's ADP organization, with the continuing cooperation of the program offices, will be responsible for formulating specific technical ADP plans for meeting these needs.

Of particular note, this study is not intended to document current ADP requirements and deficiencies of existing data bases, information systems and computerized models. However, the study does address current needs which will require future ADP support as well, and which may lead to significant system development or enhancement activities within a three to five year timeframe.

B. Methodology

The findings of this report are based on a series of interviews conducted with many of the senior managers at headquarters, regional offices and ORD laboratories, and with representatives of state agencies. These interviews, and the findings of the study, represent the perceptions of senior managers regarding trends or potential changes in program direction and operations. The interviews do not necessarily reflect firm commitments to program changes or to specific information management or ADP projects. All interviews were designed to be comprehensive, but were not intended to define program directions or ADP needs in great detail. Most interviews were 1 1/2 to 2 hours in length and followed guidelines distributed in advance of the interview (see Appendix A). In conducting this study, the Task Force found that many interviewees were very tentative in projecting three to five year trends and tended to focus on shorter term program directions and ADP needs.

Interviews were first conducted at headquarters with managers at the office director level. Many managers consulted their staffs or included them in the interviews. The interviews encompassed virtually all program offices. (See Appendix B for a complete list of interviewees, including representatives of regional offices, ORD laboratories, and state agencies.)

Following the interviews at headquarters, the Task Force prepared an interim report for comment by the interviewees and to guide interviews with managers in regional offices and ORD laboratories and with representatives of state agencies.¹ To obtain the perspective of the regions, three sets of on-site interviews were conducted. The Task Force conducted in-depth interviews with managers in Region I and their staffs. Interviews were also conducted on-site with senior managers in Region II. In addition, group interviews were conducted in Region VI for a cross section of managers from

¹"Long Range ADP User Requirements Study - Interim Report", June 7, 1983. All comments regarding the interim report are reflected as appropriate in the current version.

all other regions, and several senior Regional managers were interviewed in Washington. Regional representatives on the ADP Steering Committee were included in these interviews.

The Task Force also interviewed many of the directors of ORD laboratories. On-site interviews were frequently attended by senior laboratory staff. Several directors were interviewed in Washington.

States are represented in the study by interviews conducted with the directors of associations of state environmental agencies and two members of the association of solid waste program administrators. Although individual states were not contacted in conducting this study, state agencies will be called on to participate in continuing ADP planning activities.

C. Next Steps

This report completes the initial phase of an ongoing long range ADP planning process. The Agency's ADP organization will assume responsibility for extending the planning effort into the next phase, and for working with other EPA offices on a continuing basis to assess their long range user requirements.

The ADP organization is now conducting two planning activities that will be coordinated with the findings of this study:

- A Computing and Telecommunications Acquisition Plan (3-6 years) that addresses the central computing facility, the distributed data processing network and the telecommunications network requirements.
- A Short Term ADP Plan (1-3 years) that addresses the ADP implications of the Agency's 1984 and 1985 program requirements and management information needs. ADP plans will be developed first at the program element level and will subsequently be developed for individual systems and related types of services.

The ADP organization is also working with representatives of other offices to develop a policy for acquiring and using microcomputers.

D. Report Organization

Chapter II summarizes the findings of the study from a cross-cutting perspective and is structured to highlight overall information and information management needs and implications for ADP support. The remaining chapters focus on the program trends, information and information management needs, and ADP support needs of individual programs. Each chapter addresses the programs and functions attributed to a specific Associate or Assistant Administrator, and is organized to highlight the views of headquarters, regions and states. The views of regional organizations with no direct counterpart at headquarters (e.g., Environmental Services Divisions, Deputy Regional Administrators) have been included within the appropriate programs and in the study summary. The views of ORD laboratories are reflected in the final chapter and in the summary.

II. SUMMARY OF FINDINGS

This chapter summarizes the most significant findings of the study with respect to the Agency's needs for information management and related ADP support, and the trends in programs and management/administrative functions contributing to these needs. Although the findings are directed toward a three to five year time horizon, many of the findings are important in the short term as well. Several of the most representative programs, functions and information systems (or applications) are noted in these overall findings.

A. Strategic Planning and ADP Evaluation Functions are Essential

To ensure that ADP activities adequately support programmatic activities and efficiently use available resources, the Agency needs to improve the strategic program planning process and conduct more ADP audits.

1. Enhanced Strategic Program Planning Process Needed to Provide a Foundation for Long Term ADP Planning

An analysis of the Agency's long term ADP needs, and subsequent planning for ADP support, should be based on an understanding of program goals and objectives, the initiatives that will be undertaken to achieve them, and the scientific and management decisions that will be faced and require information support. In conducting this study, the Task Force became aware of a lack of long-term Agency-wide or program specific plans for general guidance in ADP planning. Consequently, strategic planning at the program and function level is vital to the development of ADP plans that will in fact support future program needs, and should be performed regularly.

2. Increasing Need to Audit Major Centralized Systems

A number of the Agency's centralized program management and administrative information systems no longer effectively support users' needs and seem incapable of supporting future requirements. These systems were developed several years ago and have not kept pace with the changing information

needs of management or with advances in ADP technology. However, the Agency continues to devote considerable resources to maintaining both the software and data for these systems. The Agency's evolving systems audit function should expand the number of system audits for existing systems and post-implementation audits for major new systems to ensure that major problems are identified for action and that limited ADP resources are used cost-effectively.

B. Strong Growth in Information Exchange with States

As EPA continues to delegate environmental programs to state agencies, there will be an increasing need to obtain information from state agencies and also to provide technical and other information to state (and local) agencies.

1. Increasing Requirement to Obtain Information from States

Most environmental programs will continue to be delegated to state agencies, and EPA will need more and better quality information from states to assess overall program effectiveness, identify major problems, and report to the Congress. The Agency also must be sure that information of known quality, especially for monitoring activities, is being collected. Effective management of information obtained from states will require increasing ADP support. State cooperation in the use of EPA data systems or forwarding of data from state systems will be essential.

Cooperation will vary among states, among programs, and among different types of data. State agencies are generally willing to report grants information, are less cooperative in reporting monitoring information, and resist providing detailed compliance and enforcement information. States which administer environmental programs through local agencies generally find it more difficult to provide complete program information to EPA.

Program offices may adopt a variety of strategies to encourage states to report information required by the Agency. A common strategy will be to make an EPA information system available to support state (and local) program managers. For this strategy to succeed, the Agency will need to address a

number of characteristics of the state ADP environment and experience gained to date:

- States will seldom use systems that do not meet their needs, and they should have a significant role in the design of new and enhanced systems. Although no system will be able to meet the needs of every state, the participation of several representative states will help build a consensus on key requirements and encourage adoption of the system by other states.
- Agency systems should require the submission of only the key data items that are needed and will be used by program managers. The Agency should recognize the burden on states of collecting and maintaining data and not require the submission of non-essential data.
- Agency systems should provide some flexibility for states to fine tune the system to address their unique requirements. Systems should provide a capability for user-defined data items and an easy to use report writer to enable states to develop custom reports and retrievals.
- Some state agencies, like many organizations, experience turnover among system users and frequently need to train new users. Also, many agencies receive limited support from state ADP staffs. To enable state agencies to effectively use EPA systems, these systems should be well documented and easy to use, especially for data entry processing. Users must be able to easily enter new data and correct errors, and will prefer interactive processing for many applications.
- State agencies have limited resources and are strongly discouraged from purchasing ADP services outside the state government. To encourage use of EPA systems, the Agency should continue to provide timesharing to states through

state grants, and incentives for using EPA's systems. These incentives should include flexible report writers, graphics capabilities, similar state-of-the-art ADP capabilities, and other incentives for states to acquire and use hardware, software and systems compatible with those of EPA that may not be available through the state ADP organization.

- Providing standard software to state agencies for implementation on state computers is constrained by the diversity of hardware and software utilized by states and the need to design systems using common, and often less flexible, programming languages (e.g. COBOL, FORTRAN). The Agency should investigate the feasibility of providing microcomputers or minicomputers to states (as government furnished equipment owned by EPA) to provide interactive data entry and manipulation capabilities and encourage state use. This approach may prove to be more cost effective than direct state use of EPA mainframe computers at the National Computer Center or the use of regional minicomputers. Should this approach be taken, the Agency should select a standard operating system for computers provided to states by EPA programs to minimize the need for the Agency to maintain information systems in several different software environments.

Regardless of the Agency's efforts to improve ADP support, some state agencies will not fully support EPA's data needs. Several managers believe that the Agency should take a harder line in defining state reporting responsibilities and establish a stronger link between reporting and program grants.

2. Increasing Need to Provide Information to States

As state agencies assume more responsibility for administering delegated programs, they will request additional information and technical support from EPA. An increasing awareness of toxic pollutants in all media will also

generate a greater volume of state requests for scientific and technical information generated or compiled by EPA. Although much of the information required by states may ultimately be retrieved directly from automated systems, many requests will require that EPA staff explain the source and accuracy of different types of data and constraints on its use to ensure that the data is used properly. Specific requirements will include:

- technical data on effluent guidelines and the performance of control technologies to assist permit writers
- health and environmental effects data for pesticides, chemicals and hazardous compounds, and physical and chemical properties, to support state response to environmental emergencies
- technical data on the control of hazardous waste
- status information for enforcement actions referred to EPA
- monitoring data maintained by states using EPA system.

In developing systems to support state agencies as well as EPA, it will be essential to gain the participation of states in the design phase to ensure that state needs are given full consideration.

C. Critical Need to Improve Quality of and Integrate Data

Program managers need more complete and accurate data than is currently maintained in the Agency's information systems. To effectively use available data, managers also need the capability to link data that is now maintained in different systems to reflect the relationships between Agency programs and functions. These needs are described below. The need to protect confidential data from unauthorized access is also discussed in this section.

1. Need to Improve Quality of Data Maintained by Agency Systems

A significant number of the Agency's major data systems maintain data that is incomplete, inaccurate and/or not current, and thus do not meet the quality control requirements of one or more current and potential users. Such systems include monitoring, management and administrative systems. Two problems frequently cited are data collection, entry and error correction procedures that do not reflect actual work flows, and inadequate automated controls (i.e., edits) in data entry and update processes. For both new and existing systems, providers of data will increasingly require interactive processing for data entry, edit and error correction from terminals located in users' offices (including headquarters, regions, laboratories and states). Such processing must be "user-friendly" for individuals who enter data fairly frequently but who do not have strong ADP skills. Examples of applications likely to implement interactive data entry are the water permits compliance system, hazardous waste compliance monitoring and enforcement systems, and personnel system. For some systems, interactive data entry will be performed by professional staff located outside of EPA facilities (e.g., at hazardous waste sites) using portable terminals.

Another issue that will need to be addressed is the formulation of standard definitions for data items that are used by or collected from two or more different organizations. It will be especially important to define program activities or accomplishments reported by state agencies (e.g., administrative enforcement actions), and develop with state assistance criteria for denoting the "equivalence" of activities conducted by states with comparable activities monitored by EPA.

An increasing emphasis on the multimedia measurement of toxic materials will also affect the types of data stored in the Agency's systems. Concentrations of toxics in air and water are generally very small (e.g., parts per billion, parts per trillion). Systems for maintaining ambient data must be capable of accurately storing data for these materials at these small concentrations in such a way that users know of the quality of the data (i.e., how precise, accurate and sensitive the monitoring system was that generated the data).

2. Need More Integration of, or Linkages Among, Systems and Data Bases Across Programs and Functions

Many program offices indicate a specific need for the ability to link logically related data which are or will be maintained in different files or data bases. This capability is needed to perform analyses, data manipulations, and simple retrievals, and should link data across systems within the same media and across media and functions. Representative examples of this need are:

- Obtaining current and consistent information on budgets, status of funds, FTE counts, and contract commitments and obligations.
- Identifying current water quality and trends, construction progress, grants issued for designated waste water treatment plants, and permit and discharge data for use by water program staff at headquarters and in the regions.
- Identifying for OPRM staff and regional environmental services divisions the release of pollutants into all media for designated facilities.
- Obtaining the compliance status and enforcement history of a facility or parent company for one or more statutes for OLEC staff, regional counsel, regional top management, and the staffs of enforcement offices at headquarters and in the regions. (More complete data than that maintained by existing systems is also required).
- Identifying groundwater problems and the location of nearby injection wells, Superfund sites, hazardous waste sites, and other facilities for use by regional program staff.

- Comparing trends in program accomplishments for specific organizations (including states) with budgets and performance commitments, to support the Comptroller's Office, other offices within OPRM, and regional management and program staff.
- Identifying chemical properties, health and environmental effects, and containment and removal technologies for substances found at hazardous waste sites for use by regional environmental services divisions and state waste program staff.
- Identifying chemical properties and health and environmental effects of chemicals with comparable structures as part of the review of pre-manufacture notifications and other notifications under TSCA.

Two major obstacles identified by users attempting to perform data "cross-walks" are:

- Inconsistent data definitions for common parameters, such as facility/company identifier, chemical identifier, and geographic location; and
- Differences in the software used by various applications, the lack of a common language to access data, and limited training and user support provided by ADP staffs responsible for systems operated by another program office.

Although most programs at headquarters indicate a need for increased data integration within media, OPRM, OLEC and regional program offices and environmental services divisions have the greatest need for integration across media. OA and regional administrative services staff have the greatest need for integrating data across administrative functions. OPP, OTS and OSWER have the greatest need for integrating health and environmental effects information generated or collected by different program offices.

3. Need to Protect Confidential Information in More Applications

With an increasing emphasis on toxics in several media, requirements to safeguard confidential business information may be extended to several new and existing systems. In addition to confidential information now maintained in the OTS chemical inventory and in systems for pre-manufacture notifications, firms may submit confidentiality claims for information about toxics in air emissions, water effluents, and solid wastes. Compliance and enforcement data for hazardous waste sites may also be claimed confidential. Security for systems which maintain these data will likely need to be improved to guard against unauthorized data access and disclosure.

D. Likely Explosion in Demand for ADP Services

Program managers are becoming increasingly aware of ADP technology and the benefits to be gained by making greater use of ADP to support program analysis and operations. There will likely be an explosion in demand for ADP services in four areas:

- System development and enhancement support for major ADP applications
- Increasing automation of office and laboratory operations
- Increasing use of ADP "tools" by end users
- Increasing need for general and technical ADP orientation and training

Each of these is described below.

1. System Development, Enhancement and Expansion Support for Major ADP Applications

The growth in demand for ADP services represented by major applications will take three forms. Several programs and administrative functions

will be developing new or replacement information systems. Second, several existing systems will experience significant data base growth. Finally, environmental models will be increasing in size and complexity. These trends point toward an increasing demand for both computer and ADP staff support.

a. Development of New and Replacement Systems

Many of the systems the Agency requires to carry out both programmatic and administrative functions are currently in place. However, several programs will likely develop major new or expanded applications. These include:

- pesticides and toxic substances research data bases/bibliographies to support chemical analyses and research
- underground injection control and permits system to track injection sites
- groundwater monitoring data base to identify national and local problems and link data on groundwater quality with data for potential sources of contamination
- ocean monitoring data base to assess the effects of ocean dumping of wastes
- effluent guidelines research data bases/bibliographies to assist NPDES permit writers in identifying appropriate technologies on a case by case basis
- hazardous waste site permitting, compliance monitoring and enforcement data bases to track program accomplishments
- Superfund removal and remedial site management, monitoring and enforcement data bases

- Laboratory data management, and, in particular, sample file control for some regional laboratories to perform functions such as:
 - data acquisition and reduction
 - analytical quality control performance limits checking
 - instrument calibration chart maintenance
 - automated instrument control

Several major system upgrades or replacements are anticipated, including:

- air quality monitoring and emissions system
- water permits compliance system
- financial management and related systems
- hazardous waste data systems
- payroll system
- personnel system
- facilities management system
- contracts information system.

b. Data Base Growth

Significant growth is expected in the volumes of several types of data processed by existing data systems, including:

- toxic emissions and monitoring data related to National Emission Standards for Hazardous Air Pollutants
- water monitoring data for toxics
- compliance monitoring and status information, especially for programs administered by state agencies with incomplete reporting to EPA at the present time

- enforcement actions, including administrative and other actions taken by state agencies.

c. Increasing Size and Complexity of Environmental Models

Environmental and health effects models developed by several program offices and laboratories are expected to process larger volumes of data and increase in computational complexity. Greater use will be made of models of local ecosystems within designated bodies of water. These models process voluminous monitoring and other data. Complex long range transport models for acid rain and regional (i.e., large area) models for ozone will likely be developed. Models used to develop standards and regulations will encompass more variables to more accurately reflect potential exposures, environmental impacts and health effects, and to help ensure the proper degree of control (e.g., air quality and pesticides). Overall, modelers will require access to large computers to operate some of the more complex models.

2. Increasing Automation of Office and Laboratory Operations

Many functions now supported by manual information handling procedures will substitute automated capabilities to make better use of limited staff resources. Among the types of activities to be automated are local office tracking systems and collection of data from laboratory equipment. In addition, there will be much greater use of the electronic mail system and a need to expand the system to users outside the Agency.

a. Widespread Growth in Development and Use of Localized Applications

Several program offices at headquarters and virtually every regional organization and ORD laboratory anticipate making greater use of ADP to process numerical and text information that is principally of local interest. A significant number of Agency staff are becoming computer literate and will require that greater use be made of ADP to support program planning,

management and office operations. Examples of the most common localized applications include:

- project scheduling and tracking
- automated tickler files (e.g., follow-up on pesticide registration filings, administrative orders, etc.)
- workload planning and modeling
- word processing and automated document filing, including correspondence, studies, reports, and policy papers

Senior managers perceive that most of these applications will have relatively small data bases, will be operated by end users, and will not be developed unless they are inexpensive to operate and maintain. These applications generally would not be implemented on the Agency's existing mainframe computers, but may use data stored in the Agency's centralized data bases. Of particular note, reasonable management controls should be placed on computer use to ensure that data are protected from unauthorized changes and that users do not waste resources on frivolous or personal applications.

b. Continuing Automation of Laboratories

Automated collection of experiment data and control of equipment has made tremendous advances in the past several years and will continue to increase significantly. Much of the laboratory equipment now used by the Agency for analysis, and new equipment available to scientists, generates raw data in a form suitable for collection, reduction and analysis by computers. Some equipment generates large volumes of data quickly and requires the scientist to use a computer to monitor the analysis and make adjustments. For behavioral experiments that generate smaller volumes of data, small computers (i.e., microcomputers) may be used to take periodic measurements and readings of equipment and free scarce EPA laboratory staff to do other important tasks that cannot be automated.

A few ORD laboratories will require the capability to monitor experiments being conducted off-site by contractor staff by examining data submitted in real time to the Agency's computers by contractors' equipment. Regional ESD laboratories may adopt a Sample File Control system to improve data quality and management.

Overall, laboratories in ORD and in the regions will require more dedicated small computers to support data collection and reduction, and control of laboratory equipment, and improved processing capabilities to support laboratory data management.

c. Growth in Use of Electronic Mail and Need to Add State Agencies to the Network

Most offices at headquarters and in the regions with access to electronic mail have found it extremely useful in communicating with regional offices, laboratories and, to a lesser extent, other program offices at headquarters. Most remaining offices expect to find it useful, and all but a few anticipated at a least a doubling in their use of electronic mail within the next two years. Most regional offices have found it to be especially useful in communicating with headquarters, and would like a comparable capability within a region to improve communications among program groups.

Several offices would like to add state agencies and other organizations at the Federal, state and local level to the network to enhance communications for environmental emergencies, streamline grants processing, provide improved coordination on enforcement actions, and reduce the "paper shuffling" and mailing delays for documents submitted by states (e.g., SIP revisions) for EPA review. However, access privileges for some new users may need to be restricted if the network is expanded. In addition, confidential information should not be entered into the mail system unless adequate security can be provided.

3. Widespread Need for User-Friendly ADP "Tools"

Most offices have a current and long term requirement for a variety of ADP tools to facilitate the use of information systems by program staff with limited technical ADP expertise. Were the Agency to meet the requirement for several of these tools, especially the capability to access and manipulate data in Agency data bases, there would be explosive growth in the use of many management, administrative, and technical information systems.

a. Data Retrieval and Statistical Analysis Software

Standard user-friendly software packages are needed that enable users to retrieve data from Agency data bases by specifying their own record selection criteria, and to manipulate the data (e.g., "what if" capability) without changing the content of master files and data bases. One, or at most a few, standard packages are desired which can be applied to virtually any system or data base. User friendly retrieval tools will enable managers and staff to quickly obtain information which might otherwise require contacting several people or searching manual files. However, users must exercise caution in interpreting data they are not familiar with to ensure that it is not misused or misrepresented. (Similarly, caution should be exercised in using automated graphics and mapping capabilities discussed below.)

A related requirement exists for statistical analysis software which users can apply to the selected data to conduct a wide variety of analyses. ORD laboratories and regional environmental services divisions now have a pressing need for an easy-to-use statistical capability to analyze data generated by laboratory tests.

Data dictionaries or similar capabilities are needed to enable users to identify the data items maintained in different systems and the relationships among those items.

b. Automated Graphics

Standard user-friendly graphics packages are needed to make presentations of summary data in pictorial form and support comparisons of program performance, easy identification of trends, etc. Most users require a relatively simple graphics capability and the ability to print hardcopy graphs locally. Users also emphasize that the cost of graphics software should be lower than the costs of some software (e.g., TELEGRAF) currently used by the Agency. Color graphics would be very useful to ORD laboratory staffs, but is not essential to other users of automated graphics.

c. Automated Mapping

Much of the environmental data maintained by the Agency relates to specific states, regions or other geographic locations. Software is needed to support mapping of point sources and ambient data, including national maps and highly detailed contour and point plot maps of individual regions, states, river basins, etc. With the exception of laboratories, color mapping would be useful, but is not essential.

d. Optical Character Recognition

Several offices would like to automate high volume routine data collection and entry procedures to reduce staff resources needed for this activity. Functions which are currently using or considering using optical character recognition technology are document control in OTS, grants information reporting, and printing of ORD research reports. In addition, several offices expressed a need to convert printed materials prepared by contractors into a format that is compatible with the Agency's word processing capabilities.

e. Software Development Tools

Users in several program offices expressed a need for software that will enable them to rapidly design and implement data bases to support

local applications, and especially data management for scientific research and individual projects or studies. However, these data bases may be of interest to several offices and consequently should adhere to Agency data standards to enable other users to link or integrate them in the future to support new analytic efforts.

4. High Demand for General and Technical ADP Orientation and Training

Most managers throughout the Agency would like orientation and training for themselves and their staffs regarding the overall capabilities of ADP and specific uses and capabilities of EPA information systems and data bases. A significant number of senior managers desire hands-on training in the use of the Agency's computer capabilities and specific applications. An orientation for new appointees who may have minimal knowledge of ADP and of Agency systems will be particularly useful.

Ongoing training and user support for state users of EPA systems will be mandatory. Some state agencies experience turnover and also require training to ensure the successful adoption of new system capabilities as well as routine modifications.

E. Sources of Findings

Most of the findings of this study are not unique to individual offices, but instead reflect common needs of managers in program offices at headquarters, in regional offices, and in laboratories. Exhibit II-1 identifies the Agency (and state) organizations associated with each major finding.

F. Findings in Common with Previous ADP Studies

Several of the findings of the Task Force are consistent with those of previous ADP studies, especially with the "Stage Assessment and Five Year Management Plan for ADP" conducted in 1979 by Nolan, Norton and Company.

EXHIBIT II-1
SOURCES OF FINDINGS

Findings	Sources ¹
1. <u>Strategic Planning and ADP Evaluation Functions are Essential</u>	
<ul style="list-style-type: none"> • Strategic program planning process needed to provide a foundation for long term ADP planning • Need to audit major systems 	Task Force MSD, ASD, AWMD
2. <u>Strong Growth in Information Exchange With States</u>	
<ul style="list-style-type: none"> • Increasing need to obtain information from states • Increasing need to provide information to states 	OPRM, OLEC, ODW, OSW, OWPE, OAQPS, PTSED/RC, WMD, AWMD OLEC, OMRS, OSW, OWPE, AWMD, OAQPS, OTS, OPP/WMD/ASINPCA, ASTSWMO, STAPPA
3. <u>Critical Need to Improve Quality of and Integrate Data</u>	
<ul style="list-style-type: none"> • Need to have more complete, current and accurate data • Need much more integration or linkage of systems and data bases across programs and functions • Need to safeguard increasing volumes of confidential business information 	OPRM, OLEC, OA, ² ODW, OSW/AWMD, RC, ASD, WMD, ESD/ECAO, EMSL, MERL OPRM, OLEC, OA, ODW, OMRS, OWE, OAQPS, OPP, OTS, ORD (all)/RC, ASD, ESD, WMD, SWMD OWPE, OTS, OPP, OAQPS, OSWE/AWMD
4. <u>Likely Explosion in Demand for ADP Services</u>	
<ul style="list-style-type: none"> • Development, enhancement and expansion of major applications • Increasing automation of office and laboratory functions • High demand for user friendly ADP tools <ul style="list-style-type: none"> - Retrieval software - Statistical analysis software - Automated graphics - Automated mapping - Optical character recognition - Software development tools • High demand for general and technical ADP orientation and training 	OA, OMRS, OWE, OWPE, OAQPS, OPP, OTS, ORD/ESD, AWMD/ASTSWMO AO, OPRM, OLEC, OA, OWPE, OAQPS, OPP, OTS/DRA, RC, ASD, ESD, WMD, AWMD/EMSL, ERL, HERL, IERL/STAPPA AO, OA, OWE, OTS, OPRM, ORD (all)/ASD, WMD, AWMD, ESD OPRM, OA, ODW, OMRS, OWPE, OTS/DRA, WMD, AWMD, ESD/HERL AO, OA, OPRM, OWE, OAQPS, ORD (OPRM, nearly all labs)/ASD, WMD, AWMD, ESD/ASTSWMO, OPRM, OWPE, PTSED/WMD, AWMD, ESD/EMSL/ASTSWMO OA, OTS, /ASD MERL, CERI OPRM, OMRS, OTS AO, ODW, OWPE, OAQPS, ORD (many labs)/DRA, RC, ASD/STAPPA

¹See legend on next page. Findings attributed to state agencies reflect state needs with respect to EPA's ADP capabilities and not needs for ADP capabilities provided by state organizations.

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EXHIBIT II-1 (Cont'd)

LEGEND OF SOURCESHeadquarters

AO - Staff Offices to the Administrator
 OPRM - Office of Policy and Resource Management
 OLEC - Office of Legal and Enforcement Counsel
 OA - Office of Administration
 OWRs - Office of Water Regulations and Standards
 OWPO - Office of Water Program Operations
 ODW - Office of Drinking Water
 OWE - Office of Water Enforcement
 OWS - Office of Solid Waste
 OERR - Office of Emergency and Remedial Response
 OWPE - Office of Waste Programs Enforcement
 OAQPS - Office of Air Quality Planning and Standards
 OMS - Office of Mobile Sources
 ORP - Office of Radiation Programs
 OPP - Office of Pesticide Programs
 OTS - Office of Toxic Substances
 PTSED - Pesticides and Toxic Substances Enforcement Division
 ORD - Office of Research and Development (Headquarters)
 ORPM - Office of Research Program Management

Regional Organizations

DRA - Deputy Regional Administrator
 RC - Regional Counsel
 ASD - Administrative Services or Management Division
 WMD - Water Management Division
 AWMD - Air and Waste Management Division (includes combined air and waste management divisions as well as stand-alone air divisions and waste management divisions)
 ESO - Environmental Services Division

ORD

EMSL - Environmental Monitoring Systems Laboratory
 IERL - Industrial Environmental Research Laboratory
 MERL - Municipal Environmental Research Laboratory
 ERL - Environmental Research Laboratory (including the Environmental Sciences Research Laboratory)
 HERL - Health Effects Research Laboratory
 ECAO - Environmental Criteria and Assessments Office
 CERL - Center for Environmental Research Information

State Organizations

ASIWPCA - Association of State and Interstate Water Pollution Control Administrators
 ASTSWMO - Association of State and Territorial Solid Waste Management Officials
 STAPPA - State and Territorial Air Pollution Program Administrators

Specific findings and recommendations of the Nolan, Norton study related to the current study that are still relevant are:¹

- Adopt a "top-down" ADP planning strategy, which links EPA's overall mission plans (emphasis added) to plans for ADP applications, data resource support, and computer equipment acquisition phases. Develop an annual ADP plan within each AA office, subject to central review and coordination.
- Manage EPA's data resource as a key Agency asset distinct and apart from the systems which currently use the data. Develop a data resource plan for EPA which defines where data resides within EPA and how it is to be managed and controlled on behalf of all organizations that need it.
- Learn to use technologies now emerging which will make extensive data sharing and integration feasible and economical in the future.

¹ The following items are taken from "Stage Assessment and Five-Year Management Plan for Automated Data Processing," Management Report, July 1979 by Nolan, Norton and Company, Inc.

III. STAFF OFFICES TO THE ADMINISTRATOR

A. Program Trends - Offices at Headquarters

The major functions of the staff offices to the administrator are not likely to change significantly. However, the specific responsibilities, staff size, and priorities among staff functions are highly dependent upon the personal style of the Administrator and senior staff managers. Consequently, there will be periodic realignments of staff and responsibility.

Specific functions addressed in our interviews with members of the Administrator's staff include:

- review of decision documents
- tracking of environmental impact statements
- budgeting and financial management of the staff offices
- public affairs, including contact with the public, Congress and media.

B. Program Trends - Regional Staff Offices

The staff offices to the Regional Administrators were not covered extensively in this study. Intergovernmental liaison functions are not likely to change significantly. Specific functions addressed in our interviews include:

- interaction with state agencies and the Congress
- public affairs
- reviews of environmental impact statements required by NEPA.

C. Information Management Requirements and Related Applications

The information management needs of staff offices at headquarters and in the regions are very similar.

- A large volume of controlled correspondence and other controlled documents flows through the Office of the Administrator and the Offices of the Regional Administrators. The existing document tracking systems, many of which are manual, are inadequate, and will have to be replaced.
- There will continue to be a high volume of communications between top EPA program officials and the staff offices of the Administrator at headquarters, with a parallel flow in the regions. To better support the volume of text data, the staff offices will require:
 - Continued extensive use of word processing capability, and
 - Integration of word processing, electronic mail, and document tracking.
- The staff offices at headquarters and in the regions rarely use the major program systems containing management or technical data. Inquiries requiring program information are forwarded to the respective program office. Inquiries by the Administrator's staff for cross-cutting information may be sent to either the program offices or to OPRM.
- Each program office has one or more constituency mailing lists. There is a great deal of duplicate information among these systems, as well as redundant effort in keeping the lists up to date. There may be an effort to integrate these mailing lists.
- A variety of requirements for information management and related applications were identified as applying not only to the staff offices to the Administrator, but also to managers throughout the agency:

- On-going training and briefings to keep managers informed of the information services available throughout EPA.
- Improved retrieval and data manipulation capabilities for users to access information stored in Agency-wide administrative information systems.
- Personal data bases - an "automated filing cabinet" for managers to index, store and retrieve text that has already been keyed into word processing.
- Graphics capability for use in presentations to senior management is essential.
- Flexibility in hardware installation, especially for terminals connected to the EPA network or local mini-computers, is necessary to support internal reorganizations and office moves.
- Improved system reliability and backup are required, especially for management and administrative systems currently implemented on DEC minicomputers at headquarters. Down time and data loss create major problems in management and administrative systems that are essential to program managers and budget staff.

D. ADP Tools

- Electronic mail will be used increasingly for communications with EPA managers in headquarters and in the regions. Regional staff would like to add regional program managers and state agencies to the network to provide more timely communication of EPA actions, including policy decisions. However, state agencies should have access to only pertinent mailboxes on the network and not to all agency managers.

- Greater use of menu-driven systems to enable managers to retrieve data without requiring a great deal of system-specific knowledge and training.

E. Other Remarks

- The new ADP organization should include program and management analysts on its staff to ensure effective communications between program staff and the technical ADP staff.
- Regional staffs require more information on ADP capabilities and technology that may improve day-to-day office operations, and improved means to identify the personal contacts for EPA's program information systems.
- Telephone capabilities in some regions are archaic. Regional staff require telephone features (e.g., call forwarding and potentially voice mail) that will improve the productivity of the considerable time spent using the telephone.

IV. ASSOCIATE ADMINISTRATOR FOR POLICY AND RESOURCE MANAGEMENT

A. Overall Trends

The principal functions and responsibilities now conducted by the offices within OPRM are not expected to change significantly over the next several years, although the functions will likely be reorganized.¹ OPM will be required to assess proposed regulatory decisions from an Agency wide perspective, evaluate the effectiveness and efficiency of EPA programs and management, conduct analyses of program policy requested by the Administrator, and manage the development and review of the Agency's budget. A continuing emphasis will be placed on managing for environmental results. Specific trends within individual OPRM offices are discussed in the following sections.

B. Program Trends - Office of the Comptroller

The overall budget process and functions performed by this office are not expected to change significantly over the next several years. A potential change to a two-year budget cycle is possible, but this would require Congressional approval and is not likely to occur. The establishment of new offices within EPA, or a major reorganization, would have a significant effect on the budget structure but not on the budgeting process.

Several additional activities that may be undertaken include:

- Increased automation of the budget process, especially narrative text components of budget turnaround documents and program office submissions.
- Redesign of the budget system or conversion to data base management technology, but only in conjunction with an upgrade of EPA's Financial Management System.

¹ Pending Agency reorganization will likely shift the Office of the Comptroller to what is now the Office of Administration.

- Implementation of a program accountability system and linkage with budget submissions.

C. Program Trends - Office of Policy Analysis

This office will continue to have a strong "project" orientation, conducting roughly 100 projects concurrently such as regulatory analysis for proposed regulations, assessments of the economic impacts of alternative policies in areas such as acid rain and NESHAPS permits, analysis of the economic benefits of environmental improvement, and the large, multi-year Integrated Environmental Management Project. IEMP is developing strategies and analytic methods for assessing environmental problems and developing control strategies on a multimedia basis as an alternative to traditional approaches which usually focus on individual media. IEMP will develop and assess three strategies for regulatory integration reflecting different baselines: the industrial approach, geographic approach and chemical approach.

- The industrial approach will ultimately develop complex models of the operations of eleven industries and the impacts and interaction of environmental regulation for all media. These models may be used to forecast industry trends and support the design of new and revised regulations, and will be maintained to reflect current data and changes to the parameters of the model and their interrelationship.
- The geographic approach will cut across industries and examine specific locations with respect to pollution sources, ambient conditions, public exposure, and health effects to support the development of localized regulatory strategies. Up to twenty cities/counties will be examined.
- The chemical approach will examine multi-media and cross-industry control strategies for specific chemicals, and may assess alternative data collection and analytic methods for monitoring toxic pollutants. Its future evolution is uncertain.

Analyses by OPRM of energy issues related to the environment will probably continue to be de-emphasized. Specific analyses to be conducted in the future will be a function of the areas of interest to EPA top management.

D. Program Trends - Office of Standards and Regulations

This office will continue to address four major areas: regulatory reform, regulation oversight and review, management of the regulations development and review process, and implementation of the Paperwork Reduction Act.

- Most new regulatory reforms now being considered are extensions of the "bubble" principle -- water bubbles and bubbles for new sources of air emissions subject to new source performance standards. Ongoing programs resulting from these reforms will be transferred to the appropriate program office. Current efforts in environmental audit are oriented toward establishing an information clearinghouse for use by firms wishing to establish an audit function, and are not expected to result in new regulation. Other reforms that may be initiated within the next two to five years cannot be predicted at this time.
- OSR anticipates a continuing significant role in reviewing proposed regulations, although their degree of involvement in regulatory reviews may change under future Administrators.
- OSR anticipates refining the regulation review process and improving communications on the status of reviews to speed up the review process, identify recurrent bottlenecks in the process, and initiate action on bottlenecks in a more timely manner.
- Increasing effort will be expended for providing information resources management (IRM) direction and quality control on data collection Agency-wide. OSR will review the statistical validity of proposed data collection efforts, and provide assistance to other offices in obtaining data collection clearances from

OMB. Primary emphasis will be placed on quality control to ensure that the collection of poor quality data is either improved or terminated. An IRM handbook will be prepared to assist program offices in developing data management plans, and ongoing analytic support will be provided by OSR.

- A potential major growth area is the application of statistical analysis to the development of neutral inspection strategies required by the Barlow decision. OSR will assist enforcement programs in developing legally non-discriminatory inspection targeting algorithms which identify facilities most likely to be out of compliance with applicable regulations.

E. Program Direction - Office of Management Systems and Evaluation

The principal mission of this office will be to support efforts by the Agency's top managers to strengthen the management of EPA programs and to improve relations between EPA and state environmental agencies. Specific functions performed by OMSE will include operation of the Administrator's Accountability System (which OMSE developed), development of other systems for measuring program accomplishments and environmental results, and the conduct of management studies to identify specific problems and potential solutions. OMSE has played a major role in working with associations of State environmental officials to find ways of removing barriers to EPA delegation of authority to run environmental programs, and to develop improved methods for EPA oversight of delegated programs. These efforts will continue. OMSE officials stress that EPA-State sharing of data can be mutually beneficial only if it takes place within an agreed-upon framework for EPA oversight of program effectiveness (as distinguished from review of individual State actions).

F. Information Management Requirements and Related Applications within OPRM

OPRM will be a significant user of information generated or collected by other program offices as well as information generated internally by OPRM. With respect to the latter category of information, OPRM will have the following requirements:

- An automated project tracking capability for use by the Associate Administrator and deputies to identify the projects being undertaken within OPRM and their current status.
- A real-time capability to track the status of regulatory actions and identify bottlenecks in the regulatory review process.
- An automated capability to generate instructions for preparing budget submissions and to integrate information about program objectives and commitments with proposed funding levels.
- Automated capabilities to manage and analyze data collected by OMSE and OPA for specific projects.
- Improved access to automated models developed and operated by contractors and the capability to refine and rerun them to support comparable studies and analyses.
- Access to commercial econometric models and private data bases, and also to technical data bases maintained by the U.S. Geological Survey, National Weather Service, Bureau of the Census, and Departments of Labor and Health and Human Services. Greater use will likely be made of the Domestic Information Display System (DIDS) developed by several Federal agencies.
- Improved flexibility for the Resources Management Information System and greater integration with the Financial Management System.
- In-house implementation of IEMP models developed by contractors on outside computer facilities to provide easier access and use by other program offices and potentially by regions.

G. Information Management Requirements and Related Applications
Oriented toward Other Program Offices and Systems

OPRM will increasingly be a major user of management, technical, and administrative information maintained by other program offices. Specific requirements with respect to this information and related ADP systems include:

- Improved data quality for many major systems, including monitoring, permits, emissions/effluent, compliance and enforcement. Significant deficiencies of existing systems include:

- incomplete and old data, especially data collected from State agencies
- inaccurate data, poor quality control
- lack of common data definitions and other standards, and a data administration function.

Several other offices expressed the same problems with major data systems.

- Improved access to data maintained by other programs, including:
 - direct access to software and data, without the assistance or intervention of ADP staffs
 - user-friendly software for retrievals, preferably menu-driven; compatible software across systems to minimize the need for training in different software; and technical data base designs which are transparent to users to the maximum extent practical
 - easy access to historical as well as current data to assess trends.

- Ability to retrieve logically related data now maintained in different data bases using common attributes such as facility identifier, chemical, location, etc. At present, this cannot be done for most retrievals that cut across media (e.g. multimedia studies for designated geographic locations or industries) or across functions (e.g., trends in spending for designated programs, and related facility compliance rates and ambient conditions maintained by EPA programs with data maintained by other agencies (e.g. population density). A related requirement is the addition of geographic location data to several systems, although less detail than latitude and longitude coordinates would be sufficient.

H. ADP Tools

A significant number of ADP tools are of particular interest to OPRM:

- Automated graphics would be extremely useful in presenting program management and accomplishment data to the Administrator and the Congress, and would reduce current workloads for manually preparing graphics. Color graphics would be useful, but not essential.
- Automated mapping to generate a clearer picture of environmental conditions and facilitate multimedia comparisons for use by analysts and top management. A more accessible mapping capability would be especially useful to the IEMP effort which currently utilizes the capabilities of the ORD laboratory in Las Vegas.
- User-friendly statistical analysis packages to manipulate data collected by OPRM, other programs, and other agencies to support a wide variety of analyses, ranging from budget analysis to analysis of compliance and ambient conditions.
- User-friendly software to access, manipulate and retrieve data in support of specific OPRM studies.

- Simple modeling or "simulation" software to support analyses of alternate scenarios in the development of policy recommendations. Simple programming languages are required for comparable uses.
- Text searching capability to aid in the development and review of policy statements, budget instructions, etc.

In addition, OPRM anticipates much greater use of electronic mail by its senior managers for communications with regional offices, laboratories, and other program offices at headquarters. The Office of the Comptroller will continue to be a significant user of electronic mail.

I. Other Comments

- To ensure effective oversight of programs delegated to states, and to provide information to support and justify policy decisions, EPA should invest the resources required to improve the accuracy, timeliness and completeness of monitoring data and program accomplishment data collected from state agencies.
- EPA should consider using third parties to collect and maintain detailed data from state agencies about state program activities and accomplishments that are needed to generate summaries essential to OPRM and other program offices. State agencies currently perceive that EPA desires detailed data to "second guess" state actions as well as to conduct higher level program analyses, and they have been unwilling to provide much of the data requested by EPA regarding compliance monitoring and enforcement activities. Third party organizations would generate summary reports requested by EPA, but would not provide access to individual records. The use of certified public accounting or market research firms represent two approaches to third-party data collection.

- OPRM and other offices in EPA will need the capability to identify national environmental trends and compare the performance of states on a wide array of performance measures.

V. ASSOCIATE ADMINISTRATOR FOR OFFICE OF LEGAL AND ENFORCEMENT COUNSEL

A. Program Trends - Office of the General Counsel

The General Counsel will continue to represent EPA when legal action is taken against the agency. Management and control of litigation will continue to be exercised on a case by case basis. No major program changes or requests for ADP support are anticipated.

B. Program Trends - Office of Enforcement Counsel

The role of enforcement staff in OLEC, headquarters program offices, and the regions is not likely to change significantly with respect to program operations. Overall there will be a trend at headquarters toward greater monitoring of enforcement activities and lesser involvement in individual cases. Also, the recent decline in the number of enforcement actions is likely to be reversed, with a significant increase in litigation. For most enforcement litigation, state agencies will have lead responsibility, with regional offices providing technical support and oversight. OLEC will continue to perform the functions of: general program management; oversight of regional enforcement programs, including quality control over judicial (civil and criminal) cases; and coordination on criminal cases referred to the Department of Justice. The Office of Waste Programs Enforcement, with the assistance of OLEC, will handle litigation for Superfund.

The Office of Enforcement Counsel, together with the compliance groups within program offices, may also take an active role in developing an overall enforcement plan designed to improve the overall management of the enforcement program and the current image of the program. Such a plan might include:

- An inspection targeting strategy, utilizing statistical sampling and other "neutral" inspection schemes to focus compliance monitoring and enforcement resources on facilities that are most likely to be out of compliance and have major violations of environmental statutes. For example, targeting of TSCA enforcement resources for PCBs would direct resources to the types of

facilities likely to be improperly using PCBs or non-responsive to the potential for leaks and spills in electrical equipment.

- An inspection targeting strategy geared to environmental results, focusing on facilities located in areas with significant environmental problems that are likely to be contributing to these problems.
- Giving consideration to the complete compliance history of a facility/company, including administrative orders, in determining the appropriate enforcement action.

The thrust of these policies will be to "manage" the enforcement program and move away from a more "reactive" mode of operations. The Office of Legal and Enforcement Counsel will continue to utilize NEIC for high quality technical support.

1. Program Trends - National Enforcement Investigation Center

The NEIC anticipates several significant trends related to the complexity of litigation, role of NEIC, and increase in enforcement for individual programs. Many of the trends have started within the past two years and will continue over the next three to five years.

- Enforcement litigation will continue to become increasingly complex and require access to a wide variety of information and analytic capabilities. The nature of enforcement litigation is shifting from relatively simple issues (e.g., is control equipment installed) to issues requiring substantially different theories and evidence (e.g., intent of the defendant, patterns of conduct, toxicity and risks for a substance).
- EPA will need to be more efficient in targeting its enforcement resources by identifying major environmental

problems for individual facilities from a multimedia perspective.

- State agencies will have lead enforcement responsibility for many programs. However, delegation will probably not increase dramatically in view of the lead time and resources needed to implement a new state program. Substantial EPA assistance to states will be required.
- Regional offices will have lead responsibility for targeting EPA enforcement actions for violations not addressed by state programs. However, mechanisms will be needed to provide Regional Counsels the information required to ensure national consistency and respond to consistency issues raised by defendants.
- NEIC will continue to provide expert legal technical support in enforcement litigation and support the development of overall enforcement strategies. In addition, NEIC will provide information analysis on request to support litigation by Regional Counsels and U.S. Attorneys. NEIC will not participate in enforcement actions that do not involve litigation.
- RCRA enforcement will likely experience major growth and become EPA's largest enforcement program. Moreover, RCRA litigation will be much more difficult than litigation of other statutes due to the complexity of RCRA permits and other considerations. State agencies may need considerable EPA assistance, especially for evidentiary hearings. Increasing EPA experience will ultimately result in the formulation of a routine Agency approach for RCRA litigation.
- Superfund enforcement will increase significantly. However, CERCLA litigation is now becoming more orderly with

the adoption of a new more routine approach for this activity.

- Major growth is not anticipated for other EPA enforcement programs.
- EPA compliance inspections conducted by Regional Environmental Services Divisions will address multiple media to more effectively use limited staff resources.

C. Program Trends - Offices of Regional Counsel

Regional counsels concur with OLEC's forecast that the roles of enforcement groups at headquarters and in the regions will not change significantly. State agencies will have lead responsibility for enforcement of most programs, with regional counsel and program divisions providing technical support and oversight, respectively. As delegation of EPA programs to states continues, regional counsel anticipates that more stringent oversight by regional program staff may take place to ensure that states are moving ahead diligently on individual cases and are following up on actions taken against violators (e.g., attaining compliance with administrative orders). Regional caseloads are not expected to decrease with delegation.

RCRA and CERCLA enforcement activities, and to a lesser extent, TSCA enforcement, are projected to be major growth areas. OLEC and other compliance/enforcement groups at headquarters are expected to manage for national consistency. Some Regional Counsels do not want the front line responsibility for coordinating enforcement consistency among regions.

D. Information Management Requirements and Related Applications - OLEC

- Much stronger management of compliance information is needed to help determine patterns of conduct and provide evidence in court of recurrent noncompliance. Improved automated capabilities are needed to manage evidentiary data. Of particular importance,

evidentiary data should be treated as confidential and maintained under appropriate security.

- OLEC needs to obtain more complete and accurate information on the number and types of enforcement actions taken by state agencies, as well as by EPA, for each environmental statute. Existing incomplete information constrains EPA's ability to compile evidence on prior violations, report overall rates of compliance to the Congress and justify in detail its enforcement budget requests for individual statutes. In collecting enforcement information from states, it is essential to develop standard definitions of enforcement activities and ensure that the nature of state actions is properly reflected in reports to EPA and summary reports at the national level.
- A capability to perform cross-media/statute research for designated facilities and companies is required for case development, evidentiary hearings, and penalty selection. This capability should include access to administrative actions, as well as civil and criminal actions, at the Federal and state level. This data is currently incomplete (especially for administrative actions taken by states), and in some cases inconsistent. Common identifiers are needed (e.g., Dunn and Bradstreet codes) to more easily access company information across media. Further, OLEC has no control over the data and no collection mechanism to secure data from the states. Enforcement data collection is currently a responsibility of the regional offices and the compliance offices under each assistant administrator.
- Enforcement attorneys will need the capability to link EPA compliance and enforcement information with pertinent information maintained on external data bases, especially financial information, and also including scientific information on regulated substances and legal data bases.

- An automated tracking and "tickler" system is needed to ensure compliance with administrative orders and consent decrees and to support inspections. The current level of compliance with EPA administrative orders and consent decrees is unknown.
- The "Docket" system tracks key facts and textual information about enforcement litigation. It has slow turnaround and is cumbersome to use. Required enhancements include:
 - Interactive data entry at the source, rather than the current procedure which routes new data and changes to a central coordinator who sends the data to a contractor for data entry.
 - Direct access to the data by OLEC staff members and other users, including members of the various enforcement offices, along with the capability to compile and manipulate information to meet case-specific needs.
 - Ad-hoc query capabilities.

E. Information Management Requirements and Related Applications - Office of Regional Counsel

The information management needs of regional counsels will be similar to those of OLEC.

- Regional counsels, and especially program divisions, require more complete information about state enforcement activities to effectively carry out program oversight and provide information requested by headquarters offices and the Congress. It will be important to identify the types of actions taken by states, and to distinguish between actions taken under federal legislation and actions that are unique to state statutes. Existing systems are inadequate in that they do not contain information about many state actions and do not enable EPA to assess how quickly a

state is moving on major cases and determine whether EPA may need to provide assistance or initiate a separate action.

- It will be essential to develop nationally recognized definitions of enforcement activities to enable regions to develop reliable measures of program activities at the state level. Since some states define various classes of actions using different terminology than EPA, and also have unique definitions for terms also utilized within EPA (e.g., administrative action, notice of violation), EPA should develop criteria for classifying state actions to ensure that equivalent actions are classified similarly for reporting purposes. These criteria should be defined by a collaborative effort involving EPA headquarters and regional offices and state agencies.
- An automated capability to obtain a complete compliance history for designated firms or facilities across statutes will be useful in developing enforcement actions. This history should include state actions as well as those taken by EPA, and will be especially useful in regions with a large number of enforcement actions.
- Some regions have developed legal document cross-referencing systems that should prove useful to all regions in supporting enforcement case preparation.

F. ADP Tools

- Most OLEC attorneys have excellent typing skills and will be heavy direct users of word processors. Some regional attorneys are also beginning to use word processing to streamline document production and in some regions respond to a shortage of secretarial support.

- OLEC and regional attorneys require the capability to identify and retrieve the current official copy of all consent decrees and administrative orders for use in developing similar new orders and decrees expeditiously. Regional attorneys also require access to requests for evidence and to motions for summary judgement.
- A significant volume of electronic mail traffic between headquarters and the regions is anticipated. The capability to add state agencies and other organizations to the network and rapidly communicate consistent information regarding enforcement cases to all participating government organizations would greatly improve coordination, especially for complex actions. Specific organizations that should be added to the network are:
 - U.S. Attorney in Washington
 - Assistant U.S. Attorney within the region
 - State regulatory agency
 - State Attorney General
 - Pertinent local environmental agencies and prosecutors.

Confidential information associated with enforcement actions will require stringent safeguards, and probably should not be entered into the network.

- Teleconferencing, and any other tool that could improve communications between headquarters, regions, and outside agencies (e.g. the Department of Justice), would expedite case handling and reduce travel costs. Improvements in EPA's communications network would especially be useful to support information exchange between NEIC and Regional Counsels.
- Enforcement attorneys require better access to the Agency's compliance and enforcement data bases, and the capability to manipulate available data to meet unique requirements for individual cases.

G. Other Remarks

- OEC suggested that other enforcement offices should make greater use of NEIC legal research capabilities.
- Improved ADP procurement processes are needed to enable regional attorneys to acquire terminals and use information retrieval and management routines developed by the NEIC.
- Regional counsels require more information about the capabilities of EPA's compliance and enforcement systems, support capabilities available from the NEIC, and about ADP capabilities and technology in general.

VI. ASSISTANT ADMINISTRATOR FOR ADMINISTRATION

The Office of Administration projects two broad trends cutting across all functions within OA. First, OA activities will be viewed as services for client organizations rather than as individual functions. OA will strive to provide a wider range of services, and to consistently provide high quality service. A major initiative will be to make administrative data systems more accessible and reliable for program users by providing more accurate data and improved capabilities. Second, OA will seek to improve the efficiency and efficacy of its ADP systems in supporting Reform 88.

Emphasis will also be placed on developing mechanisms which equitably identify the cost of services provided by OA to the other offices within EPA that are using these services.

A. Program Trends - Financial Management

- Recent legislation, such as the Federal Financial Managers' Integrity and Prompt Payment Acts require tighter internal control that will be implemented over the next several years. Internal control reviews will be conducted on possible vulnerable areas. Actions will be implemented to strengthen cash management processes for both collections and disbursements to comply with Treasury and OMB directives.
- The Department of Interior Payroll System (DIPS) will no longer be supported by DOI after September 1984. EPA will establish an in-house payroll function and implement DIPS at the NCC.
- Program offices will have greater participation in identifying financial management needs and problems. A survey will be conducted on the needs for better cost accounting information.

Under current development is an allocation methodology for distributing indirect costs to Superfund sites for purposes of billing the responsible parties. Additional enhancements related to the Superfund program will be developed.

- Enhancements will be implemented to comply with the GAO requirements for approval of accounting systems in operations.
- Efforts will be made to continue to improve the effectiveness and efficiency within accounting operations offices.
- Agency-wide quality assurance and compliance program will be instituted.
- Accounting procedures, systems and controls will be standardized by eliminating duplicative data entry systems.
- Greater emphasis will be given to data integration with other administrative functions.

B. Program Trends - Human Resources

The primary trend in human resources management will be to increase the involvement of line managers throughout the agency in managing people requirements, and to encourage more structured planning of the Agency's training and staff realignment needs. Line managers will have a more active role and/or greater responsibility in developing training plans and processing personnel actions.

C. Program Trends - Facilities Management

There will be two major program thrusts within the facilities management area. The first priority will be to significantly increase the responsiveness, quality, and efficiency of existing services. EPA will exercise a greater degree of control over facilities-related work (such as building maintenance) performed by contractors.

Second will be an effort to upgrade the quality of EPA facilities. As the computer and the terminal become part of the office of the present, greater consideration will be given to furniture, space, heating/cooling, lighting, and wiring for ADP networks.

D. Program Trends - Procurement and Contracts

There will be no major change in direction for procurement and contracts management. However, several factors will affect the work environment, including:

- New Federal procurement regulations, which in large part are reflected by existing EPA procedures
- Greater automation of routine activities
- In conjunction with increased automation, a shift in staff responsibility from clerical activities to policy, procedures, and management activities.

E. Program Trends - Grants Administration

The grants administration function may experience several significant changes over the next several years. Block grants would result in fewer grants with larger dollar amounts. However, the total dollars granted through EPA programs are not expected to decline. In addition, EPA will continue to be accountable to the Congress for how program grant monies are spent by state agencies, and for monitoring funding provided by state governments beyond the Federal grant. EPA will also continue to monitor 12,000-14,000 active construction grants.

RCRA may have a significant impact on the grants administration function, with the potential evolution of a large grant program with some unique characteristics (e.g., cost sharing). In the long term, EPA may also elect to fund construction grants for resource recovery facilities.

F. Program Trends - Library Services

The library function will evolve from literature curatorial services to a more comprehensive and centralized bibliographic reference service. The objective will be to provide equal access for all EPA organizations to library collections and to a broad range of bibliographic data bases.

G. Program Trends - Regional Administrative Services and Management Organizations

Regional administrative services and management organizations anticipate few substantive changes in the way they will perform administrative functions. Most changes over the next three to five years will reflect new or improved applications of ADP technology to administrative functions, and the impact of ADP on specific functions such as facilities planning and maintenance. Greater use will be made of optical character recognition and other office automation tools to improve productivity at reasonable cost.

Regional organizations perceive a shift to more project oriented activities and an attendant need for improved accounting systems. Regions also are beginning to experience an overall increase in "ADP literacy" of program staff and increased demand for access to computer capabilities. Greater emphasis will need to be given to space planning, furniture, lighting and especially to wiring and local area networks to meet this demand. In addition, regional libraries and "information centers" will shift from an initial heavy emphasis on public access to information support of regional program staff.

H. Information Management Requirements and Related Applications - OA

- Data entry for many administrative systems will be moved to the point of transaction.
- Data edit and validation will be performed at the time of transaction input. Erroneous data will be corrected by the person with the most knowledge of the

transaction. For some functions (e.g., grants administration) data will be entered by state agencies as well as by EPA.

- Written copies of many transactions will be unnecessary, and the cost of preparing, processing, and storing the transaction document will be eliminated.
 - Transactions need only be entered once, eliminating redundant, and perhaps inconsistent, data.
 - Hardware to support geographically dispersed data entry, and real time access to data bases from the geographically dispersed data entry locations, will be required.
 - With distributed data entry, it will be particularly important to place accountability for data quality with the individuals who enter data, and design the proper approval controls and audit trails into each application.
- Data will be stored once, rather than in a number of different places, within a data base environment.
- There will be some cases where it is more expeditious to store the same element more than once for ease of access (i.e., access pathways).
 - Logical linkages between data structures that contain the same element(s) will be required. For some purposes, it may be valuable for a manager to view data as having a different logical structure than the structure actually used to store the data in automated files.

- Some systems, such as the Grants Information and Control System (GICS), may utilize distributed regional data bases. However, the Agency has not yet implemented a significant application in this manner. For these systems, the use of standard software and data definitions across regional systems will be mandatory.
- Systems that perform the same functions for different users, will be merged or eliminated. This will improve the service level and reduce the cost of maintenance for a number of applications (e.g., financial spending registers, FTE tracking). A pilot study for a small purchases system may be expanded into an Agency-wide system, encompassing the full cycle of procurement actions from purchase requests through disbursement of funds by the U.S. Treasury.
- A wide variety of users require access to information held in "corporate" data bases. For example, many line managers and budget officers need access to financial data generated by FMD (and currently stored in FMS) regarding their program. State agencies and EPA program staff will continue to require access to data maintained in GICS. However, widespread access will be balanced against the "need to know" in designing data bases and access privileges for individual offices, as well as for data regulated by the Privacy Act.
- Computers will be substituted for manual processing whenever practical.
- A number of reports that are currently compiled manually (by putting together outputs from several systems) will be automated.
- Point of transaction data entry will eliminate preparation of many paper input documents and error listings.

- A number of other office paperwork functions will be automated such as the preparation of procurement/contracts documents.
- A major system replacement/integration effort is likely for the budget/accounting/finance/procurement/contracts functions, possibly to include payroll. A pilot system is currently being developed by the OA Budget and Control Staff to access selective administrative data bases and integrate related data using an office computer. This pilot may or may not be the basis for a larger integration effort.
- Another likely candidate for system replacement/integration will be the payroll/personnel/human resources functions.
 - A probable enhancement to the personnel system will simplify and streamline processing and reduce the paperwork burden, thus allowing personnel staff more time to service program officials.
 - Tools are needed Agency-wide to support analysis and projection of staff capabilities, requirements, and potential staffing problems.
- The Financial Management System may be brought in-house from the Parklawn computer facility. The Department of Interior payroll System (DIPS) will be brought in-house within the next year.
- Major changes will be made to the Contracts Information System to improve its accuracy, timeliness, efficiency and utility.
- Facilities management has a need for two types of integrated applications;
 - Job planning, status tracking, performance reporting, and chargeback.

-- Facilities, property, and inventory tracking.

- To respond to Congressional inquiries about the effects of delegation and spending of grant monies, the grants administration function will require more information about how grant monies are spent by states (e.g., monitoring, enforcement), and require a link between GICS and other programmatic systems such as compliance and Superfund site tracking systems.
- The Budget and Control Staff requires an automated budget development and projection capability, and believes that this capability would be useful to other EPA budget officers. BCS also would like an enhancement to the budget system to support electronic transfer of the OA budget developed using automated tools by OA into the budget system.

I. Information Management Requirements and Related Applications - Regional Organizations

The information management needs of regional administrative organizations are relatively consistent across regions and are comparable to those of OA. Regions will require much better ADP support through agency-wide administrative systems to improve program management, provide more efficient reporting to program staff in the regions and headquarters, and eliminate the need to maintain redundant localized administrative systems. The current patchwork of OA systems is not responsive to regional needs. The highest priorities of regional organizations are improved access to data, more timely processing of transactions, integration among administrative systems and with program management systems, project accounting, and expanded computer support for local applications.

- Regional administrative and program organizations will require improved access to data maintained in official agency systems (e.g., financial management, personnel) and more user-friendly

retrieval capabilities. These systems should be enhanced to improve access but should incorporate adequate security to protect sensitive information.

- Improved data quality will be essential. Financial transactions, personnel actions and other transactions must be recorded accurately and processed in a timely fashion to support management analysis and decisions. Corrections to erroneous financial data, especially for payroll, must be made promptly and the correction process will need to be less labor intensive.
- Regions require integration of data now maintained in several different administrative systems, and also integration with program data. The most important linkages among administrative data are finance/contracts, payroll/personnel, and personnel/budget (to support planning for personnel operations). Linkages with many program management systems (e.g., permits enforcement) will be needed to compare state agency program commitments and accomplishments with grants as part of EPA's oversight function for delegated programs.
- Virtually all regions will require an improved project accounting capability, especially for labor and contracts, to support Superfund and other project work.
- Virtually all regions will require additional computer support for local applications such as work planning and project status tracking. Many regional minicomputers are now operating at or near capacity.
- As OA enhances existing administrative systems, regions should have an opportunity to participate in system designs to ensure that potential impacts on regional program and administrative operations are fully considered.

- To enhance EPA's oversight function, Regions require information about the expenditure of state funds on environmental programs in addition to EPA program grants.
- Regions will need the capability to track EPA property (e.g., ADP and laboratory equipment) made available to states as part of delegation.
- Regional administrative organizations require an index of pertinent reference materials, such as OMB circulars, and access to consolidated contracts information generated throughout EPA (e.g., suspended and disbarred contractors).
- Regional libraries will require the capability to link data for local collections with reference information for other EPA libraries and with other bibliographic systems (e.g., health effects data bases for chemicals and pesticides).

J. ADP Tools

- Improved tools are needed for end-user retrieval and manipulation of financial, personnel and other administrative data to support analyses of financial status, staff requirements, current skills mix, and potential staffing problems.
- An automated graphics capability would be very useful to headquarters and regional users to support analyses of grants and other administrative data.
- Electronic mail would be extremely useful to grants administration if state agencies were added to the network and EPA no longer needed to retype grant applications submitted by states.
- Electronic mail capabilities linking regional program managers and administrative organizations will be extremely useful.

- The Financial Management Division will be exploring the capability to transmit data directly, to the Treasury Dept. for electronic transfer of funds (EFT) to recipients' commercial bank accounts. Cryptographic codes will be developed by the FMD to authorize the release of payments by Treasury.
- Grants administration may utilize optical character recognition (OCR) technology to facilitate progress reporting and data entry for program and construction grants. The application of OCR Agency-wide to timecard processing may also be cost effective.
- Professional staff in several administrative offices and regions will make considerable use of word processing and reduce the typing workload for support staff.
- Existing word processing equipment needs to be improved to better support filling out pre-printed forms and the production of long documents.

K. Other Remarks

- Several regional administrative staff require additional information on the operations and internal procedures for OA systems and more information about ADP technology and capabilities in general.
- EPA should establish a group responsible for monitoring technology trends and their application to the Agency. Topics should include ADP equipment, software and networks; telephone industry; and document reproduction.
- The existing PDP-11 minicomputers are fairly expensive to operate (e.g., air conditioning, electric power) and should be replaced with more efficient equipment.

- Employees working at home is a new trend in the private sector and may be addressed by the Office of Personnel Management within the next five years. If at-home work is officially recognized, EPA will need to modify its time reporting process and payroll system.

VII. ASSISTANT ADMINISTRATOR FOR WATER

A. Program Trends - Office of Drinking Water

The Office of Drinking Water administers two major programs, drinking water quality and underground injection control. The drinking water quality program is mature and virtually totally delegated to state agencies. Individual utilities largely self-monitor water quality, with state agencies identifying persistent non-compliance and initiating appropriate actions to encourage compliance. Regional offices will continue to have lead responsibility for oversight of state agencies. Headquarters will continue to perform overall program management, establish and update water standards, monitor national trends and the effectiveness of regional oversight efforts, and assist in resolving major problems. No major changes are anticipated for this program.

The underground injection control (UIC) program is relatively new. Regulations are currently being developed, and the program will ultimately be delegated to state agencies. Several types of wells will require permits, including 40,000 salt water disposal wells in oil and gas fields. Deep wells for hazardous waste disposal may also require permits in the future. Other types of injection wells, such as solution mining, may be regulated in the future.

B. Program Trends - Office of Water Program Operations

The major program within this office, construction grants, is largely delegated to state agencies, with 39 states having received partial or complete delegation. The headquarters role is shifting from operations to management overview, and EPA regional offices are becoming the focal point for data collection. The current \$2.4 billion annual funding level in construction grants is not likely to change significantly within the next few years.

Performing scientific and economic analysis to support the rational expenditure of grants funds is becoming a major program priority. Key elements of this strategy will include:

- Use of management information systems to monitor progress against program objectives.
- Use of existing systems to assess relationships between grant expenditures, facility construction, and water quality improvements at specific locations and nationwide.
- Use of models to predict the cost, results in effluent output, and impact on water quality of different treatment plant designs.
- Program integration to produce a municipal water strategy. This could include involvement with RCRA and TSCA programs as well as the other water programs (e.g., drinking water, NPDES permits, enforcement).

C. Program Trends - Office of Water Regulations and Standards

With the exception of ocean waste disposal, no significant shifts in program direction are anticipated.

There will continue to be substantial activity in the development of effluent guidelines through FY85. However, the issuance of revised guidelines for additional industrial categories or chemicals is uncertain. There will be an increasing number of requests from states for technical information for use in applying the guidelines to write site-specific NPDES permits.

As land-based disposal of hazardous waste becomes less politically acceptable, disposal in the oceans may increase and will receive greater EPA attention. Currently there is little information gathering or regulatory effort oriented to the ocean environment. It is likely that there will be significant growth in:

- Study of the biological, chemical, and physical aspects (e.g., ocean currents) of the ocean environment.
- Regulation of commerce at sea, including oil and gas drilling and sea bed mining.
- Permitting of sites, compliance monitoring, and enforcement for ocean dumping and incineration at sea.

D. Program Trends - Office of Water Enforcement and Permits

Delegation of permitting, compliance monitoring, and enforcement activities has accompanied delegation of the water programs. The role of the Office of Water Enforcement is shifting from efforts on individual cases to management oversight and control, with regional offices having lead responsibility for performing oversight of state agencies. The office will be more active in day-to-day enforcement of newer programs that are not yet delegated, such as UIC and oceans. There also will be an increased emphasis on enforcement of pretreatment standards.

E. Program Trends - Regional Water Divisions

Regional water program managers are in general agreement on the future direction of water programs and concur overall with the forecast by managers at headquarters. The more significant program trends for each program are noted below.

1. Drinking Water and Underground Injection Control

- State and local agencies will continue to have primacy for the drinking water program, with regions retaining lead oversight responsibility within EPA.
- New drinking water standards will likely be issued for organic compounds. These compounds will require more complex treatment than that now performed by public supply systems, and EPA will be called on to provide technical assistance and help state and local agencies identify knowledgeable consultants for designing treatment programs.
- There will be increasing interaction between the drinking water program and RCRA and CERCLA. Contamination of private supply systems is a growing problem and although EPA has authorities for only public supplies, the Agency will need to help state agencies address private supply problems.
- Groundwater issues will become more visible, with many problems related to landfills and Superfund sites. States have initiated groundwater monitoring on a case by case basis, and will likely take the lead on collecting groundwater monitoring data. Some states will continue to avail themselves of matching grants for monitoring provided by the U.S. Geological Survey, and will work with USGS for ADP support. EPA's future role is unclear, but the Agency should consider having USGS enter groundwater monitoring data directly into any future EPA data system.
- State agencies will take the lead on the UIC program, with some states completely prohibiting injection wells. Future amendments to the Safe Drinking Water Act represent the greatest potential change to the UIC program.

2. Construction Grants

- The construction grants program is highly delegated now and will be nearly completely delegated to states within the next few years. Regional offices will retain overview responsibilities.
- Future EPA activities will focus on the operations and maintenance of treatment plants. Specific issues will be projected versus actual costs, and ensuring compliance with treatment standards.
- A gradual reduction in the overall program is anticipated.

3. Water Quality and Permits

- The most significant trend will be greater delegation of permitting to states in the next few years. A heavy emphasis on state reporting and ADP will be the primary mechanism for oversight and tracking. Accountability and ADP training for states will be key issues.
- For permits issued by EPA, the regions anticipate a greater regional role in decision-making on individual permits.
- Increasing attention will be focused on organic and highly toxic pollutants, and on minor dischargers. Many Superfund and hazardous waste sites will not be major dischargers.
- NPDES permits for toxics may need to reflect the local biology of the receiving body of water.

4. Enforcement

- In concert with delegation, the enforcement role of state agencies will increase substantially. The role of EPA headquarters will probably diminish and regional offices will assume lead oversight responsibility. Audits of state programs may become a key oversight activity.
- Regional offices and states will make greater use of ADP to track NPDES permittee compliance and screen significant violations.

F. Program Trends - State Agencies

State agencies generally concur with the forecasts of EPA, but noted an alternative trend for the drinking water program. Specific trends identified are discussed below.

- Although the drinking water program is relatively mature and highly delegated, the potential adoption of much tougher drinking water standards and limited Federal funding may force some states to return the program to EPA. States are currently examining fees and other funding alternatives.
- States will increasingly focus on toxic pollutants. Monitoring strategies are currently being developed (e.g. biomonitoring, microcosm studies) and state agencies are establishing a technology exchange program. Assistance now being provided by the EPA laboratory in Athens should be expanded to increase technology exchange between the states and EPA.
- States will require EPA assistance in responding to spills and emergencies at waste sites, and would like to see EPA establish a central information center to provide information and analytic support.

- Groundwater contamination will be the hot issue of the late 1980's. States initially considered groundwater a state issue, but are shifting to the view that groundwater problems cross state lines.
- Consolidation of state environmental agencies within a "state EPA" will gradually increase. There will be an attendant slight increase in multimedia coordination and integrated permitting across programs.

G. Information Management Requirements and Related Applications - OW

- The states are legally obligated to report drinking water standards compliance and enforcement information to EPA. The Model State Information System (MSIS) will continue to be used by a number of states to support this activity. EPA will continue to make a considerable effort to provide orientation and training to state agencies for MSIS and make it a valuable tool for managers at the state level. This is a high priority since the quality of data in MSIS has been suspect. States are more likely to exercise quality control over the data if they also use the data within their program.
- The Federal Reporting Data System (FRDS) will continue to obtain information from the states for national level reporting. Some states will report more frequently than the current annual reporting requirement.
- An EPA information system will probably be developed to support the UIC program. It would include:
 - A site inventory
 - Permit tracking, including applications and dispositions

- Compliance monitoring data, including groundwater monitoring data and the results of mechanical integrity tests
- Enforcement actions.

Some of the above functions may be monitored at the headquarters (rather than regional) level by the water enforcement program.

- The capacity to maintain historical water quality data is needed to demonstrate improvements in water quality as a result of treatment plants.
- STORET will continue to be used to monitor ambient water quality. With the exception of the potential addition of biota data to the BIO-STORET component of STORET, no major enhancements are anticipated. STORET will continue to maintain one of EPA's largest data bases, with flexible state reporting procedures.
- COGENT will continue to be used by OWPO to perform modeling of river reaches and the effects of point source effluent controls on ambient water quality.
- There is an increasing need to collect accurate and complete data on state activities. OW's overall strategy will be to make systems provided to states by OW easier to use and more responsive to the needs of state program managers. Significant elements of this strategy include the following:
 - Potential enhancement to GICS to make it easier to use by state agencies (and by EPA) include:
 - On-line data entry and validation, and
 - On-line retrieval and ad-hoc inquire.

- Enhancement of MSIS to improve edits on water quality data and provide better data analysis capabilities for state users.
- Enhancement of PCS to collect additional data items to support regional and state use for tracking inspections, compliance status against permitted effluent, and enforcement actions. Technical enhancements include on-line screen data entry and retrieval capabilities, and automated graphics and mapping.
- The capability to integrate data or perform crosswalks among water data bases and with data bases for other media is needed to:
 - Link information about the same facility or municipality held throughout the agency.
 - Verify that municipal facilities receiving grants meet NPDES permit requirements.
 - Compare ambient conditions and trends with grants, permitting, and enforcement activities in order to manage for environmental results by targeting resources to the areas that produce results.
 - Analyze water program activities and activities of programs for other media to identify locations with related problems for designated chemicals/pollutants.
- Program managers within OW (and throughout the Agency and in states) require orientation and training in the capabilities and use of existing ADP systems.

- To improve access to effluent guidelines information, existing manual research and technical data may be automated, or automated indexes to hardcopy files of research documents may be developed. A study currently is being conducted by OWPO.
- All water program offices are currently conducting an analysis of program activities, related decisions, and information needs for the next several years. Regional water program staff and state agencies are participating in this effort. Findings will be available in early FY84.

H. Information Management Requirements and Related Applications - Regional Water Divisions

Regional offices generally concur with the headquarters forecast of overall information needs within the regions. Effective collection of a wide variety of data from states and improved ADP support will be essential to program oversight. In the future, program offices at headquarters should stress collection of only key items of data that will be used regularly, avoid collecting excessively detailed information which imposes a significant reporting burden, provide stronger incentives (positive and negative) to states to report data, and strive to minimize software changes and consequent retraining for systems used directly by states. Without improved data collection and ADP support, regional offices will be unable to perform their oversight function. Section K of this chapter presents several suggestions for improved data collection from states.

- Integration or crosswalks for different types of water program data and integration of water data with data for other programs will be a major need of water program managers. Specific crosswalks needed include:
 - Permit and effluent data with grants data for treatment plants
 - Permit and effluent data with water quality data
 - Data for injection wells, waste sites, and NPDES permittees

- Enforcement actions and plant outfall identifiers
- Grants information with changes in water quality.
- Regions and states will require improved access to profiles on chemicals (e.g., history, sources, transport, distributors, exposure levels) to assist in "significant no adverse response level" (SNARL) determinations.
- Regions and states require improved data entry (preferably interactive) and more timely updating of data bases for centralized information systems such as PCS and STORET. Current processing lags frustrate users and inhibit use of these and other systems.
- Regional and state permit writers will require much better access to technical effluent guidelines information developed by OWRS in order to apply the guidelines to specific facilities and more effectively address water quality conditions at the plant site. State requirements will increase significantly with continued delegation. An automated bibliography or index of pertinent documents, with reasonably prompt access to actual hard-copy, would probably be adequate.
- Much of the data that will be maintained by an UIC information system currently being developed by EPA to support well inventories, permit and compliance tracking, and enforcement will be collected by states. This system should be compatible with state agency systems, provide the flexibility to address region-specific needs, and interface with systems for NPDES permits and RCRA functions.
- Regional staff will require more information about the health and environmental effects of water toxics, especially heavy metals and organic compounds. Regional staff also require that analytic methods used to generate STORET data be included in this system.

- Use of EPA monitoring systems (e.g. STORET) and management information systems (e.g. PCS, MSIS) by states will continue to vary from state to state. State agencies with responsive in-house ADP functions will tend to use state systems and provide the minimum information requested by EPA. State agencies with limited ADP resources will tend to use EPA systems or rely on manual processing systems. Training of state agencies in the use of EPA's water systems will be a continuing requirement to respond to turnover of state staff and support modifications to EPA's systems.
- Many states will continue to use GICS to provide grants information to EPA.

I. Information Management Requirements and Related Applications - State Agencies

State water agencies will differ markedly in the level of ADP support requested from EPA. Many states will have little in-house ADP support and will use EPA systems made available to them if adequate training is provided and if the systems do not require more staff than alternative manual procedures. States with strong ADP support will tend to use their own systems to support program operations and management. Most states have the following requirements of EPA:

- More consistent reporting requirements from year to year.
- Elimination of simple "bean counting" to measure program activities, and collection of redundant, irrelevant or extraneous information. States would be willing to assist in the development of new reporting standards, but caution that the standards should not limit regulatory flexibility.
- More timely turnaround for updating data submitted by states and providing feedback to state agencies.

- Access for permit writers to "best available technology" information and other information developed by EPA in formulating effluent guidelines.

Also, the use of new procedures and technology to process construction grant applications, review and reporting, should be reviewed carefully to assure maximum effectiveness at all levels. Specific actions should be fully discussed with the states to determine optimum operational efficiency.

J. ADP Tools

- There is a major requirement for "user friendly" access to data, especially for software tools to support user retrieval and manipulation of program and administrative data.
 - The Office of Water Program Operations has a specific need to do large scale data analysis, such as in the development of effluent guidelines, on a one-time basis. APL and SPSS would be useful tools.
 - Several managers at headquarters and in the regions require the capability to down-load data and perform analyses using local computers in order to provide ready access to the necessary processing capability and to control costs.
- Several program offices anticipated increased usage of electronic mail in headquarters as well as between regions and headquarters. One director specifically suggested that electronic mail be limited to use between managers at the office director level and above to control the volume of traffic through the system and avoid an overload of mail messages sent to senior managers. Others suggested that state agencies be added to the network.

- There is a pressing need for simple automated graphics to support presentations and data analysis. A few regional program users require color graphics. Some managers consider existing graphics packages too complex and/or expensive to be beneficial.
- Regions require an automated mapping capability. Site mapping for bodies of water, treatment plants, NPDES permittees, waste sites and injection wells is particularly important. Few regions seem to use the existing river reach models.
- Automated scheduling and calendars with general access would be useful to some regions.

K. Other Comments

- Program managers at EPA headquarters and regions, and representatives of state agencies, have numerous suggestions for improving the collection of data from states. Several suggestions are not addressed directly at ADP, but emphasize a better definition of information needs prior to system development and the use of program audits as a surrogate for collecting voluminous program management data from state agencies. Most suggestions, however, relate to ADP, and should be considered by all programs with state delegation.
- States should have a significant role in system design to ensure that a system is useful to the states as well as to EPA. Systems that do not meet state needs seldom succeed. Although no system can meet all state needs, participation by several states will help choose the most needed capabilities and gain the acceptance of other states.
- Software designed by EPA should be flexible to meet unique state and local needs. In addition to standard data items and processing routines, a system should provide data

fields that can be defined by states. Flexible report writers should also be available to facilitate unique state retrievals.

- Since some state agencies, like many organizations, experience high turnover and limited training support is available from state ADP organizations, EPA systems should be easy to use, especially for data entry processing. Data entry and edit should be interactive and enable users to quickly and easily correct errors. Retrievals should also be interactive where possible.
- State resources are extremely limited for many programs, and ADP often is funded at a minimal level. State agencies are frequently prohibited from purchasing ADP services that could be provided in-house. EPA should consider providing states free timesharing resources and should not charge timesharing use against grant monies. Timesharing costs for state users should be considered a necessary EPA business expense.
- Interactive processing using centralized data bases for multi-user systems may be quite slow and very expensive. EPA should consider developing applications for states on minicomputers or microcomputers and giving or lending them to states.
- EPA should provide intensive training to state staff on the use of systems developed by EPA, including ongoing training for new state agency staff. Establishing user groups and user support functions is also helpful. Failure to provide adequate ongoing training and support will cause even the best designed system to fail.

- For systems maintained and operated on state computers, EPA should provide program maintenance or support for the core system, and encourage state ADP staffs to address the more challenging and state-of-the-art issues -- use of data base management systems, graphics, etc.

These recommendations are not mutually exclusive and should be used in combination to address the particular needs for each program application.

- To avoid unreasonable expectations of new systems, managers need to have a realistic perception of:
 - The elements of system development and associated duration and costs. Testing and debugging costs are frequently underestimated.
 - The total cost of operating a system, especially data collection and input.
- A common problem in system development has been "shooting at a moving target". Requirements for future years must be better defined prior to system development to avoid the need for frequent system modification.
- A number of systems were developed several years ago and may no longer meet program needs. Systems should be audited more frequently to identify needed improvements and assess the cost-effectiveness of continued system operation.
- Collection of data from states using external third parties is unnecessary and wasteful in the opinion of state agencies. EPA and states should work together to establish mutually acceptable frameworks for information exchange.

- There is a data quality problem throughout EPA. ADP staffs have been pathological about not taking responsibility for data, and to date program staff have not assumed responsibility for data quality.
- There is a need to demystify ADP through orientation and training of senior managers.
- Additional resources will be needed by regions to maintain the information in centralized water systems (e.g., PCS, STORET).

VIII. ASSISTANT ADMINISTRATOR FOR SOLID WASTE AND EMERGENCY RESPONSE

A. Program Trends - Office of Solid Waste

There has been a radical revision in the RCRA program direction in the last several months. The hazardous waste program had been viewed as a maturing program; state delegation was increasing, and the Federal EPA role was concentrated on program oversight and monitoring, plus making policy decisions for relatively few new regulatory issues. It now appears that EPA's role will be much more significant, both in terms of formulating new regulations and maintaining an active involvement in RCRA program operations.

Regulatory action will occur in two areas. EPA will regulate several previously unregulated activities, including burning waste in boilers, underground storage tanks, and air emissions from land disposal sites. In addition, EPA will identify additional substances as hazardous wastes.

An area of uncertainty is the regulation of land disposal of hazardous waste. To date the emphasis has been on effective containment of land-based disposal of hazardous waste. Due to the problems associated with Superfund sites, as well as evidence of the failure of liners, land disposal of hazardous waste may be prohibited or severely limited in the future.

Delegating RCRA permit issuance, inspection, compliance, and enforcement to the states has been on a fast track; 36 states have at least partial authorization. However, it appears that the two year deadline for complete delegation will not be met, for various reasons:

- There continue to be a wide variety of unresolved technical and legal issues requiring EPA involvement.
- Permit issuance has been moving slowly, and EPA attention is needed for improving the permit review and approval process.

- There appears to be widespread non-compliance with existing interim status standards. In addition, many states are not doing an effective job of monitoring compliance.
- In some states, enforcement action has been virtually non-existent.

The net result is that substantial EPA headquarters and regional office involvement in RCRA operations will continue for an extended period of time.

B. Program Trends - Office of Emergency and Remedial Response

Considering the progress of the Superfund program so far, and the size and impact of the program, reauthorization of the CERCLA legislation is likely. There are currently 419 Superfund sites with remedial action underway at approximately 170 sites. The major limitation to the program is funding and staffing for site and program management. In the future it is likely that OERR will handle at least an additional 150-200 sites.

Program activities are evolving from an emphasis on overall program planning to more operational functions, including:

- Emergency removals
- Remedial construction
- Monitoring of contained sites.

There is a possibility that Congress will include victim compensation in a reauthorization of CERCLA. The resulting actions required of EPA, and the resources necessary to perform them are unknown at this time.

C. Program Trends - Office of Waste Programs Enforcement

Day to day enforcement for the RCRA program is performed either by the delegated states or by the regional offices (for undelegated states). The headquarters role is one of overall management and program direction. However,

because the RCRA program was relatively new at the time of delegation, there have been a number of problems;

- Lack of resources in regions and contract support.
- A large number of unresolved legal and technical issues that must be assessed and coordinated to avoid possibly inconsistent decisions on specific issues arising at different waste sites.
- No standard reports of measurable activities and no complete data base addressing compliance monitoring and enforcement activities nationwide.
- Some state authorizations, inspections, and enforcement actions falling behind schedule.

Consequently, it is likely that EPA regional offices will perform more direct enforcement and provide substantially more program aid and direction to states than was anticipated. The RCRA program will revert back to EPA from at least some of the states.

The CERCLA (Superfund) inventory currently contains 419 of the possible 15,000 sites, and the priority list will likely expand to 800-1200 sites. There are currently at 50-60 active enforcement cases in the Superfund program. These cases are very complex, with some cases involving upwards of 500 responsible parties. It is anticipated that the case load will double to 100 or more cases within the next 1-2 years.

D. Program Trends - Regional Organizations¹

Regional offices anticipate several significant trends for the Superfund and hazardous waste programs.

¹ This section includes the RCRA and CERCLA programs within Regional Waste, Air and Waste, and Environmental Services Divisions.

1. Superfund Program Trends

- For many of the highest priority sites Superfund activities will shift from site surveys to site cleanup, with significant construction and removal efforts.
- The number of enforcement actions taken by EPA and attendant litigation will increase substantially. Cost recovery will likely be a major issue. EPA may accept partial reimbursement by firms which cannot afford to pay the full cost of site cleanup.
- EPA will undertake more detailed tracking of costs for individual sites to support cost recovery. In addition to direct cleanup costs, EPA will likely include an overhead allocation as part of total reimburseable costs, and may seek to include unrecovered costs at some sites as part of the overhead to be allocated to other sites.
- The present funding will not address all designated Superfund sites. Over the next ten years, less than half of the expended funds will likely be recovered. The Congress will likely enact new legislation providing substantial additional funding.
- EPA will probably designate additional sites for cleanup under superfund.
- EPA will continue to rely heavily on contractors to perform site surveys and cleanups.
- States will receive limited delegations of authority but will have an increasing role for some sites.

2. Hazardous Waste Program Trends

- The hazardous waste program will be growing rapidly in most regions, and will likely become the single largest program in each region.
- The hazardous waste program will continue to be delegated to state agencies. Several regions now report complete delegation. Most states will implement the RCRA program successfully with EPA technical assistance and federal funding. Congress will likely extend RCRA compliance deadlines for states if necessary. EPA may need to pull back the program in a few states, and some states will return the program if funding is cut significantly.
- Some states now have an active enforcement program. RCRA enforcement and litigation will increase substantially over the next few years. However, for sites likely to require government funds for cleanup, states may be reluctant to initiate action and subsequently seek reimbursement.
- State agencies will look to EPA to establish a RCRA clearinghouse or information center to make available information about cleanup/containment strategies and risks associated with specific substances.
- The number of regulated waste sites will increase by a factor of 15 to 20 if the cutoff for regulated facilities is lowered to 100kg.
- Present as well as future goals are very unclear. Regions expect OSW to articulate specific goals and objectives for the Agency's RCRA program.

E. Program Trends - State Agencies

State agencies forecast that the emphasis for both RCRA and CERCLA will shift to construction, removal, and permitting. Additional resources will be needed to support state workloads. In addition, groundwater contamination may prove to be a major problem. Some states will integrate the UIC and RCRA programs.

F. Information Management Requirements and Related Applications - OSWER

- The Hazardous Waste Data Management System (HWDMS) serves the basic RCRA program information needs, including inventory, permits, inspections, and compliance data. However, the completeness and accuracy of HWDMS data is suspect.
- There is a pressing need to collect information regarding state RCRA activities. The strategy taken by other EPA offices of developing standard software tools for the states will likely be followed. There is a potential for a major software development project to;
 - Support the state program management functions now addressed by HWDMS for EPA.
 - Collect monitoring and inspection data, including facility, hazardous waste type or group, discharge composition as compared to permit amounts, other pollution source, waste manager, and geographical location.
 - Provide EPA headquarters the ability to summarize the above information and perform analyses of:
 - The number and type of inspections performed,
 - The number and percentages of violations, and some detail regarding each violation,

- The time between findings of non-compliance and the return of facilities to compliance, and
 - Enforcement actions taken in cases of non-compliance.
-
- Several states have developed systems to track manifests of hazardous waste and follow up on discrepancies in the manifests to detect disposal violations. It would be very useful to be able to provide such software to other states on request.
 - The Emergency and Remedial Response Information System (ERRIS) maintains an inventory of Superfund sites. The enforcement program has a need to track site specific technical information and may want to link this information to ERRIS. In addition, use of ERRIS may be extended to states, in order to improve and expand the inventory with state data.
 - The Site Enforcement Status System (SESS) is now being implemented. It will identify all Superfund sites for which enforcement actions have been taken or are in progress, and will summarize the actions for each site.
 - The Program Management System (PMS) is being developed to support CERCLA management needs. The system contains three components:
 - A Project Tracking System, which contains the summary status of all projects, has been implemented, but OERR is concerned with its ability to provide up-to-date information.
 - A Site Coordination System, which will support on-site management, is currently in the planning stage.

-- An Enforcement System will be developed in the future.

- There is a requirement for a system to store and classify Superfund technical information and support dissemination to regional and state on-site coordinators and other personnel involved in technical aspects of site management.
- A need exists for systems to support budgeting/planning efforts for both the overall CERCLA budget process and for project management.
- An ADP training or orientation effort is needed to make managers more aware of the ADP tools and applications currently available throughout EPA.

G. Information Management Requirements and Related Applications -
Regional Organizations

Overall data management for Superfund and hazardous waste sites needs to be improved substantially to support regional and state program operations. Designation of a data administrator for RCRA at EPA headquarters will be especially helpful. Specific requirements for regional organizations are identified below:

- EPA will need more reliable site-specific accounting information for staff and contract resources to support enforcement actions for cost recovery and enable site managers to more effectively control costs. Existing accounting procedures and systems, especially error correction processing, must be improved.
- Regional offices and states require the capability to maintain cost information for many types of on-site contractor activities to support a more informed evaluation of proposed prices. Contractor prices vary widely for materials, labor and transportation in different areas, and seem to also vary greatly within designated areas. This requirement will become more important as remedial actions increase at RCRA and Superfund sites.

- Regional offices will need automated capability to manage RCRA enforcement information for an increasing number of actions. Existing manual systems will not be adequate. Since most sites have at least one potential violation it will be especially important to denote specific types of violations to ascertain the magnitude of non-compliance of a site, and include information for enforcement actions taken by states (and their equivalence to EPA actions). Access to a central data base of administrative orders and consent decrees will be very useful to regional staff in preparing new orders and decrees and to EPA headquarters for technical review.
- Regional and state RCRA site and program managers will need automated tickler files to manage site activities. This capability must be sufficiently flexible to support common and unique tracking points. Some sites may have as many as 70+ tracking points. However, it may be difficult to replace interim manual tracking systems used by many managers.
- Regional offices need the capability to integrate air, water and waste data for specific facilities now, and this requirement will be imperative in the future.
- EPA must initiate a major effort to manage groundwater data that is now being collected by several programs, and an anticipated major increase in monitoring data to be collected in the future. Many states and EPA contractors collect some monitoring data, but most of the data is stored in manual form. No standard coding conventions exist for many common data items. Several regions are currently trying to use STORET to store some of the available data, but STORET may not be able to fully accommodate groundwater data requirements. Requirements for a groundwater data base are critical.

- Many states have developed or will be developing RCRA site management systems. EPA should provide software capabilities which will enable states to use these systems to automatically feed data to EPA which meets RCRA reporting requirements. However, some state systems will not maintain adequate data, and data definitions across systems will vary. Regions will require improved data support analyses of compliance rates and permit processing turnaround.
- Proposed regulations for manifest tracking will impose a substantial data collection and management burden on state agencies. Several states have developed manifest systems which will meet EPA's requirements and may prove useful to other states. EPA may need to develop standard software for use by states. Some states will maintain data in parallel EPA/State systems.
- Regional (and state) RCRA and Superfund program and site managers will require access to a clearinghouse that can provide detailed information about physical and chemical properties of wastes, cleanup and containment technology, and the health and environmental effects of compounds discovered at waste sites. Access to a data base containing both acute and chronic exposure toxicity data for rapid response risk assessments is considered a vital need. A clearinghouse will be vital to maintaining national consistency for RCRA and CERCLA.

H. Information Management Requirements and Related Applications - State Agencies

- Many state agencies will resist providing detailed RCRA site information to EPA. EPA reporting requirements are becoming increasingly detailed, change frequently, represent a significant drain on program resources. State agencies are more willing to submit summary information quarterly to EPA.

- Many states will use an automated site tracking capability, including state systems. However some states, such as Nebraska will have relatively few hazardous waste sites and will be able to support site tracking needs with manual systems.
- State agencies require the technical support of a RCRA clearinghouse. Associations of state waste program administrators (i.e., ASTSWMO) are now beginning to establish a clearinghouse function and encourage a cooperative effort with EPA.

I. ADP Tools

- Regional offices require more user friendly software to access and retrieve information from centralized data bases and systems.
- Electronic mail has been very useful. It will have increasing utility for communications with regions.
- There is a need for statistical packages to perform analysis and "what if" manipulations on existing data. However, some doubt exists as to how useful these tools will be if there is not a significant effort to clean up existing and new data.
- A flexible graphics package and site mapping capabilities would be very useful to EPA regional and headquarters staff (and state agencies) for data summary and analysis, and for management briefings.
- A PERT-type site planning and management capability would be especially useful to site managers in managing large sites which will probably involve EPA, state, and contractor parallel activities.

- Voice mail and teleconferencing are potential tools to expedite enforcement actions which require a high degree of coordination among different organizations. A great deal of time is lost playing "telephone tag".

J. Other Remarks

- Audits should be conducted of major Superfund and RCRA information systems to ensure that they meet the needs of their intended users.
- OSWER will need to make a substantial commitment to training regional and state users of Superfund and hazardous waste systems developed centrally to ensure that the data bases are kept current and used effectively.
- The collection of detailed site tracking and technical information by EPA has become a major burden for regional and state site managers. In view of limited resources and the other responsibilities of site managers, EPA should carefully consider its reporting requirements to balance information needs with available resources for data collection and maintenance.
- The collection of information from states about state activities at Superfund sites will not take place until Superfund monies are authorized for this purpose. Reporting of state activity at Superfund sites is not covered by RCRA reporting requirements.
- The NEIC Financial Assessment System will be a potentially useful tool in assessing a firm's "ability to pay" when selecting enforcement actions. Regional RCRA and CERCLA program staff will need to learn more about this and other NEIC capabilities.
- The NEIC literature search and research capabilities should be used more effectively by headquarters and regional staff in preparing litigation.

IX. ASSISTANT ADMINISTRATOR FOR AIR, NOISE, RADIATION

A. Program Trends - Office of Air Quality and Planning Standards

The air program is relatively mature with most day-to-day activities conducted by state and local agencies. Regions perform program oversight functions as well as handle program operations where required for states with incomplete state implementation plans (SIPs). Headquarters operations include development of standards; establishing policy and procedures; evaluating program effectiveness; assessing air quality, emissions, and compliance status and trends, and program representation in the public forum. No major changes in program operations are anticipated unless there are major changes in the reauthorization of the Clean Air Act. These changes may include expanded programs to address acid rain and air toxics.

National ambient air quality standards (NAAQS) have been established for the criteria pollutants and will be reviewed on staggered five year cycles. New source performance standards were to be completed for 68 source categories by 1982, with reviews on a staggered four year cycle. It now appears that one round of the NSPS effort will be completed between 1985 and 1988.

National emissions standards for hazardous pollutants (NESHAPS) are being developed for particularly hazardous pollutants. Seven pollutants have been examined to date, with NESHAPS established for four pollutants. Thirty-seven additional pollutants are currently under study, and there is potential for substantial growth in this program area.

The prevention of significant deterioration (PSD) program is designed to control the degradation of air quality in areas that currently meet NAAQS. This program has been delegated to most states, and many of the states have delegated the PSD program to local regulatory authorities.

Compliance monitoring and enforcement activities have largely been delegated to state agencies (and, in turn, to local agencies) with EPA's role focused largely on program oversight and ensuring that state actions comply with state implementation plans (SIPS). Regional offices currently administer

these activities in states that have not implemented a compliance monitoring and enforcement program, and conduct inspections to assist states in developing enforcement actions. EPA will be completing delegation wherever possible and carry out oversight to ensure that state programs are working properly. Audits of state programs have been initiated recently, and will increase in number over the next few years to include annual audits of most states.

There will be a push for more frequent monitoring and/or reporting of compliance status. There are approximately 28,000 sources subject to inspection. The 17,000 NSPS, NESHAPs, and Class A1 SIP sources are subject to annual inspection, while the 11,000 Class A2 SIP sources are inspected biennially. Currently, EPA collects from states and regional offices quarterly data providing a snapshot of facility compliance, but few states provide details regarding the number of days a facility is out of compliance. The technology now exists to support continuous emissions monitoring (CEM). EPA will require continuous emissions monitoring where it is cost effective and presently requires CEM for certain classes of sources. However, EPA is unlikely to require CEM for the large majority of sources.¹

B. Program Trends - Office of Mobile Sources

Mobile sources is a fairly mature and stable program. Research and regulations development are performed at the national level, while the inspection and maintenance program is administered by state and local agencies. There is only a minor regional office role. Although program emphasis may shift from year to year, no major shifts in program direction are anticipated.

The national program to test cars for emissions violations has recently placed greater emphasis on testing in-use vehicles (but will also continue to test new vehicles). This trend may accelerate if programs that place greater emphasis on determining compliance on the basis of in-use emissions are adopted in the future.

¹NOTE: Environmental Sciences Research Laboratory in ORD believes that CEM is especially important to provide an accurate emissions inventory and eliminate a major source of error in air models.

EPA collects summary data from state inspection programs but does not request detailed records from states. Data for tampering and fuel switching programs, as well as for emissions violations, are obtained by other OMS activities and are not obtained by the state inspection and maintenance programs.

There are several regulatory efforts currently underway regarding;

- Heavy duty vehicles (trucks, heavy equipment, etc.)
- Diesel powered vehicles
- Fuels - especially for additives other than lead, blended fuels, and liquid fuels other than gasoline, notably methanol and ethanol.

No major additional regulations are expected to be promulgated.

C. Program Trends - Office of Radiation Programs

The Office of Radiation Programs is relatively small and differs substantially from most EPA programs. It specializes in one hazard, addressing radiation across media and across legislation. Legislative authority is contained in virtually all major authorizing legislation for EPA programs including RCRA, CERCLA, CWA, CAA, and TSCA. Coverage includes discharges into air and water, waste disposal of radioactive effluents, and naturally occurring radioactive materials. ORP also derives authority from other laws including the Atomic Energy Act and Uranium Mill Tailings Act.

Current regulatory activities of the radiation program are aimed largely at completing regulations started in previous years. Virtually no new regulatory actions have been started during the past two years.

The non-regulatory functions include:

- Identifying, locating, and measuring radiation sources and resultant exposures.
- Technical assistance to other agencies, state government and other groups to facilitate protection and determine appropriate remedial actions.
- Emergency preparedness - including response to radiation accidents by measuring releases into the environment and suggesting solutions. This activity includes a continuing presence at Three Mile Island.
- Research - including keeping up with existing scientific information and in rare cases conducting or sponsoring validation studies.

The office conducts no enforcement program. Enforcement activities will continue to be conducted by other offices in EPA and offices in other federal agencies (e.g., NRC). There is a small regional role in the radiation program.

The future directions of the radiation program are uncertain. There are few new regulatory activities in progress. On the other hand, the need for the four non-regulatory functions listed above has not changed significantly. Further, several Superfund sites have been identified as having hazardous radioactive material. While the Office of Radiation Programs has not yet been involved in Superfund activities, the office may have a future role in the cleanup of radioactive hazardous materials.

D. Programs Trends - Regional Organizations²

Regional air program staff concur with the headquarters forecast of continued state delegation, but believe that many elements of the air program will continue to evolve over the next several years. The following trends are anticipated:

- Air pollution control strategies for criteria pollutants may shift from an emphasis on ambient concentrations to performance based standards.
- Control of air toxics will likewise reflect a performance based strategy, as evidenced by NESHAPS.
- Continuous emissions monitoring may be adopted for certain types of facilities. EPA would not collect CEM data from firms, but would likely require reports of non-compliance events and/or period reports of compliance rates.
- Emissions trading activity may increase in some parts of the country. The reopening of plants that are now shut down as the economy gears up and new VOC regulations may encourage increasing bubble activity. However, several regions anticipate no significant emissions trading activity.
- Modeling for criteria pollutants may increase in some regions and decrease in others. Dispersion and diffusion modeling may increase to check on industry modeling for proposed emission trades, and to predict the impact on air quality of Superfund site cleanup efforts. More complex models will be developed for long range acid deposition and ozone.
- State agencies will continue to need technical assistance and training on the use of air quality models.

² This section include the air and radiation programs within Air, Air and Waste, and Environmental Services Divisions.

Regional offices will have continuing role in the mobile source programs. Regional activities will address fuel switching, tampering, state inspection and maintenance, and local transportation control management plans. TCM plans will be needed in more localities if the current CO standard is not relaxed. Complex models for CO diffusion will be needed to support TCM planning.

Regional offices also will have a continuing role in supporting the radiation program. Radiation issues will arise for a number of Superfund sites, and regions will also assist states in preparing and reviewing radiological emergency response plans developed to address potential accidents.

E. Programs Trends - State Agencies

EPA has addressed many tough problems for controlling air pollution for criteria pollutants, and will in the future address more difficult problems for controlling air toxics. In the short term, state and local agencies seem to be more aggressive than EPA in controlling toxic emissions. EPA is expected to speed up the NESHAPS program to quickly develop an effective federal program and obtain more national consistency.

- State agencies would like to see more continuous emissions monitoring. CEM will make enforcement easier and will be essential to effectively enforce bubbles. Several EPA new source performance standards will require CEM.
- States anticipate limited growth in emissions trading. Shifting EPA policies and limited state funds will inhibit growth.
- Delegation of air programs to states will continue and will be successful if EPA provides technical assistance, and if sufficient federal state and local resources are available for program operations. If funds are cut significantly, delegation of some programs will not be completed and several states may return the air program to EPA.

- EPA audits of state air programs will commence in FY84, and may become more detailed and address a larger number of program areas in future years. Many state agencies support audits as a means to ensure national consistency and a strengthening of programs in some states. Audits will probably be conducted annually in each state.
- Mobile source programs will not change significantly at the state level, although some states or localities may implement tampering and fuel switching programs as an alternative to inspections and maintenance programs now required by EPA.
- Congress may authorize a major new acid rain control program within the next five years.

F. Information Management Requirements and Related Applications - OANR

- There will be a continued effort to collect and maintain a large volume of air quality, emissions and compliance data. Much of the data required is currently collected by state or local agencies. Both the Congress and EPA staff will be raising questions that require access to large volumes of raw data, such as:
 - Time series of emissions data for NSPS and best available control technology (BACT) development and review.
 - Compliance status of a facility or industrial classification, including identification of specific pollutants and quantitative measures of non-compliance.
- The potential exists for a significant increase in the amount of data maintained by EPA information systems and data bases:
 - The number of monitoring stations is increasing.

- The number of pollutants, especially toxics, that will be monitored and regulated is expected to increase, and in turn will require more monitoring.
- PSD provides for continuous monitoring in many cases (although EPA will probably not collect continuous monitoring data for all sources).
- While EPA might like to have the states maintain the data, and provide EPA access to the data, many states do not have automated systems to maintain the data, and access to data maintained in some state level systems would be extremely difficult.
- EPA wants improved access and more efficient maintenance of air quality data for criteria pollutants. The AIRS system is expected to be operational for air quality data by 1985, and for emissions and compliance data in 1986. AIRS will provide direct access to states and regions. Approximately 2/3 of the states will eventually use the AIRS system exclusively for maintaining ambient data, while the remaining states are expected to maintain their existing systems and submit monitoring data to AIRS in automated form. Functions now performed by CDS will ultimately be incorporated in AIRS, but not in the initial AIRS implementation.
- EPA needs organized access to state and local air program regulations through a "clearinghouse". Obtaining specific regulations can be difficult, time consuming and costly. However, no specific initiatives to address this problem are contemplated at this time.
- There will be a moderate increase in air quality modeling activities, and more accurate models will be required. Computer based models will process larger volumes of data and increase significantly in computational complexity to improve on the im-

precision of existing models. Some new models will encompass large regions, such as models for ozone and for acid deposition. In general, models will require increasing computing power.

-- A shift away from an air quality based regulatory strategy would result in a reduction in modeling. This shift is considered unlikely within the next three to five years.

- The amount of paper shuffling of SIP revisions between state agencies, regions, and several headquarters offices should decline as EPA makes greater use of word processing and electronic mail. However, no decline in the number of SIP revisions is anticipated.
- Overall state use of the Compliance Data System (CDS) will increase. More states will begin using CDS, and state input of compliance data will expand.
 - An enhancement to provide on-line input and retrieval may entice increased state use of the system. In addition, states will require in an improved management reporting capability.
 - EPA will continue an effort to standardize definitions of compliance monitoring and enforcement activities. Until data definitions are standardized, summary information can be meaningless and even misleading.
- The Office of Radiation Programs previously initiated a comprehensive Population Dose Assessment Program, utilizing an automated system to track total exposures to radiation throughout the entire country. The system was never completed, but may be revived.

- There has been a substantial amount of dumping of radioactive materials into the ocean. Little knowledge exists of how dumped materials are transported by ocean currents, and there may be significant benefit in developing a model of radiation transport in ocean environments.
- Existing administrative systems (e.g., finance, personnel) fail to meet program office requirements. An off the shelf automated document control register would be useful to program offices that do not have the resources to develop a custom ADCR system.

G. Information Management Requirements and Related Applications - Regional Organizations

Regional offices share many of the information management needs of OANR and have several unique requirements.

- Regions and state will require more sophisticated information to support compliance monitoring and enforcement of increasingly complex stationery source programs. Examples include emissions trading, and potential seasonal variation of VOC emission standards.
- Regional offices and many states will use the new AIRS system to maintain and retrieve air quality and emissions data. However, some states are skeptical about the actual capabilities of AIRS and its ease of use. AIRS will need to improve on existing interfaces to state systems that feed data to EPA. In addition, the integration of compliance and enforcement data with emissions data within AIRS should be given a higher priority and implemented soon.
- Regional offices require the capability to examine air quality data over specified time periods and perform trend analyses. Access to only current data is inadequate.

- A major acid rain program would likely require the integration or linkage of large data bases for least four types of data: emissions, precipitation, ecological effects, and air quality.
- Adoption of CEM will generate a requirement for systems to maintain compliance information submitted by firms and help EPA staff identify facilities with major recurring incidents of non-compliance.
- Greater emphasis on toxics will be accompanied in the regions by a more multi-media perspective. Regional staff will require the linkage of compliance data across media. Regional staff also will focus more on the health risks of toxics across media. Direct access to CSIN may be useful.
- Emissions and enforcement data related toxics will be claimed confidential by some firms and will require that appropriate safeguards be built into ADP systems.
- Radiological emergency response plans will be developed for many facilities and may be required of several counties for a single nuclear facility. Regional radiation staff will require ADP support to monitor the status of RERPs.
- Air quality models for criteria and other pollutants may change significantly over the next 3-5 years. The next generation of models will be more complex, utilize actual meteorological data to reflect local conditions, and generally process larger volumes of data than present models. Models for CO will be especially complex. States with limited ADP support will seek to use EPA computers for modeling capabilities.
- A new ADP system may be needed to support the evolving air program audit function.

- There should be a stronger link between automated emissions, air monitoring, and compliance data and the Administrator's accountability system. Improved collection of data from states will be essential to making this link useful.

H. Information Management Requirements and Related Applications - State Agencies

- Many state agencies will continue to use EPA data systems to maintain large volumes of monitoring data, including data for monitors not included in the national monitoring network. Agencies with limited ADP capabilities will also maintain emissions and compliance data on EPA systems. However, states require improved access to EPA air data systems and will require continued ADP training support.
- State agencies would like EPA to establish a central clearinghouse for air toxics information related to control technologies, emission limitations, and health studies conducted by EPA and other organizations. Information about the range of toxic emissions for specific industries would also be useful.
- Automation of the SIP revision process should help speed up processing of these actions. Significant improvements have been realized in the past two years as a result of parallel processing by state agencies and EPA, and "direct to final" approval of non-controversial actions.

I. ADP Tools

- Graphics have appeared to be useful in the past, but the cost of using existing graphics packages has proved to be too great. Inexpensive graphics would be very useful for management presentations and to help interpret the output of air quality models.

- Electronic mail has already proven useful to OAQPS and the regions and could be used to speed up communications for SIP processing and the review of proposed policy and standards. Electronic mail connections between the states and the regions would also be valuable to improve SIP processing.
- Regional offices and state agencies require an automated mapping capability to help track the significant number of changes in designations of attainment and non-attainment areas of specific pollutants. An isopleth mapping capability is needed to help interpret the output of air quality models.
- Regional offices and state agencies need an improved capability to access and retrieve data stored in national data bases.
- There is an increasing awareness that effective communication of large volumes of information to end users is frequently as much or more of a problem than collecting data. OAQPS is currently studying alternatives to the voluminous printouts of existing systems for communicating information to program managers and staff.

J. Other Remarks

- OAQPS is currently unaware of specific directions in office automation, but would be interested in obtaining information on current and planned capabilities to assess potential applications.
- Senior managers should receive mandatory training on the capabilities, uses, and limitations of EPA's information systems.
- Some state agencies prefer to use EPA software but do not want to store all air program data on EPA's computers. The Agency should investigate providing minicomputers to state agencies. Several states have already purchased minicomputers from a

variety of manufacturers. If EPA finds it cost-effective to provide minicomputers to state agencies, the funding of computers by different programs within EPA should be coordinated to ensure the acquisition of compatible hardware and software across programs.

X. ASSISTANT ADMINISTRATOR FOR PESTICIDES AND TOXIC SUBSTANCES

A. Program Trends - Office of Pesticides Programs

The pesticides program is relatively mature and stable, with few major changes anticipated during the next several years. EPA will continue to determine potential health and environmental effects of pesticides, focusing on both new and existing formulations. Many studies will be performed by industry and contract laboratories. These studies are expected to increase in complexity (e.g., stochastic processes) to more accurately assess the potential risks of exposure to pesticides, and reflect a variety of exposure pathways -- water, groundwater, food chain, etc. OPP will be working with ORD to determine the feasibility of developing standard models to assess specific risks (e.g., runoff in streams, leaching into groundwater) and may make these models available to industry to obtain more consistent and rigorous analyses of these risks. OPP also will be placing particular emphasis on making the results of studies reviewed by OPP available to state agencies and the public.

Two initiatives may result from a reauthorization of FIFRA. First, EPA may be authorized to collect fees for registering pesticides, with fees fully loaded to reflect direct costs and a proportionate share of overhead expenses. Second, EPA may be directed to increase monitoring for pesticides in the environment.

The overall responsibilities of state agencies and OPP are not expected to change significantly. OPP will continue to provide technical assistance to state agencies and review state agency registrations of pesticides and exemptions.

OPP will also continue present efforts to monitor staffing requirements for activities within each of its major functions and for different types of studies to develop improved models for workload forecasting and management.

B. Program Trends - Office of Toxic Substances

Overall, there will be no significant changes in the responsibilities of OTS, regions and state agencies, with most program development and management functions centralized within OTS. There will likely be substantial growth in the volume of chemical information collected by OTS under Section 8 of TSCA and other EPA program offices may use the TSCA authority to collect information on toxic pollutants (e.g., OAQPS for toxic emissions). Other non-EPA regulatory programs may also collect information under TSCA authority. Promulgation of a substantial number of new test rules is anticipated, which also will result in the collection of large volumes of data. The number of test rule studies conducted is expected to increase from 200 in 1983 to 600 in 1986.

Premanufacture notifications for new chemicals have not leveled off as anticipated and are expected to grow over the next few years. OTS anticipates collecting increasing volumes of data for each PMN, with a significant number of PMN submissions containing confidential business information (CBI). OTS may also initiate a major effort to update the information maintained in the existing chemicals inventory (i.e., CICIS).

OTS anticipates that states will increasingly want access to much of the information collected by OTS, especially exposure and monitoring data. However, access will of necessity be constrained by OTS' requirement to safeguard confidential information. OTS is developing an information sharing plan with EPA regions, state agencies, other Federal agencies, and international organizations that will address this issue. OTS also has recently proposed a regional and state support program.

C. Program Trends - Pesticides and Toxic Substances Enforcement Division

Compliance monitoring and enforcement trends for FIFRA and TSCA differ significantly, with the most significant changes related to TSCA. Enforcement authority for FIFRA has been delegated to 52 of the 57 jurisdictions. Most of

the 59,000 annual inspections of pesticide producers, distributors and applicators are now performed by state agencies. Certification of pesticide applicators has been delegated to 51 of the 57 jurisdictions. Regional offices provide oversight of state programs and conduct inspections and take enforcement actions in non-delegated states. Headquarters functions include:

- Providing policy and guidance to regional and state enforcement programs, including guidance on neutral inspection strategies and assistance to regions in setting targets for state enforcement activities;
- Conducting laboratory audits;
- Processing annual pesticide production reports;
- Providing assistance to regions and coordination with the Department of Justice on criminal enforcement actions; and
- Serving as liaison with OPP for issuing "stop sale" and other emergency orders.

The TSCA compliance monitoring and enforcement program is still in the early stages of implementation. As more regulations and sections of the laws become enforceable, the size of the program is anticipated to grow rapidly. A TSCA enforcement program is currently in place for PMS', dioxin, CFCs and PCBs. The compliance monitoring and enforcement programs for asbestos, section 8, and sections 12 and 13 will begin this year. There is currently no authority in TSCA to delegate enforcement to states, although EPA may issue grants to states and contracts to private firms to conduct TSCA inspections.

D. Program Trends - Regional Organizations¹

The regional FIFRA role will consist largely of program oversight, with most emphasis on enforcement. For states that do not have a pesticides program, regional environmental services divisions or contractors will conduct inspections of facilities. Over the next few years, regional ESDs anticipate an increasing emphasis on multimedia inspections.

Regional pesticides staff also forecast increasing analysis by OPP and ORD of pesticide fate in soil and water. The Congress and state agencies have a great interest in potential exposures to pesticide residues.

Regional offices feel that the future regional role with respect to TSCA is less certain, and will be determined largely by the TSCA budget. Regions will concentrate on inspection and enforcement, utilizing contractors for field studies and ESDs for analysis of samples. Grants may be issued to some states for inspection support, but TSCA is not a delegatable program and will be managed by EPA.

E. Information Management Requirements and Related Applications - OPTS

OPP, OTS and PTSED share a number of requirements for improved information management capabilities, and also have several unique needs. Common requirements include the following:

- Both OPP and OTS require improved access to large volumes of technical information on chemicals and references to health and environmental studies. Each office anticipates developing or enhancing major systems which will automate large volumes of bibliographic data.
 - A new Pesticides Document Management System will control bibliographic data for the approximately 250,000 existing studies regarding pesticides as well as the thousands of

¹ This section includes the pesticides and toxic chemicals programs within Air and Waste Management Divisions and Environmental Services Divisions.

new studies conducted by EPA and other organizations each year. Copies of these studies will be indexed and maintained on microfiche.

- The OTS Global Index of documents will be enhanced to maintain additional reference information. Voluminous paper copies of studies will be reduced to microfiche.
- Joint efforts between OTS and ORD laboratories will continue to address the extraction of technical information from published and unpublished sources.
- Resource constraints will require increased sharing of technical data between OPP and OTS, and with other EPA offices. Moreover, OTS anticipates a significant increase in use by other Federal agencies, EPA regional offices, and state agencies. OTS intends to make the physical and chemical properties data, health and environmental effects data, and environmental effects data maintained in SPHERE system widely accessible to other users.
- Both OPP and OTS require the capability to identify chemicals included in technical data bases that have similar chemical structures. A related requirement is the capability to identify apparently new chemicals as being the same or similar to known chemicals, and to determine if the information regarding the known chemical is applicable.

Additional OPP needs are as follows:

- OPP may develop a very large system to maintain raw and summarized technical data on chemicals and pesticides.

- Automated transmission of pesticide test results from registrants or independent laboratories to EPA is a distinct possibility. Several laboratories utilize automated data capture and appear to be willing to work with EPA to develop the required data conversion and communication software.
- OPP currently tracks 20,000 to 30,000 registration actions annually, and requires an improved capability to:
 - Track deadlines for firms to submit requested technical information and generate notifications
 - Use expected submissions to EPA to plan work loads and schedules.

Within OTS there is a need to be able to provide the public, industry, and Congress with access to the data that is used for decision making. This is balanced by the requirement to protect confidential business information in both hardcopy and in automated systems. There will be an increasing volume of confidential business information collected, with stringent access restrictions effectively requiring dual systems.

To handle OTS' increasing workload and integrate roughly 25 existing information that support the assessment of chemical risks under TSCA, OTS will be converting its existing DEC 2020 applications to an IBM-compatible processing environment. This effort will be dependent on the use of common data elements.

The new FIFRA and TSCA and Enforcement System will be used to by PTSED support both FIFRA and TSCA enforcement requirements. PTSED intends to provide direct access to states for entry and retrieval of FIFRA data, and a significant increase in data volume is anticipated. Another likely enhancement will be the capability to automatically generate "custom" letters based on specific criteria (e.g., key ingredients of pesticides).

F. Information Management Requirements and Related Applications -
Regional Organizations

- Much of the ADP support required for FIFRA oversight and regional FIFRA and TSCA operations will be provided by the FIFRA and TSCA Enforcement System. However, regions must obtain more complete information from state agencies and ensure that states use consistent data definitions in reporting to EPA.
- Regions will require improved access to current information about pesticides health effects to respond to public information requests. The existing microfiche-based retrieval system is not sufficiently current.
- A multimedia inspection initiative would require integration or stronger linkages among permit, registration, and other facility-oriented systems. A data base of inspections conducted to date and findings would be especially useful.

G. ADP Tools

- Software development tools are needed which will enable OTS to quickly develop data bases to support one-time data collection efforts for new test rules, for Section 8 studies, and for other information-gathering efforts.
- OPP will increase its use of electronic mail to communicate with regional offices, and requires the addition of state agencies to the mail network to support:
 - EPA issuance of emergency exemptions to allow uses of pesticides that are normally prohibited or restricted. Current use of special mailings takes up to 15 days to get through both the internal EPA mail system and postal service, and is unacceptable.

- Prompt notice to OPP for proposed state pesticide registrations. State registrations become de facto federal registration unless EPA disapproves them within 90 days. Prompt notification would enable OPP to conduct a more in-depth review within the allotted timeframe.
- A graphics capability is needed, especially by PTSED, to support presentations and briefings for senior managers.
- An automated mapping capability is needed to target inspection sites based on proximity to other inspection sites, and to support analyses of patterns for chemical spills or disposal in developing enforcement cases under TSCA.
- Automated data capture in the form of light pens and bar codes is needed to assist in managing documents containing TSCA CBI and the TSCA library.
- OTS requires local processing capability (e.g., minicomputers or microcomputers) to improve record-keeping and analysis by individual staff, reduce the current overload of batch data entry and processing, and will be examining the use of microprocessors/microcomputers to support scientific applications. OTS is now conducting a study on the integration of terminals, word processors, and microcomputers, and on the feasibility of using microcomputers both as data entry devices and as analytical tools.

XI. ASSISTANT ADMINISTRATOR FOR RESEARCH AND DEVELOPMENT

A. Program Trends - Office of Research Program Management

ORPM anticipates that the principal mission and functions of ORD are not expected to change significantly over the next three to five years. ORD will continue to provide environmental research and development services to other EPA programs, although priorities among different types of R&D (e.g., health effects, environmental effects, control technologies) may change over time.

From a financial management perspective, ORD will continue to have a very complex budget structure and to monitor funds at many levels of detail, including crosswalks to many decision units and program elements.

B. Program Trends - Environmental Monitoring Systems Laboratories

EMSLs forecast many significant trends for environmental monitoring. The following trends are anticipated:

- Much more monitoring at landfills and Superfund and hazardous waste sites, including both quick response and relatively sophisticated monitoring for toxics.
- Less emphasis on fixed station monitors and greater focus on monitoring human exposure using portable monitors and microcomputers to record data, and including monitoring of indoor air.
- Development of a monitoring network for organic toxic air pollutants, expanding from a three station pilot to a fifty station network in two years.
- Increasing analysis of the interaction of multiple compounds (i.e., multivariate analysis) in the air.

- Growth in monitoring related to acid deposition, with rapid growth if Congress authorizes a major new acid rain program.
- Increasing automation of monitoring equipment, with many functions now performed by software or people handled by computer chips.
- Continuing strong emphasis on quality assurance/quality control for monitoring data, and utilization of sample file control systems within EPA laboratories.
- Continuing development of standard test procedures (i.e., methods research) for all media.
- Close working relationship between EMSL and state water programs to improve QA/QC for water monitoring data generated by states.

C. Program Trends - Industrial and Municipal Environmental Research Laboratories

IERLs and MERL may be consolidated in a proposed reorganization of ORD. However, consolidation will likely have a minimal impact on actual work requirements of these laboratories. Specific program and research trends anticipated by MERL include:

- Greater emphasis on quality assurance/quality control over laboratory data, with real-time QA/QC of data as it is generated for some studies.
- Increasing modeling of the operations of waste water treatment plants to assess their ability to treat toxic wastes and to project equipment maintenance needs.

- Implementation of new approaches for operating small remote treatment plants from a central location using micro-computers and minicomputers.
- Development of new modeling capabilities to assess the impact of upstream discharges on downstream municipal drinking water supplies, and continued assessments of effluent on water quality even though water standards will be oriented to control technologies.
- Much greater MERL role in responding to spills and cleanup of Superfund sites, and a potential increase in Superfund research.
- Increasing automation of laboratory activities to improve overall productivity. (MERL is currently heavily automated.)
- Establishment of an Innovative Technology Clearinghouse for use by other EPA offices.

Specific trends anticipated by IERLs include:

- Greater use of computers as feedback/control devices on laboratory processes.
- Continued strong emphasis on quality assurance/quality control for laboratory data.
- Development of new automated models for control technologies, such as incineration of hazardous waste.
- Use by permit writers in regional offices and states of a new effluent guidelines design and costing model.

- Development of new data bases and growth of existing data bases for organic chemicals production, hazardous waste destruction, and other research data.
- Potential shift to more in-house work, less extramural (i.e., contractors).
- Development of internal inventories of chemicals and detailed "cradle to grave" tracking systems for chemicals handled by EPA laboratories to meet Agency-wide chemical handling rules.

Delegation of programs to states will have no major impact on IERs. Little direct interaction with state agencies is anticipated.

D. Program Trends - Environmental Research Laboratories

ERs anticipate many research trends with important implications for ADP support. Specific trends include:

- Development of complex models to conduct analyses of smaller particles and secondary materials found in the air that are produced by conversion of gases to particles.
- Continued shift from short distance to more complex long range air transport and regional models from both a standards setting and R&D perspective.
- Potential adjustment of air quality standards to shorter intervals (e.g., one hour standard).
- Generation of large volumes of data by laboratory and field experiments.
- Development of multimedia models oriented to individual chemicals.

- Development of very complex estuarine models to assess the resilience of estuaries and biota to various pollutants.
- Increasing automated collection of salinity, dissolved oxygen, and PH data, and automated tracking of water clean-up activities within marine laboratories.
- Overall much greater emphasis on real world ecosystems and potential shift away from purely technology-based standards for water effluent (e.g., "use potential" of streams considered in writing permits).
- Increasing application of office automation within laboratories.

E. Program Trends - Environmental Criteria and Assessment

Environmental Criteria and Assessment Offices will continue to support other program offices by furnishing the best possible scientific information to those responsible for making regulatory decisions regarding pollution control. This information, in the form of assessment documents, criteria documents, and special reports, must be the most comprehensive and current evaluation of relevant literature possible. The ECAOs will therefore continue to seek improvements in timely research data acquisition, retrieval, and presentation. Specific areas of information needs are identified in several trends:

- EPA will face increasing pressure from the Congress and from within to establish standard protocols and guidelines for conducting risk assessments and standardize analytic methodologies where practical.
- ECAO's will be investigating theories of toxicity to enable EPA to more easily and reliably predict the toxicity of new chemicals and substances.

ECAOs are unique within ORD in that they do not generate research data, but collect and evaluate the scientific literature produced by national and international researchers. Access to the most current and comprehensive information on pollutants under study is crucial to document quality. Integration of the reference data base resulting from literature search and review with text and graphic components of the documents must occur expeditiously, as successive drafts of the 300 to 1200 page documents are typically produced against very stringent schedule requirements.

ECAOs also anticipate an increasing emphasis on air toxics beyond the forty pollutants targeted to date. As many as 500 to 1,000 toxic pollutants may need to be regulated. ECAOs also will participate in ongoing review of existing pollution standards, and anticipate providing more support in the future to OTS and OPP for chemical assessments, and to regional offices for Superfund site assessments. ECAOs may also establish information exchange programs with the Center for Disease Control and other Federal agencies who require access to EPA health research information.

F. Programs Trends - Center for Environmental Research Information

CERI will continue to perform three major functions - technology transfer among EPA laboratories, with state organizations, and to a lesser extent with industry; production of research reports produced by all components of ORD; and general office administration functions. CERI is uncertain of the future mix of these functions. Report production activities could decrease significantly if EPA's research role is diminished by state delegation (but delegation of research is not anticipated). However, CERI would continue to perform a clearinghouse function.

CERI intends to automate more of the document production process by utilizing automated transmission capabilities between ORD laboratories, CERI editors, and typeset operations to avoid rekeying of documents.

G. Program Trends - Health Effects Research Laboratories

HERL research related to water health effects will continue to include a large proportion of toxicology studies. Epidemiology studies may also be conducted for all media and would be performed largely by contractors. For air and other media, HERL research will continue to emphasize human clinical studies, animal studies, genetic toxicology, nonionizing radiation, and neurotoxicology with increased emphasis on teratology (i.e., birth defects), neuropathology, and neurochemistry.

There will also be a strong emphasis on determining the contribution of air and water pollution to cancer using bioassays and potency analysis. For animal studies the goal is to provide better models to quantitatively extrapolate animal data to humans. Other emphasis will be to produce dose-response data on the toxic effects of pollutants and develop models to improve our ability to use toxicological data in risk assessments.

HERL anticipates no significant increase over the limited technical support it now provides directly to states.

H. Information Management Requirements and Related Applications - Office of Research Program Management

- ORD's requirements for scientific information are specific to individual studies and laboratories. It is ORPM's view that there is a limited need to share data across studies; however, some studies require scientific and technical data (e.g., monitoring) maintained in systems operated by other program offices. This requirement will continue.
- In ORPM's view, it is extremely difficult to predict overall ADP support requirements for scientific work. However, current trends indicate that laboratories will require the capability to support the automated collection of greater volumes of data being generated by laboratory experiments.

- To support headquarters' requirements for management information, ORPM will continue to develop and enhance the ORDIS system, a comprehensive system encompassing many administrative functions and implemented on a network of microcomputers. Future enhancements of ORDIS include establishing an automated interface with EPA's Financial Management System and Resources Management Information System, and adding contract plans to the ORDIS data base.
- ORD will likely standardize the management systems used by the laboratories and establish a communications link between these laboratory systems and ORDIS.
- ORD budget staff require a more current (possibly real time) obligations register within EPA's Financial Management System to support control of spending, especially for monitoring end-of-year obligations balances.

I. Information Management Requirements and Related Applications - Field Organizations

The program and research trends projected by ORD laboratories and other field organizations will have significant implications for information management and ADP support.

- There is a strong need to share research data and its derivatives across project and program lines. The demands for quality assurance, engineering design and economic recommendations, exploration of program interfaces, and the maintenance of organizational technical "memories" all require broadly-based data management strategies. It will be especially important to develop standards for common data items to ensure compatability of data across projects.

- ECAOs, EMSLs and other users require the addition of QA indicators to air monitoring data bases and the submission of QA data for other monitoring data bases that now have indicators.
- Most laboratories require improved access to the Agency's major central data bases, including technical, bibliographic and administrative data. ORD headquarters and laboratories should have an opportunity to participate in the redesign of Agency-wide administrative systems now operated by the Office of Administration.
- Many laboratories will need an automated capability to track chemicals handled in the laboratory. A standard application would be appropriate to conform to Agency-wide guidelines.
- ECAO and other laboratories require access to additional outside bibliographies and literature search capabilities.
- ORD has a very complex budget structure due to the large number of program areas served, and types of accounting information required by AAORD. ORDIS will probably not meet all information needs of laboratory managers. Supplementary information management systems will remain necessary to monitor lower levels of data for day-to-day operations.
- Virtually all ORD field organizations require automated support of local applications - project tracking, document management, equipment and supplies monitoring, and others.

J. ADP Tools

ORD laboratory functions will require access to a number of ADP tools.

- Many laboratories (e.g., EMSLs, ERLs, HERLs, IERLs) will be using minicomputers and microcomputers to collect data directly from laboratory and field equipment. Examples include:

- strip chart recorders
- brain stem analysis
- salinity monitors for estuarine field studies

Automated sensors will also be used increasingly for behavioral studies to reduce staffing needs for observation and recording data.

- Many laboratories, especially ERLs and HERLs, will be using computers to operate laboratory equipment and provide data in real time to staff scientists and technicians to monitor and control experiments. Examples include:

- control human exposure chambers
- electroencephalograms

- Most laboratories require the capability to access and manipulate research and financial data. User-friendly statistical software packages are a major requirement of ECAOs and HERLs, and these organizations also require much greater participation from applied statisticians in the design and analysis of health research experiments.

- Many scientists require a user-friendly capability to integrate word processing, data processing, and model outputs to more efficiently prepare research reports. This capability is especially important to ECAOs in reducing the time needed to produce and review criteria and assessment documents.

- Most laboratories and headquarters staff require an easy-to-use automated graphics capability. Graphics capabilities are especially useful in displaying model results. HERL has a high priority to produce high quality hardcopy graphs and ECAO requires a three-dimensional graphics capability. Most laboratories require scientific and color graphics. ORDIS now provides a graphics capability for management and financial data.
- Electronic mail capabilities are quite useful in communicating between headquarters and laboratories. A small increase in use is anticipated. Several laboratories do not yet have access to the mail network.
- CERl requires a capability to transmit large documents from other laboratories to CERl for editing and production. The ability to transmit engineering sketches and graphs in addition to text is needed by IERLs and CERl.

K. Other Remarks

- HERLs, EMSLs and other laboratories will continue to require access to big computers to operate models, perform complex analyses, and process the large volumes of data associated with many experiments.
- HERLs requires improved local computer capabilities to support more rapid collection of data generated by some equipment used in a single experiment.
- Many laboratories anticipate significant use of word processing by scientists. Several laboratories need to replace old equipment that is not reliable. CERl requires a spelling checking capability that can support many technical terms and check spelling for documents quickly.

- Several laboratories require improved ADP training for technical and administrative staff.
- EPA needs to improve its ADP procurement process to enable ORD laboratories to acquire relatively inexpensive ADP equipment (e.g., microcomputers) needed to support laboratory operations.
- HERL Cincinnati identified a need to increase the number of on-site scientific ADP support staff.

APPENDIX A

Interview Guidelines

The purpose of the interviews is to identify how EPA's key programmatic functions are likely to operate in the long-term (e.g., five years from now) and what this implies for ADP support.

1. What trends do you foresee for your program's goals and operations and related ADP support needs over the next five years?
2. What are the main forces within and external to EPA which will affect your program over the next five years?
3. In response to these trends, how do you expect the functions of EPA headquarters and regional offices, and of state and local agencies, to evolve? What are the implications for related ADP support?
4. What new information needs do you expect to have? Are you aware of any existing sources for this information?
5. Which of your current functions require improved automated support? What major changes or enhancements to current ADP systems would allow you to do your job more efficiently or effectively?
6. What other needs or uses of ADP support can you envision?

APPENDIX B - INTERVIEWEES

1. Staff Offices to the Administrator

Joseph Foran
Clayton Jones
Grace Moe

2. Associate Administrator for Legal and Enforcement Counsel

- Office of Enforcement Counsel

Michael A. Brown
Richard H. Mays

- National Enforcement Investigation Center

Thomas Gallagher

3. Associate Administrator for Policy and Resource Management

Ronald Brand

- Office of Policy Analysis

Richard D. Morgenstern
Fredrick W. Allen
Michael Alford

- Office of Standards and Regulations

C. Ronald Smith
N. Philip Ross

- Office of the Controller

John C. Chamberlin
Edward Callahan
Judy Lum

- Office of Management Systems and Evaluation

Lewis Crampton

4. Office of Water

- Office of Water Enforcement
Bruce R. Barrett
James Elder
- Office of Water Regulations and Standards
Steven Schatzow
Edmund M. Notzen
- Office of Water Program Operations
Henry L. Longest, II
- Office of Drinking Water
Victor Kimm
Avrum Marks

5. Office of Solid Waste and Emergency Response

- Office of Waste Programs Enforcement
Gene A. Lucero
- Office of Solid Waste
Michael B. Cook
- Office of Emergency and Remedial Response
James Lounsbury
Elaine Stanley

6. Office of Air, Noise, and Radiation

- Office of Mobile Sources
Richard Wilson
Laszlo Bockh

- Office of Air Quality, Planning, and Standards

Sheldon Meyers
Richard Rhoads
Bernard J. Steigerwald
George Bonina
Edward E. Reich

- Office of Radiation Programs

Raymond Brandwein

7. Office of Research and Development

- Office of Research Program Management

Samuel Rondberg
Thomas DeMoss

- Environmental Monitoring Systems Laboratory - RTP

Thomas Hauser
Gerald Akland
Jon Clark

- Environmental Monitoring and Support Laboratory - Cincinnati

Robert Booth
Terri Firestone
Ann Alford

- Industrial Environmental Research Laboratory - RTP

David Stephan
Clyde Dempsey
William Candy
Albert Klee
Thelma Johnson

- Industrial Environmental Research Laboratory - Cincinnati

Jim Dorsey

- Municipal Environmental Research Laboratory

Francis Mayo
Fred Bishop
Jon Herrman
Diana Bakhaus
Warren Schwartz

- Environmental Research Laboratory - Athens
David Cline
- Environmental Research Laboratory - Gulf Breeze
Henry Enos
- Environmental Research Laboratory - Corvallis
Thomas Murphy
- Environmental Sciences Research Laboratory - RTP
Alfred Ellison
Robert Browning
- Health Effects Research Laboratory - RTP
F. Gordon Hueter
Gerald Nehls
- Health Effects Research Laboratory - Cincinnati
Richard Bull
Judy Stover
- Environmental Criteria and Assessment Office - RTP
Michael Berry
- Environmental Criteria and Assessment Office - Cincinnati
Steven Lutkenhoff
Richard Hertzberg
- Center for Environmental Research Information
Robert Edgar

8. Office of Pesticides and Toxic Substances

- Pesticides, and Toxic Substances Enforcement Division
A. E. Conroy, II
John S. Seitz
Ken Shiroishi
- Office of Pesticide Programs
Edwin L. Johnson

- Office of Toxic Substances

Marcia Williams
Linda A. Travers

9. Office of Administration

- Immediate Office of the Assistant Administrator

John P. Horton
Samuel A. Schulhof
Martha McDonald
Susan Gordon

- Office of Administration - Cincinnati

William Benoit

- Office of Administration - RTP

John DeFord
John Knight

- Office of Personnel and Organization

Kenneth F. Dawsey
Clarence Hardy
Robert Magor
Victoria W. Pierce
Don Webb

- Office of Fiscal and Contracts Management

Clarence E. Mahan
Harvey Pippin
Steve Allbee
Paul A. Martin
Tom McIntyre
Gordon R. Takeshita
John Sandy

- Office of Management Information and Support Services

Edward Hanley
Carol Alexander
Stormy Friday
Jack Sweeney

10. Region I

- Office of Intergovernmental Liaison

Stephen Ellis

- Office of Regional Counsel

Sam Silverman

- Administrative Services Division

Louis Gitto

Robert Goetzl

Wayne Wirtanen

Nancy Lewis

Daniel Regan

Phillip Cincotta

Michael MacDougall

- Air Management Division

Harley Laing

Harold Kazmaier

Marvin Rosenstein

John Hanisch

- Waste Management Division

Dennis Huebner

Mary Grealish

Robin Lind

Ruth Leabman

Dennis Gagne

- Water Management Division

Jerome Healey

Charles Bishop

Clyde Shufelt

Al Ikalainen

Larry Brill

Carol Wood

Anthony DePalma

- Environmental Services Division

William Walsh

Donald Porteous

11. Region II

- Deputy Regional Administrator
Richard Dewling
- Assistant Regional Administrator for Policy and Management
Herbert Barrack
Robert Messina
- Air and Waste Management Division
Conrad Simon
- Environmental Services Division
Barbara Metzger

12. Region III

- Water Program Division
Leonard Mangiaracina
- Air and Waste Management Division
Stephen Wassersug

13. Region IV

- Deputy Regional Administrator
John A. Little
- Air and Waste Management Division
Thomas Devine
- Environmental Services Division
James Finger

14. Region V

- Air Management Division
Steve Rothblatt
- Environmental Services Division
William Sanders

15. Region VI

- Deputy Regional Administrator
Frances Phillips
- Assistant Regional Administrator for Management
John Floeter
- Water Management Division
Kenton Kirkpatrick
James Graham
- Air and Water Management Division
Robert S. Jorgensen
- Environmental Services Division
William Librizzi

16. Region VII

- Assistant Regional Administrator for Planning and Management
John Arendale
- Water Management Division
Alan Abramson

17. Region IX

- Administrative Services Division
James Thompson
- Office of Regional Counsel
Robert Thompson

18. Region X

- Deputy Regional Administrator
R. Edwin Coate
- Environmental Services Division
Gary O'Neal

19. State and Territorial Air Pollution Program Administrators and Association of Local Air Pollution Control Officials

S. William Becker

20. Association of State and Interstate Water Pollution Control Administrators

Robbi Savage

21. Association of State and Territorial Solid Waste Management Officials

Sue Markland Moreland

22. State Agencies (through ASTSWMO)

- Oklahoma State Department of Health, Waste Management Service

H.A. Caves

- Nebraska Department of Environmental Control, Water and Waste Management Division

Maurice W. Sheil