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Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives

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EPA TOXIC SUBSTANCES PROGRAM

Long-standing Information Planning Problems Must Be Addressed

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Accounting and Information
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The Honorable Mike Synar
Chairman, Environment, Energy, and
Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

This report responds to your request that we review the Environmental Protection Agency's (EPA) planning for and use of information resources to support the identification and assessment of risky chemicals and the retrieval of critical health and environmental data under the Toxic Substances Control Act. This report contains recommendations to the Administrator of EPA focused on improving EPA's information resources planning for its toxic substances program.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the date of this letter. We will then send copies to the Administrator, EPA; Secretary, Department of Health and Human Services; Secretary, Department of Labor; and other interested parties. Copies will also be made available to others upon request.

This report was prepared under the direction of Dr. Rona B. Stillman, GAO's Chief Scientist for Computers and Communications, who can be reached at (202) 512-6416. Other major contributors are listed in appendix IV.

Sincerely yours,

Donald H. Chapin
Assistant Comptroller General

Executive Summary

Purpose

The Environmental Protection Agency (EPA) is responsible for administering the 1976 Toxic Substances Control Act (TSCA). This act requires EPA to identify, assess, and regulate risks that may be posed by the approximately 72,000 chemicals in commerce as well as any new chemicals that firms propose to manufacture. EPA and other agencies are also responsible under various other laws for studying and controlling chemical substances. Nearly every American's body contains traces of toxic chemicals as a result of exposure to chemicals released into the air, water, or land, or absorbed by skin contact. Some of these chemicals, such as asbestos, PCB's, and ozone-depleting chemicals have been found to cause tumors, birth defects, cancer, and have killed fish and other wildlife.

Because of concern over EPA's information resource management (IRM) practices, the Chairman, Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations asked GAO to determine whether EPA is effectively planning for and using information resources to support two key activities in its existing chemical program—the identification and assessment of those chemicals that pose the greatest risk to human health and the environment, and the retrieval of critical data on health and environmental risks by other federal users that assess risks from chemicals.

Background

TSCA authorizes EPA to (1) collect data concerning adverse health or environmental effects of chemical substances, (2) assess the risks posed by these substances, and (3) regulate those substances that it determines present an unreasonable risk of harm to human health or the environment. TSCA requires the EPA Administrator to establish an interagency committee tasked with designing, establishing, and coordinating a system within EPA for the efficient and effective collection and use of TSCA data and dissemination of these data to other federal departments and agencies. TSCA also requires the Administrator, in consultation with other agencies, to design, establish, and coordinate an efficient and effective system to retrieve scientific data that could be useful to EPA in carrying out TSCA. The system is also to provide for systematic retrieval of these data by other agencies with responsibilities for regulating or studying chemicals and their effects.

EPA has delegated its responsibility under TSCA to its Office of Pollution Prevention and Toxics (OPPT). As part of this responsibility, OPPT has amassed a wealth of data on existing chemicals, including their characteristics, uses, production, adverse effects, and human and

environmental exposures. Companies are required to submit information to OPPT about any chemical substance they manufacture, process, or distribute that may present a substantial risk of injury to health or the environment.

Results in Brief

OPPT finds itself today without the information resources it needs to reduce its backlog, which numbers in the thousands, of unreviewed existing chemicals, many of which could potentially pose considerable health and environmental risk if left unregulated. Moreover, the information resources environment that OPPT has—over 200 stand-alone data systems that do not facilitate data exchange among themselves because they lack standard data definitions and formats—forces its scientists to work inefficiently, separately accessing many systems to compile a complete set of data on each chemical they review. This situation can be traced in part to OPPT's long-standing neglect of its strategic information resource planning responsibilities. OPPT has never had a strategic IRM plan to guide it in acquiring and managing the information resources needed to efficiently accomplish its existing chemical mission.

OPPT's inattention to IRM planning has also limited its ability to support other EPA offices' use of TSCA data or to disseminate these data to other departments and agencies. GAO found that external users are forced to follow a cumbersome, time-consuming, and labor-intensive process in order to obtain TSCA data. Moreover, other external users, whose need for chemical data is time critical to respond to violations of worker protection laws or chemical spills, told GAO that they have not been able to obtain TSCA data quickly enough when responding to these time-critical situations because OPPT's database that indexes TSCA data is incomplete and has limited search capabilities. Contributing to OPPT's difficulties in meeting external user needs is (1) EPA's failure over the last decade to convene an interagency data committee, established under TSCA, for developing an efficient and effective means for disseminating TSCA data to external users, and (2) OPPT's failure to compensate for this committee's inactivity.

OPPT acknowledges some of its past information resource planning weaknesses and is planning to complete development of a strategic plan in early 1994. GAO reviewed a draft of OPPT's IRM plan and found that it omits key elements; omissions that could greatly diminish its value. For example, it envisions that system improvements and additions will proceed before defining a systems architecture, which provides the technical blueprint to guide the coordinated evolution of compatible

systems. Moreover, whether the architecture will even be developed at all is uncertain because of funding constraints. Without this architecture, systems development activities will likely continue to be incompatible, and thus are unlikely to provide effective mission support.

Principal Findings

OPPT Is Not Effectively Meeting Its Internal Data Needs

EPA policy requires that each office prepare a mission-based, strategic IRM plan that explains how the office will acquire and manage information resources to aid in accomplishing its respective mission. OPPT, however, has never completed a strategic IRM plan to support implementation of TSCA. According to senior OPPT officials, a plan has not been completed because past leadership considered it a low priority given budget constraints and competing priorities and because no compelling reason existed for completing one. Without such a plan, OPPT's divisions and branches have developed over 200 stand-alone information systems and databases that lack standard data definitions and formats and cannot efficiently share data. This systems environment forces OPPT scientists to waste time and effort canvassing many systems and undertaking cumbersome manual searches through voluminous studies to assemble a chemical's complete risk picture or screen chemicals in order to set review priorities.

OPPT is completing an IRM plan. Scheduled for completion in early 1994, this plan is to describe the Office's broad strategic IRM goals as well as implementation activities. However, the plan did not include an assessment of users functional and information requirements. At the conclusion of GAO's review, OPPT officials told GAO that these steps were now underway. In GAO's view, the final plan's effectiveness, and thus OPPT's ability to create an information resources environment that allows it to efficiently and effectively accomplish its existing chemical mission, could be limited unless OPPT completes these assessments and adjusts the draft plan accordingly.

GAO also found that OPPT's plan calls for system improvements and additions before defining an information system architecture, which clearly shows how the development and use of information technology, data, and people will support the Office's operations. According to OPPT's director, a proposal for developing an information system architecture will

compete for the Office's internal allocation of fiscal year 1994 funding with other program activities and, if funded, will not be completed for over a year. If OPPT undertakes systems development without defining an architecture, there is substantial risk that the systems will continue to be incompatible and will not provide efficient mission support.

OPPT Is Not Effectively Addressing External Users' TSCA Data Needs

TSCA makes the Administrator responsible for an interagency committee that is to establish a system in EPA for the collection, use, and dissemination of data submitted under the act. TSCA also requires the Administrator to establish a scientific-data retrieval system for use by all federal agencies with responsibilities for the control and study of chemical substances. However, the EPA-led interagency committee has not met for over 10 years because the member agencies' administrations have not viewed it as a priority. In the absence of committee activity, OPPT has not satisfied external users needs to effectively and efficiently identify and obtain TSCA data. OPPT's only on-line database available to external users for accessing TSCA data (1) lacks a complete, well-organized index to facilitate the identification of TSCA studies; (2) has limited search capabilities; and (3) does not provide on-line access to abstracts to facilitate identifying TSCA studies that would be pertinent to external users data needs. Moreover, most of the TSCA data are in the form of hardcopy documents that external users must request and wait days or weeks to receive. Because of these difficulties, external users whose need for TSCA data is time critical do not attempt to obtain these data. Others, whose needs are not time critical, must follow a cumbersome, time-consuming, and labor-intensive process to obtain TSCA data. At the conclusion of GAO's review, OPPT officials stated that they were compiling data on external users needs for information, and would consider reflecting these needs in their IRM plan. In GAO's view, the effectiveness of OPPT's efforts will be limited unless they focus on external users' needs.

Recommendations

To assist OPPT in its efforts to provide efficient and effective collection, dissemination, and use of TSCA data as required by the act, GAO recommends that the Administrator of EPA

- direct the Assistant Administrator for the Office of Prevention, Pesticides, and Toxic Substances to (1) complete a strategic IRM plan based on external users needs as well as an analysis of internal users functional and information needs, (2) evaluate alternative system architectures for

meeting these needs, and (3) select a target architecture to guide the development and evolution of OPPT systems;
- limit new OPPT system development efforts until the IRM plan and target systems architecture are completed; and
- reconvene the interagency committee established under TSCA as an active body responsible for defining users functional and information needs.

Agency Comments

As requested by the Chairman's office, GAO did not obtain agency comments on a draft of this report. However, the views of responsible agency officials, including the Director for OPPT, were obtained on the accuracy of the information in this report and have been incorporated in the report as appropriate.

Contents

Abbreviations

CBI	confidential business information
DOS	disk operating system
EPA	Environmental Protection Agency
IRM	information resources management
LAN	local area network
OMB	Office of Management and Budget
OPPT	Office of Pollution Prevention and Toxics
OSHA	Occupational Safety and Health Administration
RM1	Risk Management 1
SIC	standard industrial codes
TSCA	Toxic Substances Control Act
TSCATS	Toxic Substances Control Act Test Submissions

Introduction

The Toxic Substances Control Act (TSCA) of 1976 authorizes EPA to (1) collect data from firms concerning adverse health or environmental effects of chemical substances they manufacture, process, or distribute; (2) assess the risks posed by these substances; and (3) regulate those substances that it determines present an unreasonable risk of harm to human health or the environment. TSCA makes the Administrator responsible for an interagency committee that is to establish a system in EPA for the collection, use, and dissemination of data submitted under the act. TSCA also requires the Administrator to establish a scientific-data retrieval system for use by all federal agencies with responsibilities for the control and study of chemical substances. EPA distinguishes between chemicals already inventoried under TSCA, known as existing chemicals, and new chemicals. Under TSCA, EPA generally has 90 days to determine whether a new chemical can enter commerce. In contrast, there is no deadline for EPA to complete its assessment of existing chemicals, and thus they can remain in commerce until EPA determines they present an unreasonable risk to human health or the environment.

EPA has delegated its responsibilities under TSCA to its Office of Pollution Prevention and Toxics (OPPT). OPPT's budget for collecting data on existing chemicals, assessing their risks, managing the existing chemical testing program, and disseminating information on existing chemicals was about $22 million for fiscal year 1993. Approximately 150 full-time employees are engaged in these efforts. OPPT is required by TSCA to report annually to the President and to the Congress on actions taken and problems encountered in administering the act.

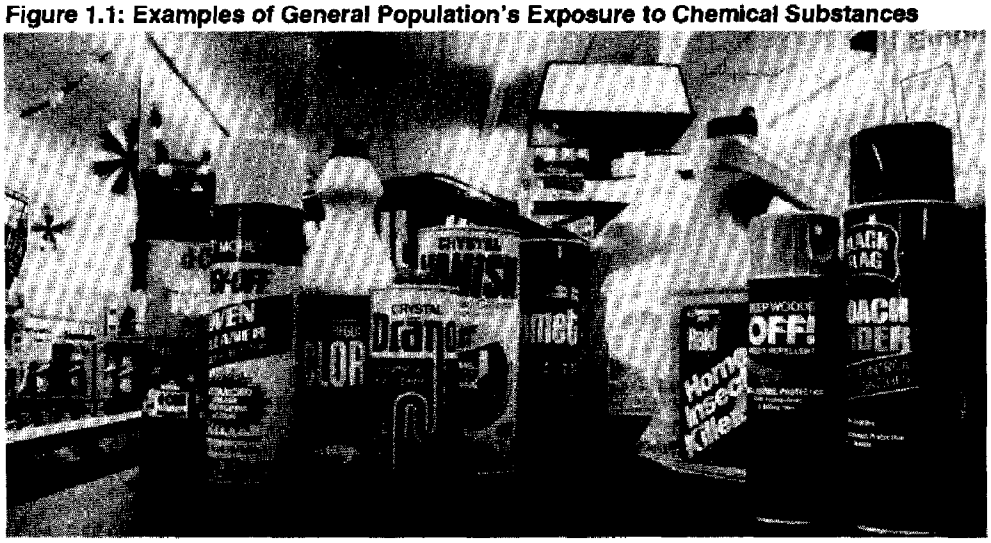
Currently, OPPT's chemical inventory totals about 72,000. Of these, approximately 20,000 have received some form of review, leaving about 52,000 unreviewed existing chemicals. OPPT is currently focusing its efforts on assessing the risks posed by the approximately 14,000 non-polymer existing chemicals that are produced in excess of 10,000 pounds per year, known as moderate to high production volume chemicals. About 1,750 of these moderate to high production volume chemicals have received some level of review since April 1990.[1]

Collecting and assessing data on chemicals is important because nearly every American is exposed in varying degrees to chemicals with toxic properties. For example, some common chemicals, such as solvents found

[1]OPPT was unable to tell us how many of these chemicals were screened prior to 1990 because the software needed to retrieve these data was not working properly. EPA is not focusing on polymers produced or imported in excess of 10,000 pounds per year because EPA considers them to have low toxicity.

in many paints and cleaning products, have toxic effects if inhaled in high concentrations. And even small amounts of other chemicals, such as asbestos and PCB's, have been found to cause tumors, birth defects, cancer, and kill fish and wildlife. Figure 1.1 shows examples of potential exposure to chemical substances.

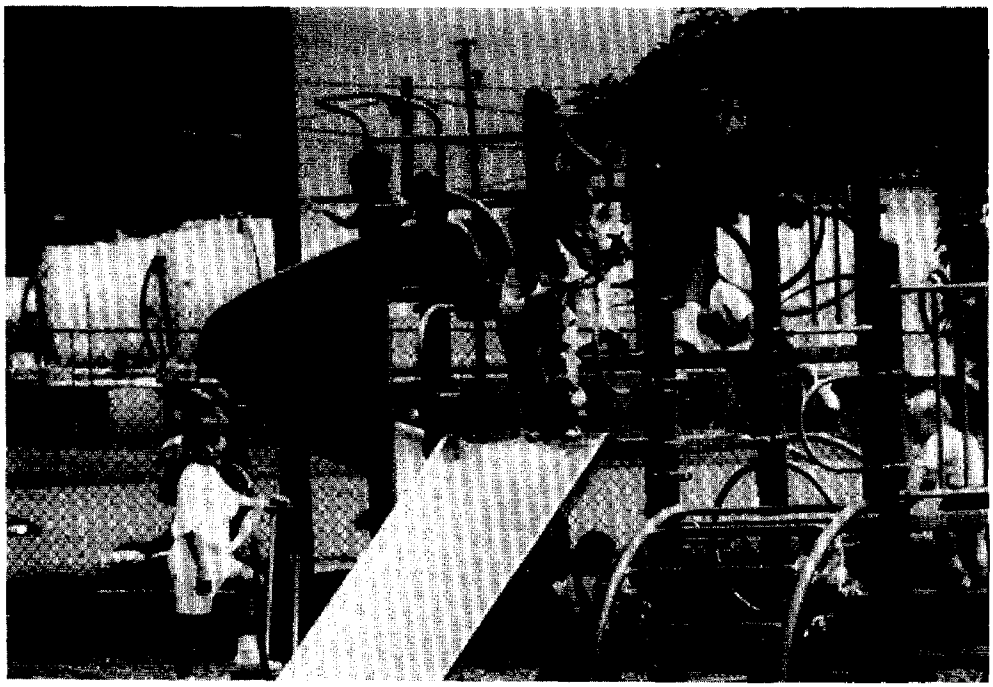
Figure 1.1: Examples of General Population's Exposure to Chemical Substances



A wide variety of toxic chemicals are found in common household products.

Source: EPA

Consumers are concerned about chemical risks from home improvement products.



Chemical hazards may be present in many settings.

Source: EPA

OPPT recognizes that working through the backlog of unreviewed existing chemicals requires strategic vision and direction because of the sheer size of the backlog and the lack of critical data for many chemicals, especially data on the extent of human and environmental exposure to chemical substances. As such, OPPT has recently begun to develop a new strategy for addressing the assessment of existing chemical risks. According to OPPT officials, this strategy, which is currently in the form of a working document, envisions (1) expanded reporting of chemical uses by the chemical industry, from which better estimates of chemical exposure can be derived; (2) improved and expanded dissemination of TSCA data to the public and the chemical industry; and (3) expanded voluntary actions by the chemical industry to identify and control chemical risks.

TSCA Risk Assessment Process Heavily Data Dependent

To assess chemical risks, OPPT must collect and evaluate pertinent data, including studies of adverse health and environmental effects and human and environmental exposures. OPPT must also collect data on chemical characteristics, production technologies, production quantities, and production sites. Companies are required by section 8(e) of TSCA to submit information about any chemical substance they manufacture, process, or distribute that supports the conclusion that such substance presents a substantial risk of injury to health or the environment. Commonly referred to as 8(e) studies, this information, which is primarily in the form of copies of laboratory studies of chemicals' toxic effects, is often the only available data on substantial toxic effects of chemical substances and the first information OPPT receives concerning the potential toxic effects of existing chemicals. Currently OPPT has about 12,000 8(e) studies, of which only about 2,000 have been fully reviewed and abstracted. OPPT estimates that it will take until August 1994 to determine which of its backlog of 8(e) studies contain data indicating that a chemical's toxicity is of high concern. OPPT does not know how much time will be required to more fully review and abstract these studies.

OPPT's risk assessment process has two basic steps—screening and review. Screening is typically used to determine whether new information on a chemical, such as an 8(e) study, warrants a more thorough review. In the review phase, OPPT staff search and compile readily available data from a variety of sources to determine if EPA or some other agency should consider taking steps to regulate or otherwise control the chemical. OPPT's process for conducting the initial screening and evaluation of existing chemicals is known as the Risk Management 1 process (RM1). Separate groups in OPPT that provide input into a chemical's RM1 assessment include

toxicologists, chemists, economists, chemical engineers, and exposure assessors. The inputs from these groups are compiled by risk integrators who prepare dossiers used to support decisions as to whether chemicals should be dropped from further consideration, referred to another federal agency or EPA office, or analyzed in more detail to determine appropriate risk management strategies. The major functional elements of the RM1 process are shown in appendix I.

In the early 1980s, OPPT developed an on-line index of TSCA data on toxic chemicals, called the Toxic Substances Control Act Test Submissions (TSCATS). This database, which is accessible through several on-line systems, is still the only database EPA has for use by other agencies and the public. Currently, this database indexes about 72,000 TSCA studies. In addition, TSCATS contains the abstracted test results of about 9 percent of these studies. The remaining 91 percent of these studies have not been abstracted.

TSCA Data Needed by Many Outside OPPT

There are many users of TSCA data outside of OPPT in the federal government. For example, within EPA, the Office of Water uses TSCA data to assess risks posed by water pollutants while the Office of Solid Waste uses TSCA data in its assessments of risks posed by hazardous waste. Outside EPA, the Occupational Safety and Health Administration (OSHA) needs TSCA data to assess health risks posed by workers' exposure to chemicals, issue worker protection standards, and evaluate the regulatory impacts of such standards; the Food and Drug Administration needs TSCA data to ensure that chemicals (e.g. food additives) are safe enough for human consumption; and the National Toxicology Program uses TSCA data to plan for toxicological tests it performs in support of other federal agencies, such as the Food and Drug Administration.

Objectives, Scope, and Methodology

As requested by the Chairman of the Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, we reviewed EPA's information resources planning activities that support the administration of TSCA. The objectives of our review were to assess EPA's planning for and use of information resources to support (1) identification and assessment of existing chemicals' risks, and (2) retrieval of critical data on these chemicals' health and environmental risks by other agencies and EPA offices that are responsible for assessing chemical risks. To evaluate EPA planning efforts to support the identification and assessment of chemicals, we reviewed federal and EPA

business planning and information resources management regulations, policies, and guidelines. We also reviewed and discussed with OPPT officials their draft strategic information resource management plan. Additionally, we interviewed officials from OPPT's Information Management Division about steps underway or planned for developing an information systems architecture. We also interviewed scientists and managers in OPPT's Chemical Control Division, Chemical Screening and Risk Assessment Division, Health and Environmental Review Division, Chemical Management Division, and Information Management Division to obtain their views on the importance of information systems to the assessment of chemical risks and the efficiency and effectiveness of OPPT information systems in screening and assessing chemical risks.

To evaluate EPA planning to support retrieval of critical data by others, we visited selected EPA offices and federal agencies. Appendix II identifies the agencies and EPA offices contacted during the course of this review, their function, and their use of TSCA data. We selected these EPA offices and agencies because they are explicitly mentioned in TSCA, they participate in the TSCA interagency testing committee, or they were identified by OPPT officials as users of TSCA information. We discussed with representatives from these EPA offices and federal agencies their (1) particular responsibilities for assessing, managing, and researching chemical risks; (2) need for TSCA studies and data; (3) ability to identify and retrieve such data; and (4) approaches to obtaining the information needed. We also reviewed available documents and correspondence concerning agencies' experiences requesting TSCA information from OPPT.

We performed our work at EPA's Office of Pollution Prevention and Toxics, Office of Air and Radiation, Office of Water, and Office of Solid Waste and Emergency Response; the Food and Drug Administration's Center for Food Safety and Applied Nutrition; the TSCA Interagency Testing Committee, and the Occupational Safety and Health Administration, all in Washington, D.C. We also met with officials at the Agency for Toxic Substances and Disease Registry in Atlanta, Georgia; the National Library of Medicine in Bethesda, Maryland; the National Toxicology Program of the National Institute of Environmental Sciences in Research Triangle Park, North Carolina; and held a video-conference with officials from the National Institute of Occupational Safety and Health in Cincinnati, Ohio. In addition, we visited an EPA contractor in Bethesda, Maryland, and a representative from a private chemical company in Wilmington, Delaware.

We conducted our review from August 1992 to October 1993, in accordance with generally accepted government auditing standards. As requested by the Chairman's office, we did not obtain agency comments on a draft of this report. However, the views of EPA officials were obtained on the accuracy of the information contained in this report and are incorporated in the report as appropriate.

OPPT Has Not Effectively Planned for Meeting Its Own TSCA Data Needs

OPPT has never had a strategic IRM plan to guide its investments in information resources and support attainment of mission objectives. As a result, information systems development efforts throughout the Office have produced a large number of incompatible systems that force users to use inefficient work processes, and thus provide little support in reducing the backlog of existing chemicals upon which OPPT is focusing its efforts (non-polymer chemicals that were being manufactured when TSCA went into effect and that are now produced in excess of 10,000 pounds per year, making them moderate to high production volume chemicals). While OPPT has developed a draft of its first IRM plan, it bypassed critical steps in the development process—identification of users' functional and information needs and definition of an information system architecture. At the conclusion of our audit work OPPT senior managers stated that they were uncertain to what extent, if any, these omissions will be addressed before OPPT begins system improvements and additions contained in the draft plan.

OPPT Has Never Had a Strategic IRM Plan

Agencies are required to develop IRM plans that are clearly linked to strategic business plans and show how information technology and resources will be used to best accomplish the agency's mission, goals, and objectives. The Paperwork Reduction Act establishes a broad mandate for each federal office to perform information management activities. Office of Management and Budget Circular A-130 implements provisions of the Paperwork Reduction Act and establishes policies and standards for information resource planning and management activities. Consistent with this guidance, the EPA Information Resource Management Policy Manual requires EPA offices to prepare mission-based IRM plans.

A key component of a strategic IRM plan is an information systems architecture. This architecture clearly shows how the development and use of information technology, data, and people will support an office's operations. An information systems architecture is a description of all functional activities to be performed to achieve the desired mission, the elements needed to perform the functions—including all IRM resources (hardware, software, facilities, data, and people)—and standards for and performance levels of those system elements. An architecture includes information on the technologies, interfaces, and location of functions. It is considered an evolving description of an approach to achieving a desired mission.[1] We have found that without an IRM plan and supporting

[1]For additional information on information architectures, refer to Strategic Information Planning: Framework for Designing and Developing System Architectures (GAO/IMTEC-92-51, June 1992).

architecture, agencies often acquire information resources in a fragmented fashion, resulting in system and data proliferation, incompatibilities, and duplications, which in turn mean that time and money are wasted and mission efficiency and effectiveness is reduced.

The OPPT Director as well as other senior OPPT officials told us that OPPT has never developed or implemented a strategic IRM plan or an information systems architecture because (1) until recently they did not believe OPPT's mission under TSCA necessitated officewide systems integration, and thus, no need for an officewide plan and systems architecture existed; (2) it has not been a high enough priority given the limited resources available to OPPT; and (3) developing an IRM strategy would not improve OPPT's ability to obtain resources for improved information management in EPA's budget process, because there is no link in EPA between strategic planning (business or IRM) and the annual budget process. In addition, the Director of OPPT's Information Management Division said that in the past OPPT leadership viewed itself as a collection of disparate programs, such as the testing program, the existing chemicals program, and the new chemicals program, each addressing separate sections of TSCA and that there was little need to exchange or integrate data across these programs. She added that with OPPT's current leadership and new focus on data dissemination as a mission priority, there is a recognized need to exchange and integrate the Office's data.

In the absence of an IRM plan, the responsibility for planning and implementing the majority of the Office's information systems has been left largely to the discretion of OPPT's various divisions and workgroups. This unplanned, delegated approach has led to system proliferation, lack of system integration, and systems that do not satisfy users' needs.

OPPT Has Many Stand-Alone Data Systems

OPPT's lack of attention to IRM planning has permitted the development of over 200 stand-alone systems. These systems are used for such purposes as reviewing new chemicals, screening and reviewing existing chemicals, or storing and disseminating data on releases of toxic chemicals. The systems range in size from small, personal computer databases to large mainframe databases that serve the entire office. OPPT uses about 50 systems to store, retrieve, and manipulate scientific, engineering, and economic data for the RM1 process alone—the process for initially screening and evaluating risks posed by existing chemicals. (See app. III for a description of these systems). Additional systems are used for administrative purposes and to track documents. For example, OPPT's

Health Effects Branch uses 23 stand-alone personal computer systems to assess the toxicity of chemicals in the RMI process—additional systems are used to support more detailed toxicity assessments. While we recognize that the number of systems does not conclusively show that OPPT has too many systems, OPPT's Director acknowledged that the numbers on the surface seem large, and the Branch Chief for the Health Effects Branch stated that there were opportunities to consolidate some of the systems.

We identified systems for which consolidation appears to make sense. One example concerns OPPT's systems used to manage companies' 8(e) studies. Currently, data used to manage the studies (e.g., document number, submitting firm name, chemical reference number, status of OPPT review of the study, OPPT referral of and action on the study, etc.) reside in five separate systems, two containing confidential business information (CBI) data and three containing non-CBI data.[2] Because these data are scattered among the five databases, OPPT staff must canvass as many as four of the five systems to piece together a complete picture of the study, its status, and results. For instance, one system, the Chemical Screening and Risk Assessment Division Existing Chemical Assessment Tracking system, contains data about 8(e) studies such as document numbers, chemical reference numbers, submitting firms names, status of OPPT's review of the study, and action on or disposition of the study within OPPT. Another database, TSCATS, contains all these data except review status and disposition, and it also contains some data on the purpose and kind of studies OPPT has received for each chemical. A third system contains OPPT's initial toxicological classifications of the approximately 10,000 8(e) studies received during the last 3 years (i.e., whether the study results are of high, medium, or low concern). Such system proliferation and duplication unnecessarily increases system costs and reduces staff efficiency and productivity.

Also, 8(e) study data that are considered CBI, such as the reference number or chemical name, are stored in two separate systems. A mainframe-based system contains data received prior to October 1990, while a Local Area Network (LAN)-based system contains data received since then. Rather than transferring all data to the newer, more accessible LAN-based system, OPPT chose to operate both systems simultaneously because it did not acquire a file server on the LAN-based system with sufficient storage capacity to hold all of the CBI data. As a result, inefficiencies and lost

[2]About 40 percent of OPPT's data are considered CBI by the firms submitting them. TSCA requires that OPPT protect CBI from unauthorized access.

productivity occur when users must search two systems to locate a CBI study.

Because Systems Are Not Integrated, Work Processes Are Inefficient

Because OPPT's TSCA systems are not integrated, users are forced to use inefficient work processes, accessing systems in more than one location and manually writing the data stored on them on a sheet of paper. OPPT's systems for managing CBI illustrate these work inefficiencies. Specifically, to minimize the risks to its CBI, OPPT acquired systems that are physically separate from its other non-CBI systems. These CBI systems include two databases, an imaging system, and a LAN. However, the imaging system, used to store and retrieve large volumes of document data in the form of images of TSCA studies and related documents, is not connected to the LAN. Therefore, users must go to one of the imaging system terminals, retrieve the image of a document, make manual notes of the data they need, then go to their personal computers and enter the data there, for local use, or to transmit to another computer on the LAN. For security reasons, users are discouraged from making copies of CBI documents. Moreover, each copy of a CBI document must be controlled and tracked in OPPT's CBI tracking system, a procedure that adds additional administrative burdens. The Deputy Director for OPPT's Information Management Division told us that the primary objective of the imaging system was to improve archiving of TSCA studies and related documents, and that this objective had been accomplished, resulting in savings of $300,000 a year in microfiche costs. He added that improved access to data contained in TSCA studies was also an original objective and it was now receiving increased emphasis. At the conclusion of our review, the Director for OPPT's Information Management Division told us that OPPT is trying to obtain resources to purchase software to connect the imaging system with the CBI LAN to improve users' access to studies in the imaging system.[3]

OPPT Officewide Systems Do Not Meet Some Internal Users' Needs

OPPT's officewide systems do not meet users' needs for screening large numbers of existing chemicals and setting review priorities. Instead, these systems largely serve either as an index to available chemical studies or to track the progress of chemicals through OPPT's review process. These systems do not meet users' needs because OPPT never (1) assessed and validated users' needs for chemical data—such as the type of data needed or how quickly such data should be retrieved, or (2) developed information systems to satisfy these data requirements. Without such

[3]Although the Deputy Director of the Information Management Division stated that the imaging system is currently used primarily to store CBI about new chemicals, OPPT's goal is to use the imaging system to store thousands of the Office's 8(e) studies and thus also support the existing chemical program.

analysis of user needs, OPPT scientists and contractors must follow cumbersome and time-consuming manual steps when screening large numbers of chemicals.

The availability of 8(e) data illustrates the problem. OPPT division directors identified 8(e) data as critical to screening chemicals for risk and setting priorities for review. However, to obtain these data, users must access an automated indexing system to identify potentially relevant studies and then manually retrieve microfiche copies of the studies, many of which are voluminous and have not been abstracted to provide bottom-line results and quality of the study. OPPT officials consider this procedure adequate for conducting detailed reviews of chemicals at the current rate of less than 70 reviews per year. However, OPPT officials acknowledge that this procedure is cumbersome when OPPT needs to screen hundreds of 8(e) studies for the purpose of setting priorities for chemical review across large numbers of chemicals. The Executive Director of the Interagency Testing Committee also stated that summary data are needed by scientists and managers making risk assessments or setting priorities.[4] At this time, only the approximately 2,000 8(e) studies OPPT received prior to 1992 are fully abstracted and accessible in an on-line database while nearly 10,000 studies received since then remain to be abstracted. Moreover, the abstracts that are available are of limited utility because data on the studies' quality are not contained in the abstracts or in the automated 8(e) index system. This is particularly important given OPPT officials' statements that the quality of 8(e) studies varies widely.

OPPT's Draft IRM Plan Can Be Improved

OPPT is in the process of developing a strategic IRM plan. Planned for completion in early 1994, this plan is to describe OPPT's strategic goals, objectives, and implementation activities for its information resources. However, OPPT's draft plan omits key elements that would enhance OPPT's ability to improve the state of its information resources.

Effective strategic IRM planning involves first identifying the organization's functions to be performed in carrying out its mission, identifying the information users need to perform those functions, identifying the software applications to provide the information, analyzing alternative system architectures, and selecting a target systems architecture. Our analysis of the draft plan and discussions with OPPT officials revealed that OPPT had not addressed users' functional or information requirements. At

[4]The Interagency Testing Committee was created under TSCA to identify chemical testing needs across federal agencies and recommend testing priorities to EPA's Administrator.

the conclusion of our audit work, the Deputy Director of the Information Management Division stated that OPPT was compiling the results of focus group meetings held with internal and external users to determine user needs and solicit input in the form of suggested implementation activities. However, documentation of the results of these meetings was not available, and the draft plan had not been updated to reflect the results of those meetings.

OPPT officials told us they will begin implementing the plan once a final version of it is approved, but before a target systems architecture is selected. The Deputy Director for Information Management told us the proposal for developing an information systems architecture will compete for fiscal year 1994 funding and thus, if funded, will not be completed for at least a year. The OPPT Director stated that while he recognized the value of and supported having a systems architecture, he did not know whether he could afford to fund one in lieu of competing information system projects.

The danger OPPT runs in affecting any significant information system changes without a guiding architecture is that the changes may run contrary to the standards and direction ultimately specified in a subsequently adopted architecture, and thus may prove to be unwise investments. Because OPPT has yet to finalize its list of implementation activities, we could not identify specific examples of this possibility. However, OPPT could potentially choose to expend considerable resources to upgrade an existing system or group of systems that operate in a vendor-specific, proprietary environment. In contrast, the target architecture may call for migrating data and applications to an open system environment. Without a systems architecture to guide new systems development, there is substantial risk of developing incompatible systems that do not satisfy users' needs for efficient retrieval of TSCA data.

Conclusions

EPA's responsibilities under TSCA for regulating those chemicals in commerce that pose health and environmental risks is of paramount importance. These chemicals, which number in the tens of thousands, are used in some form everyday, potentially exposing many Americans to undue risk. For OPPT to meet its TSCA responsibilities, it must ensure that the information needed to assess these chemicals and make regulatory decisions about them is available when and in the form needed. However, for over 10 years OPPT has not effectively used information technology to support its TSCA responsibilities. As a result, the automated data systems

currently in place do not provide OPPT with the data they need to efficiently assess and manage risks from chemical substances or allow effective efforts to reduce the backlog of unreviewed, moderate to high production volume existing chemicals.

To OPPT's credit, it has begun developing a strategic IRM plan to guide its development of an information system environment aimed at helping to satisfy its TSCA responsibilities. However, this planning process did not include key steps, such as the identification of users' functional and information requirements and the definition of a systems architecture. Unless OPPT corrects these omissions, its IRM plan may not produce the results that the Office needs.

Recommendations

To assist OPPT in its efforts to provide efficient and effective collection, dissemination, and use of TSCA data as required by the act, we recommend that the Administrator of EPA

- direct the Assistant Administrator for the Office of Prevention, Pesticides, and Toxic Substances to (1) complete a strategic IRM plan based on an analysis of internal users functional and information needs, (2) evaluate alternative system architectures for meeting these needs, and (3) select a target architecture to guide the development and evolution of OPPT systems; and
- limit new OPPT system development efforts until the IRM plan and target systems architecture are completed.

OPPT Has Not Effectively Planned for Meeting External Users' Needs for TSCA Data

TSCA section 10 requires EPA to establish an interagency committee that will design, establish, and coordinate an efficient and effective system within EPA for the collection and use of TSCA data and dissemination of these data to other federal departments and agencies. The act also requires EPA, working with other agencies, to establish an efficient and effective scientific-data retrieval system, including provision for systematized retrieval by other agencies responsible for regulating or studying chemicals or their effects. However, the TSCA interagency committee has not met in over 10 years and, in its absence, OPPT has not planned or developed a system that effectively meets outside users needs. Without an effective and efficient means for obtaining TSCA data, external users are forced to follow a cumbersome, time-consuming, and labor-intensive process to obtain the TSCA data they need. Other users whose need for TSCA data is time-critical—to respond to chemical spills or enforce worker protection laws—simply choose not to attempt to obtain these data from OPPT, even though they told us that the data would be very beneficial to their analyses of chemical risk.

TSCA Provisions Requiring EPA to Meet Users' Needs Have Not Been Implemented

In the late 1970s, the Interagency Data Committee was established to meet requirements in TSCA section 10. The committee's member agencies included EPA, Occupational Safety and Health Administration (OSHA), the Food and Drug Administration, the Consumer Product Safety Commission, Department of Defense, and Department of Agriculture. According to former committee members, the heads of these agencies strongly supported interagency coordination in assessing and controlling chemical substances. To achieve this coordination, the committee developed an automated system to provide users with on-line access to remotely located files, including OPPT's TSCA data. The system's former administrator told us the system was partially operational in the early 1980s, that users were satisfied with the system, and that cost analyses justified its use and maintenance. However, in 1982 the work of the committee ceased to be a top-management priority, due to the 1980 change in member agencies' administrations, and the system was terminated.

Since 1982, OPPT has not performed the necessary activities, including strategic IRM planning, to ensure that it is complying with TSCA section 10. A key component of such IRM planning would be identifying external users' functional and information needs and devising applications and systems to satisfy those needs. However, OPPT has not identified external users' needs, nor has it identified alternative system approaches for addressing them.

Consequently, OPPT's only on-line database for external users, TSCATS, does not meet external users' needs for identifying and obtaining TSCA data.

We interviewed users from three EPA offices and six other federal agencies about their ability to obtain TSCA data. These users stated that TSCATS does not support efficient access to TSCA data. Their specific complaints included (1) the need to perform cumbersome and time-consuming searches to identify relevant TSCA studies, (2) the absence of abstracts in TSCATS to facilitate selection of studies (only about 9 percent of TSCATS studies are abstracted), (3) the incompleteness of the TSCATS database, and (4) delays in obtaining studies from OPPT. For example, users at the National Toxicology Program stated that identifying and obtaining relevant TSCA data involves searching a combination of government and commercial databases—including TSCATS—to identify pertinent information and then submitting written requests to OPPT for copies of specific studies. These users told us they often wait anywhere from 2 weeks to 3 months to receive the requested studies from the OPPT library. In another instance, the contractor that performs database searches and risk assessments of hazardous waste in support of EPA's Office of Solid Waste said that because TSCATS generally lists fewer studies than OPPT actually has, there is a risk of missing relevant data. As a result, the contractor stated that TSCATS searches must be verified manually against the listings of all TSCA studies submitted by chemical firms.

Officials at the Agency for Toxic Substances and Disease Registry and OSHA, whose need for data on toxic chemicals is time critical, do not attempt to search for TSCA data because of the time and effort involved or because the information is not presented in a useful format. For example, scientists at the Agency for Toxic Substances and Disease Registry often have 2 weeks or less to produce reports (e.g., health consultations, health advisories) characterizing the human health impact of chemical releases from Superfund sites. They told us that they do not use TSCA data because of the time required to identify and obtain these data. Instead, agency scientists depend on information accessible through their own, commercial, or other government databases or literature to produce their reports.

Finally, within days of accidents involving worker exposure to toxic substances, OSHA's field inspectors must reach preliminary decisions about the extent of the employer's liability. The Director of the Office of Field Programs said that in investigating such incidents, OSHA inspectors need access to summaries and analyses of toxicological data in order to assess

the employer's compliance with OSHA's worker protection standards. However, OSHA inspectors do not rely on OPPT's TSCA data, even though TSCA data may make a difference in their determinations, because of the time and effort needed to access the data and difficulty in obtaining information from them. As a result, the inspectors rely on what information they can obtain from employers' material safety data sheets, information supplied by chemical manufacturers, and data available in commercial and government databases to identify concerns with chemicals involved in worker accidents.

Other problems that external users have in identifying TSCA data were highlighted in a September 1992 OPPT survey of TSCATS users.[1] This survey found problems that included incomplete or ineffective indexing and limitations in TSCATS' search capabilities. For example, it cited that TSCATS does not cross-reference interim test results and final results. The survey report concluded that while TSCA studies represent an important and unique information base, their impact falls short of their potential partly because TSCATS' indexing limitations do not facilitate user identification of relevant studies.

The Chief of OPPT's Information Access Branch told us that implementation activities under consideration for improving agencies' access to TSCA data include increased abstracting of studies to help identify and select studies indexed in TSCATS, and revisions to the database to improve indexing and searching capabilities. The Branch Chief also said that the cost of abstracting TSCA studies prevents complete abstracting of all studies indexed by TSCATS. The Branch Chief said OPPT is in the process of deciding which TSCA studies to abstract and make available to other federal agencies and the public. At the conclusion of our review, the Deputy Director of the Information Management Division told us that OPPT was compiling the results of focus group meetings held to assess external users' needs for TSCA data and is looking at alternative ways of providing users with TSCA studies. The Branch Chief said OPPT would use the focus group results in its consideration of revisions to TSCATS.

The Branch Chief also told us that while OPPT was planning to improve indexing and abstracting of TSCA data, actual distribution of the voluminous TSCA documents and microfiche is not an EPA responsibility and thus should continue to be handled primarily through the National Technical Information Service. However, TSCA section 10 is clear that EPA

[1]The TSCATS Database: A Survey of Current and Potential Users, Hampshire Research Associates, Inc., September 1992.

is responsible for establishing an efficient and effective system within the agency to disseminate TSCA data, and a systematized retrieval capability for other agencies. As discussed in this report, external users request copies of TSCA studies directly from OPPT and have experienced difficulties obtaining these studies in a timely manner.

Conclusions

Users of TSCA data outside of OPPT often do not attempt to obtain these data because of difficulties identifying and obtaining it. Moreover, the interagency committee established under TSCA to assist in the design, establishment, and coordination of a system to disseminate TSCA data to external users has not met for over 10 years. Clearly, action is needed to improve external users' access to TSCA data, first through a clear definition of these users' needs, and second, through system improvements to meet these needs.

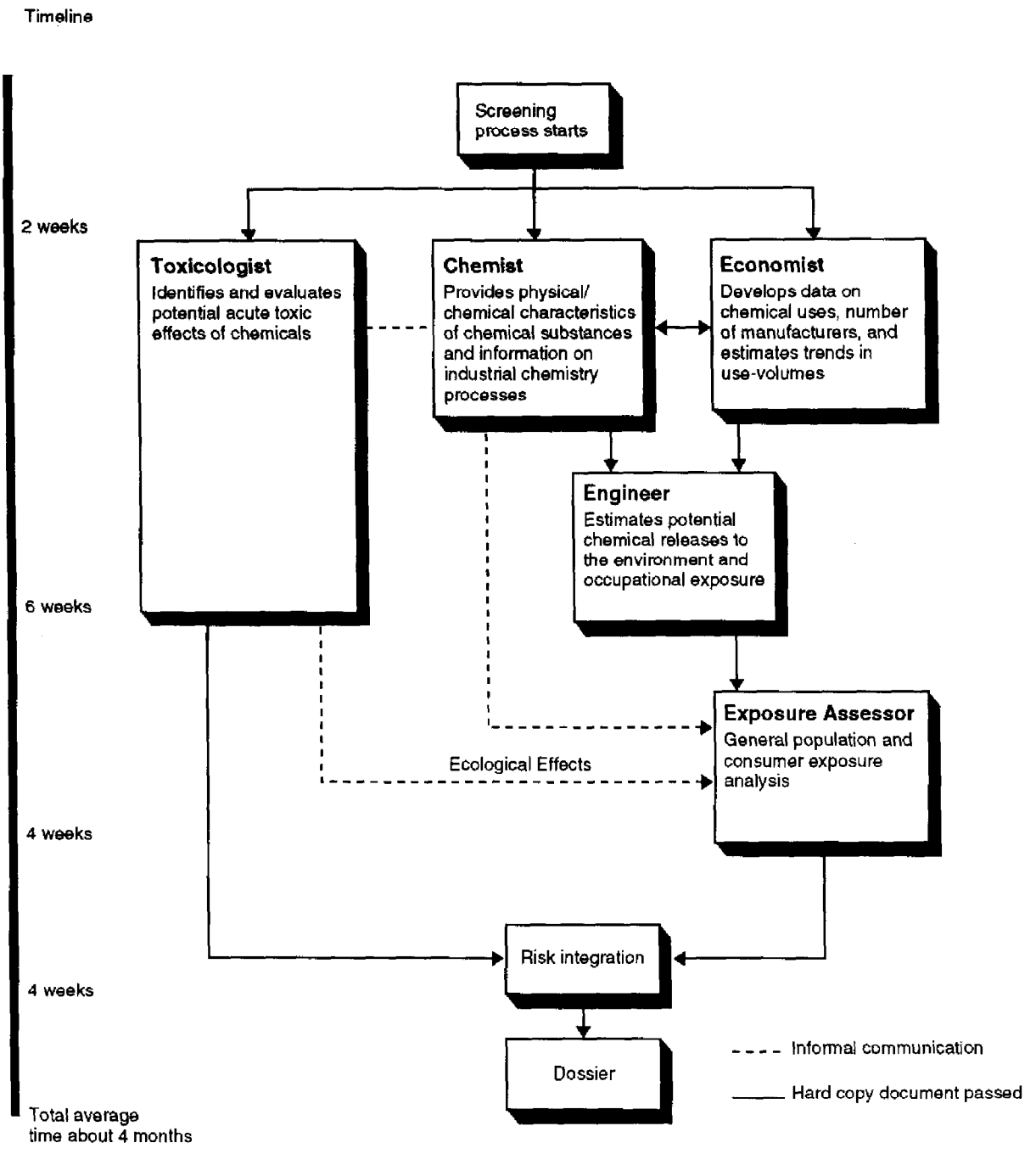
To its credit, OPPT leadership is considering ways to improve external users' access to TSCA data, and is developing an IRM plan that may include expansion of abstracting and improvements in indexing of TSCA studies. However, the specific activities remain uncertain and are not being considered in the interagency forum specified under the act. Without the benefit of the interagency committee's direction, insights, and support, the likelihood of OPPT meeting its dissemination responsibilities under TSCA is diminished. Until it reconvenes this committee, OPPT's plans and implementation activities will not have the benefit of its input concerning users' needs or assistance in establishing and coordinating an improved dissemination system. Moreover, as discussed in chapter 2, OPPT's IRM plan may not include developing a systems architecture needed to avoid developing incompatible systems and further impeding efficient retrieval of TSCA data.

Recommendations

To assist OPPT in its efforts to provide efficient and effective dissemination of TSCA data as required by the act, we recommend that the Administrator of EPA

- reconvene the interagency committee established under TSCA as an active body responsible for defining external users' functional and information needs;
- direct the Assistant Administrator for the Office of Prevention, Pesticides, and Toxic Substances to incorporate the committee's findings in OPPT's IRM plan and target architecture.

Functional Diagram of the Initial Chemical Review Process (RM1)



Function of EPA Offices and Federal Agencies Contacted for This Review and Their Access to and Use of TSCA Studies

Organization		Function	Access to and use of TSCA studies
Occupational Safety and Health Administration (OSHA)	Health Standards Program	Assesses health risks of chemicals found in the workplace and develops standards for regulating them under the Occupational Safety and Health Act.	Regularly obtains TSCA health and safety studies from OPPT staff. Studies used in risk assessments.
	Office of Regulatory Analysis	Assesses regulatory impacts of OSHA's standards, such as permissible exposure limits under the Occupational Safety and Health Act.	Attempted and failed on several occasions in the past to obtain TSCA studies from OPPT. TSCA studies recently provided by OPPT staff found very useful. Needs summary of study results.
	Office of Field Programs[a]	Plans and coordinates worksite inspections for compliance with OSHA's standards; responds to worker complaints; and responds to accidents, deaths, and other worker catastrophes.	Never attempted to use TSCA studies because lacks resources needed to search for and access TSCA studies. Needs summary of study results.
National Institute for Occupational Safety and Health		Conducts research for the prevention of occupational illness and injury. Provides workplace health and safety recommendations to the Department of Labor.	Regularly searches for and obtains TSCA studies through OPPT's database, TSCATS, and OPPT staff. Studies used for chemical screening and risk assessment.
Food and Drug Administration/ Center for Food Safety and Applied Nutrition	**Contaminants Standards and Monitoring Branch**[a]	Assesses human health effects of chemicals that accidentally get into the food supply.	Attempted and failed on one occasion to obtain TSCA studies from OPPT. Lacks time and resources for searching TSCA studies.
	Health Effects and Evaluation Division	Assesses safety of chemicals for human consumption.	Obtains TSCA health and safety studies through TSCATS and Interagency Testing Committee databases. Studies used for chemical screening.
Agency for Toxic Substances and Disease Registry	Division of Toxicology	Develops toxicological profiles for chemicals found in Superfund sites.	Contractor regularly searches for and retrieves TSCA health and safety studies. Studies used in toxicological profiles and risk assessments.
	Division of Health Assessment and Consultation[a]	Evaluates health impacts of releases of chemicals found in Superfund sites.	Does not rely on OPPT TSCA studies because they are not readily accessible.
National Toxicology Program of the Department of Health and Human Services		Researches human health risks posed by chemical substances in support of various federal agencies within the Department of Health and Human Services.	Goes through a cumbersome and time-consuming process to search for and obtain TSCA studies. Studies used in planning program's research activities.
National Library of Medicine		Provides public access to chemical information through its Toxicology Data Network under the Public Health Services of the Department of Health and Human Services.	Has an interagency agreement with EPA to provide public access to TSCATS database to other federal agencies and the public through its network.
EPA/Office of Water	Human Risk Assessment Branch	Assesses human health risks posed by water pollutants under the Clean Water Act and Safe Drinking Water Act.	Regularly obtains TSCA health and safety studies from OPPT staff. Studies used in chemical screening and risk assessments.

(continued)

Organization		Function	Access to and use of TSCA studies
	Drinking Water Standards Division	Develops drinking water standards, focusing on 83 chemicals identified by the Safe Drinking Water Act.	TSCA data not useful in its current format.
	Engineering and Analysis Division	Assesses water pollutant treatment options and potential water pollutant substitutes for 480 water pollutants, including 126 chemicals identified by the Clean Water Act of 1986.	TSCA data not useful to this division's risk assessments.
	Standards and Applied Sciences Division	Produces environmental risk analyses of water pollutants.	TSCA data not useful to this division's risk assessment.
EPA/Office of Air and Radiation	Office of Radiation and Indoor Air Programs/Indoor Air Division	Coordinates indoor air activities of EPA program offices and information from other federal agencies, assists in setting research agendas, formulates indoor air policy, and develops and disseminates information on indoor air quality to the general public and key audiences.	Limited use of TSCA studies as obtained from OPPT staff because of TSCA focus on individual chemicals. This office needs information on effects of chemical mixtures.
	Office of Air Quality Planning and Standards/Pollutant Assessment Branch	Provides analysis of human health effects and exposure, develops and implements activities described in Title III of the Clean Air Act Amendments of 1990, and provides support and guidance to state and local air toxics agencies.	Obtains TSCA studies from OPPT staff. Studies are used to aid in health effects assessments and to help in the prioritization of hazardous air pollutants for health effects testing and research.
EPA/Office of Solid Waste and Emergency Response	Office of Solid Waste/ Characterization and Assessment Division	Assesses and manages risks posed by hazardous or potentially waste constituents.	Contractor regularly searches for and retrieves TSCA health and safety studies. Studies used in risk assessments.
	Office of Emergency and Remedial Response/Hazardous Site Evaluation Division	Assesses and manages risks posed by chemicals found in Superfund sites. Provides guidance and risk assessment tools to EPA project managers and risk assessors in Superfund sites.	Does not access TSCA studies. Chemical information and risk assessments provided by EPA's Office of Research and Development.

[a]Organization has time-critical (less than 2 weeks) need for TSCA data.

Systems and Databases OPPT Uses for Screening and Review of Existing Chemicals

System	Description	Hardware/ Software
Chemistry		
Biolstein	Used to reference chemical and physical properties of chemicals such as boiling points, melting points, etc.	Hard copy
CAS ONLINE	Used to retrieve chemical structures, names, and references to or full-text articles on chemistry, toxicology, and biology	On-line access through the Chemical Abstracts Service
TSCA Inventory	Used to reference all chemicals that have been reported under TSCA since the act's enactment in 1976. Inventory is updated continually as new chemicals are added to the inventory	On-line access from an EPA mainframe
ChemBase Files	OPPT retains files on its ChemBase system to store names, physical properties, and structures of chemicals	PC/ChemBase Disk Operating System (DOS)
Economics		
CAS ONLINE	Used to retrieve chemical names and structures	On-line access through the Chemical Abstracts Service
Chemical Economics Handbook	Used to reference information on chemical uses, benefits, market trends, prices, production volumes, and substitutes	Hard copy
PIP	Used to store chemical use data and data on chemical substitutes	PC/DBase III DOS
Synthetic Organic Chemicals	Used to reference information on chemical production volumes, imports, manufacturers, and prices	Hard copy
Specialty Chemicals	Used to reference information on chemical production volumes, imports, manufacturers, uses, substitutes, and market trends	Hard copy/On-line access to mainframe
Chemical Buyers Guides	Used to reference information on producers, uses, and substitutes	Hard copy
DIALOG	Used to retrieve biological and toxicological data, newspaper articles, trade journal articles, economic data, and financial profiles	On-line access through Dialog Information Services
Engineering		
Census of Manufacturers	Data on numbers of workers and facilities with breakdowns by state	Hard copy
Chemical Protective Equipment	Information on the chemical resistance of various types of personal protective equipment	Hard copy and PC/LOTUS
Industrial Hygiene Monitoring Data	OPPT-generated database of literature on industrial hygiene monitoring	PC/LOTUS DOS

(continued)

System	Description	Hardware/ Software
National Air Toxics Information Clearinghouse	Contains data on air permits, releases, and estimation techniques	On-line access for current data and PC/FOX PRO
National Occupational Exposure Survey	Data from 1982 survey of 4,500 facilities and 20,000 chemicals extrapolated across Standard Industrial Codes (SIC)	PC/FOX PRO DOS
OSHA Computerized Information System	Contains occupational monitoring data and material safety data sheets	On-line access from OSHA mainframe
SARA Section 313 Production and Use	OPPT-generated database containing information on production and use of Toxic Release Inventory chemicals	PC/FOX PRO DOS
Toxic Chemical Release Inventory	Data on chemical releases, sites, SIC codes, pollution prevention information for about 300 Toxic Release Inventory chemicals	On-line access from the National Institute of Health or PC/FOX PRO
TSCA Inventory Update	Data on facilities and production volumes for about 70,000 chemicals	Hardcopy for Confidential Business Information (CBI) and on-line access from EPA mainframe for non-CBI
Exposure		
DERMAL	Used to estimate exposure to products likely to contact skin and calculates potential annual exposure dose	PC/Turbo C + + DOS
SCIES	Used to estimate exposure to products from inhalation and to calculate average and peak indoor air concentrations	PC/Turbo Pascal DOS
FLUSH	Used to estimate exposure resulting from disposal of household products	PC/Turbo C + + DOS
TRIWATER Database Model	Used to estimate dissolved chemical concentrations in stream reaches from point sources	Access through an EPA minicomputer/VMS
PDM 3.1	Used to estimate probability of exceeding a concern concentration for average and worst case scenarios	PC/Turbo Pascal Version 6 DOS
REACHSCAN	Used to estimate downriver exposure and possible impact on drinking water supplies	PC/Turbo C + + DOS
TRIAIR Database Model	Used to estimate Toxic Release Inventory data and employs atmospheric modeling programs	Access through an EPA minicomputer/VMS
Lotus Water Worksheet	Used to account for stream dilution in estimating exposure from surface water releases, and used to calculate surface water concentrations and potential dose rates from drinking water and fish ingestion	PC/ LOTUS DOS

(continued)

System	Description	Hardware/ Software
POINT PLUME	Used to estimate the maximum short-term atmospheric concentration value, frequency of concentration, and location from a single source	Access through an EPA minicomputer/VMS and PC access through PC/GEMS DOS
Toxicology		
METAB2	Contains data for compounds having metabolism references	PC/ChemBase DOS
Gastrointestinal Absorption	Data on compounds having gastrointestinal tract absorption references	PC/ChemBase DOS
Promoter Carcinogen Interaction	Data on carcinogens	PC/DBase III DOS
SARA 110 Listing	Contains prioritized substances found at Superfund sites	PC/LOTUS DOS
Binary Carcinogen Interaction	Contains combination effects of chemical carcinogens	PC/DBase III DOS
Aromatic Amine/Dye	Contains health effect and ecological toxicity data linked to aromatic amine dyes	PC/ChemBase DOS
Analog Database	Contains information on chemical analogs	PC/DBase III DOS
Acrylates	Contains health effects on acrylates and acrylamide	PC/DBase III DOS
ASSAYCOD	Contains assay codes for mutagenicity tests	PC/DBase III DOS
CALL/CALLCBI	Contains data on mutagenicity testing results and chemical review results	PC/DBase III DOS
GTOX	Contains data on genetic toxicology	On-line access through the National Library of Medicine
Q1STAR	Contains carcinogens with slope factors calculating cancer risks	PC/DBase III DOS
Arodye	Contains common names for aromatic amine dyes	PC/DBase III DOS
Neurotox	Contains neurotoxicity data	PC/DBase III DOS
AVITOX/MAMTOX	Avian and mammalian toxicology data	PC/Dbase III DOS
JF1	Contains data on fish toxicity	PC/DBase III DOS
RATORAL	Contains data from rat studies	PC/DBase III DOS
CREB File	Contains pointers to reference materials on chemicals reviewed by the Health and Environmental Review Division	PC/DBase III DOS
DART	Bibliographic database on reproductive toxicity	On-line access through the National Library of Medicine

(continued)

System	Description	Hardware/ Software
Developmental Toxicity	Contains data on developmental and reproductive toxicity	PC/ChemBase DOS
Expert Cancer System	Expert system used to determine the carcinogenic potential of an untested chemical	PC/ DOS
ACQUIRE	Contains data on aquatic toxicity	PC/ DOS
8(e)/FYI Database	Database of 8(e) and FYI health and safety study submissions. Database is searchable by substructures and effects	PC/ChemBase DOS

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Related GAO Products

Environmental Protection: EPA's Plans to Improve Long-standing Information Resources Management Problems (GAO/AIMD-93-8, Sept. 16, 1993)

Strategic Information Planning: Framework for Designing and Developing System Architectures (GAO/IMTEC-92-51, June 1992)

Advantages of and Barriers to Reducing the Use of Toxic Chemicals (GAO/RCED-92-212, June 17,1992)

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Toxic Substances: Effectiveness of Unreasonable Risk Standards Unclear (GAO/RCED-90-189, July 20, 1990)

Toxic Substances: EPA's Chemical Testing Program Has Made Little Progress (GAO/RCED-90-112, Apr. 25, 1990)

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