⌭EPA

NEW DIRECTIONS

A REPORT ON REGULATORY REINVENTION

Reinventing Environmental Information: Making Data Resources Work for Better Environmental Results

Introducing REI

Earlier this year, Administrator Carol Browner publicly announced an EPA action plan for a broad initiative called Reinventing Environmental Information (REI), launched by the Agency in response to information and database management needs identified by EPA, its regulatory partners, and stakeholders. The REI Action Plan is a "living document" that commits EPA to meeting a series of highly specific 3- to 5-year goals. The Agency developed the plan with assistance from stakeholder groups including the Council of the Common Sense Initiative (CSI), EPA's program for exploring industry sector-based approaches to environmental protection.

But what does it mean to "reinvent" environmental information—which sounds like a formidable undertaking—with a time horizon of 5 years?

What REI has targeted for reform is not the universe of environmental information as such, but certain "disconnects" between existing data systems and the information needs of our evolving environmental protection system. It is useful to think of these disconnects as incomplete transitions between *then* and *now,* where *then* harks back to the infancy of our environmental protection system in the 1970s. *Then* was a time of fledgling information technology and a single-media policy focus tied to the sequence of single-media statutes enacted in those early years. *Now,* by contrast, is a time of rapidly advancing information technology

capabilities and increasing emphasis on cross-media environmental issues, a time when community-based environmental protection (CBEP) and sector-based approaches to environmental problems require increasingly sophisticated aggregations of data.

As scientists and policymakers inside and outside EPA have publicly stated, sound scientific information has become increasingly critical for developing workable solutions to today's highly complex environmental problems. Tomorrow's environmental issues will be no less complex—probably more so. To succeed in meeting these challenges, EPA believes the United States needs what a prominent stakeholder group called, in a recent report, "an information-rich environmental protection system" (see page 3). In other words, we need a system that takes full advantage of information management technology, readily meets the needs of decision-makers for integrated, cross-media configurations of data, and also meets outside stakeholders' needs for easily accessible, understandable environmental information. REI is about fundamental, strategic database management reforms that will provide the foundation for meeting a wide range of environmental information needs in the 21st century. It is a collaborative initiative predicated on effective working partnerships between EPA and its counterpart state agencies.

inside

REINVENTION

Environmental Reporting—
Required by Law

A Bounty of Data Collected...

EPA and its state partners presently collect a wealth of environmental data under various statutory and regulatory authorities. Examples include reports on air emissions under the Clean Air Act, on wastewater discharges into waterways under the Clean Water Act, and on pollutant levels in drinking water supplies under the Safe Drinking Water Act. The Resource Conservation and

Recovery Act requires that records be kept on the transport and storage of hazardous waste, and administration of the Superfund law entails gathering many kinds of data including details concerning site assessments and remediation actions. Under the Federal Insecticide, Fungicide, and Rodenticide Act and the Toxic Substances Control Act, manufacturers must provide extensive data on the toxicity and uses of pesticides and other chemicals. These and other data are routinely collected to help ensure that environmental laws are properly observed. The result is a rich assortment of diverse and vastly detailed data, garnered under different environmental programs, stored in different databases, and tailored to different uses.

But an Outmoded Data System...

The existing environmental data management system, which continues to rely heavily on paper-based reporting, is outmoded in a number of ways. As a legacy of preceding decades, the system is made up of many separately designed databases that generally are not technically compatible with each other. As such, the overall system is out of step with recent advances in information technology such as Geographic Information Systems that allow integration of data from multiple systems.

The Internet, another significant advance in information technology, has made powerful new tools available to EPA, its partners at state and local levels,

and anyone with access to a computer. In just a few years, the Internet has become a widely used device for providing stakeholders with access to environmental data and information, and the public has come to expect the efficiency of advanced computer technology. Particularly since the advent of the Toxic Release Inventory, or TRI (see inset box on opposite page), the public has become increasingly knowledgeable about environmental information as a resource that can help them safeguard their neighborhoods and communities. Conversely, the success of community-based, sector-based, and other partnership-based approaches to environmental protection depends in no small measure on timely access to multi-media, place-based, and sector-based configurations of environmental data.

Needed: Data Standards and a Common Network For Sharing Information...

EPA recognizes that transforming environmental data into easily accessible and meaningful forms is one of the most important steps it can take to strengthen environmental decision-making, assess the effectiveness of its own environmental protection strategies, and get the best possible environmental results for the least possible cost. This recognition lies behind the steps EPA is taking to reinvent the way it collects, manages, and shares environmental data. Through REI, EPA committed to the following four reforms, seen as building blocks for continued improvements in information management:

- Standardize basic data elements (i.e., adopt common "data standards") to allow the aggregation of data from different databases around places, chemicals, sectors, and environmental conditions—starting with six high-priority data standards (see box on page 5).

- Provide universal access to electronic reporting of environmental data as a means of improving data management and access.
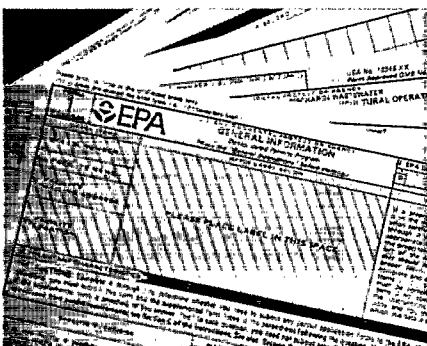
An Outside View

In a January 1998 report entitled *The Environmental Protection System in Transition: Toward a More Desirable Future,* the broad-based, bipartisan group of environmental, business, and government leaders known as Enterprise for the Environment (E4E) put forward their vision for a future system summarized as "performance-based, information-rich, flexible, accountable, and open and transparent to stakeholders." Based on consensus reached during 2 years of deliberations led by former EPA Administrator William D. Ruckelshaus, E4E participants recommended a "stepping stone" approach toward an improved environmental regulatory system—an incremental, step-by-step process involving experimentation, adaptation, and evolutionary change, rather than sudden, drastic alterations to the system that exists today. The principles embodied in the E4E report closely relate to EPA's reinvention approach of testing and evaluating new ideas before adopting changes systematically.

One of E4E's recommendations, consistent with REI, is for the federal government to undertake a well-funded, multi agency, multi year initiative to improve the quality, collection, management, and accessibility of environmental information. E4E points out that such an initiative should reflect input from all appropriate stakeholders and should achieve goals including improved efficiency and integration of information collection systems.

E4E also makes recommendations concerning the design of new, information-based public policy tools. Noting that EPA's Toxic Release Inventory (TRI) has demonstrated how information disclosure can directly affect corporate efforts to reduce emissions, the E4E report states, "The challenge for the future is to take the lessons learned from TRI and similar efforts to further develop ways in which information disclosure can drive the behavior of regulated entities in a cost-effective and flexible manner. Information disclosure is viewed as an essential element of the improved environmental protection system because it provides incentives for continuous improvement in environmental performance that are not provided by more traditional regulatory approaches."

Introducing Community Right-to-Know—

Environmental Data Goes Public After 1986 Law

When Congress passed the Emergency Planning and Community Right-to-Know Act of 1986, the stage was set for the transformation of environmental data into a powerful tool for public participation in community planning and environmental decision-making. The law requires industries to develop contingency plans for chemical emergencies and to notify their states and communities concerning the presence, routine emissions, and any accidental releases of hazardous chemicals. As mandated by this law, EPA created the Toxic Release Inventory (TRI) to handle an annual influx of industry reports and make them publicly available.

When the TRI database became fully operational in 1989, it added new dimensions to environmental reporting. TRI data covers chemical releases to air, water, and land, so it is multimedia in configuration. What's more, TRI changed the rules of the game by making environmental data reports available simultaneously to EPA and to the public. In addition to paper copy and microfiche options, citizens with access to a computer could connect electronically to the TRI database and gain access as new information was submitted.

In the decade since passage of the first federal community right-to-know statute, citizens and other stakeholders have taken advantage of TRI and other data sources and become knowledgeable "secondary" users of environmental information. In the process, they have become more sophisticated concerning applications, and potential applications, of environmental databases in local and regional planning and decision-making. Consequently, the "secondary" uses of environmental information by stakeholders have become just as important as the originally intended uses.

- Incorporate these improvements into EPA's own national environmental databases, enabling data aggregation from different media in useful ways—starting with 13 national systems (see table on page 5).
- Work in partnership with states, through the Agency's "One-Stop" program (see page 6), to integrate EPA and state data systems around common data standards.

These four reform areas reflect and build upon knowledge gained and progress made recently in information management inside and outside EPA. In particular, they reflect lessons learned through pilot projects in partnerships with states as well as other reinvention efforts such as CSI. (See boxes on "Sector-Based Approaches to Data Reform," and on "Pathfinding Innovations in Washington State.")

Projected Timeframe for Delivery

Through REI, EPA committed, in partnership with the states, to implement core data standards and make electronic reporting available in the Agency's major national systems within 5 years, starting with critical compliance systems (see table on page 5). To meet this deadline, it will be necessary for EPA to promulgate the necessary data standards, policies, and protocols within 3 years. As each new standard for data elements and electronic reporting becomes ready for implementation, it will be incorporated into national database systems within 2 years.

To keep progress on track, EPA set a series of milestones for data standards and for electronic reporting. Key milestones for data standards include:

- Promulgate interim standards for six priority data standards.
- Develop business rules and processes for implementing the standards and promulgating final standards.
- Establish a central Agency program to support implementation of the standards by EPA and the states.
- Implement data standards and business practices in national systems and accept new data in the standard format from all participating states.

The electronic reporting milestones include the following:
- Complete current electronic reporting pilots.
- Complete electronic data interchange standards development.
- Draft an Electronic Data Interchange and Electronic Commerce policy for delegated states.
- Publish a final policy for electronic environmental reporting.
- Make at least one electronic reporting method available in all national systems.
- Require all national systems to use the Agency electronic reporting standard.

Benefits of REI

By setting the Agency and its partners on a course of achievable goals and milestones, REI lays down building blocks that will be the foundation for a seamless environmental information system in the future. In the near term—within 5 years—REI will provide a number of benefits, including:
- Easier comparisons of data across different EPA databases, because common data standards will reduce confusion stemming from multiple methods of representing the same information in different data systems.
- Less regulatory burden, because universal, voluntary access to electronic reporting will cut paper work and eliminate duplicative compliance reports to satisfy separate but related environmental regulations.
- Better data quality, because electronic reporting will reduce the errors that can occur when data is entered repetitiously into separate data systems, with fewer time delays and costs from such errors as well.
- Enhanced value of information for customers, because common data standards and electronic reporting will increase the capability to aggregate data across databases in useful ways.

- Stronger, more effective regulatory partnerships with states and localities, based on data sharing.
- Improved ability to track and report on environmental performance as required by the 1997 Government Performance and Results Act.

Complementary Actions

While REI lays out the basic building blocks for building an improved environmental information network, it does not address each and every information reform need. Additional reforms will continue at the federal and State level. More than 50 specific projects involving joint collaboration are currently underway (see pie chart below). These projects involve:
- **Streamlining** to consolidate data requirements.
- **Data transmission** to support electronic reporting.
- **Reengineering** to modernize systems.
- **Developing information requirements** to better address priority issues (especially to reinforce pollution prevention objectives).
- **Improving public access** to provide citizens with better environmental information.
- **Reducing burden** to eliminate unnecessary requirements that divert attention away from higher priorities.
- **Monitoring** to support more strategic and efficient data collection.

Recognizing the need to ensure better coordination and cooperation, in
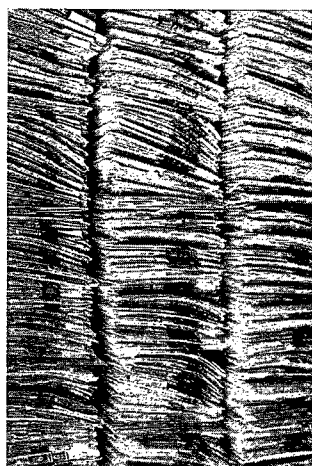
Current State/EPA Information Reform Projects*

Monitoring 2%
Burden Reduction 8%
Public Access 12%
Information Requirements 14%
Streamlining 42%
Reengineering 24%
Data Transmission 30%
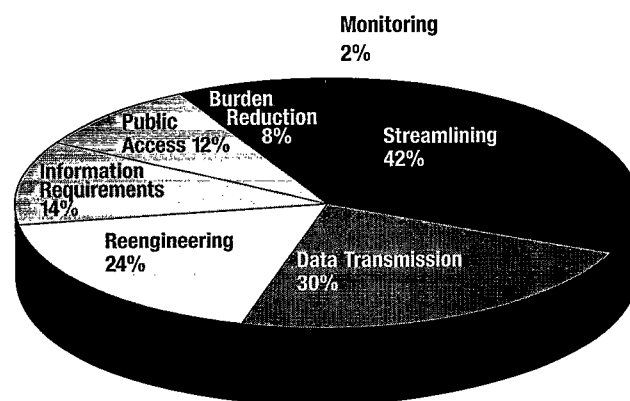
*Some projects target more than one reform objective.

What's Wrong Today?

Lots of information is collected, but not in a form that is readily accessible or understandable

Historical Data:
Lag between time data is collected and reported to regulatory agencies delays analysis and reporting. Information is always available "after the fact."

Paper-based transmission:
Repetitious entries at each level (i.e., facilities, regulatory agencies) are time and resource intensive and more prone to error.

Analytical limitations:
Media-specific databases and lack of common data standards make it difficult to conduct comprehensive (i.e., multi-media) environmental assessments.

What's the Vision For the Future?

A seamless, integrated system for all users

Local/State Government

Industry

EPA

The Public
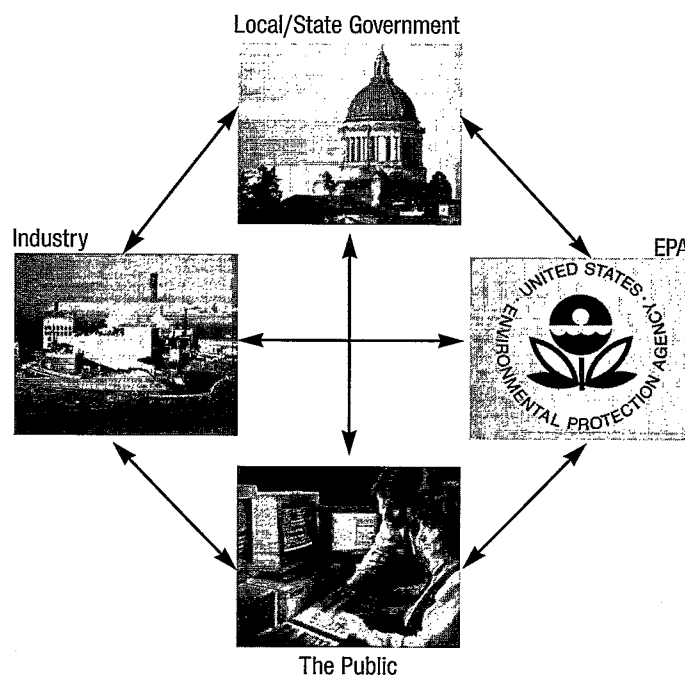
Real-time data:
All parties have ability to check and act upon latest environmental performance data.

Electronic transmission:
Single entry improves data quality and frees up resources for more productive use.

Integrated:
Multi-media analytical capabilities allow users to assess overall environmental impacts and support local planning, regulatory decision making, and community right-to-know objectives.
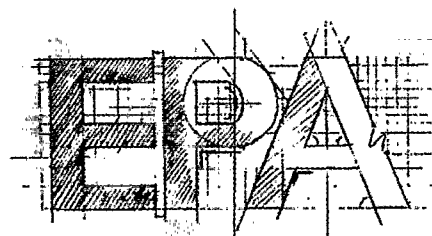
FOR MORE INFORMATION

about EPA's information reform activities or about reinvention activities in general, contact EPA's Office of Reinvention at **202 260-1849.** Or look for more information on the Internet at **<www.epa.gov/reinvent>**. You'll find special reports, remarks from senior Administration and Agency officials, detailed fact sheets, and much more.

January 1998, EPA and States (working through their national organization, the Environmental Council of the States) established a joint Information Management Work Group to guide reform efforts in the future. The group developed a joint vision on goals for improving the collection, management, and use of environmental data, and a set of operating principles that will guide how and where reform efforts are focused — both of which are consistent with the REI vision.

Continuing Challenges

In addition to the technical database management problems being solved through REI and the collaborative State projects described above, EPA and external stakeholders have identified several broader information management challenges that require further work and

> "Universal, voluntary access to electronic reporting will cut paper work and eliminate duplicative compliance reports to satisfy separate but related environmental regulations."

close collaboration between EPA and states. These ongoing challenges include:

- Identifying and filling data gaps in the Agency's information holdings, particularly in light of new directions in environmental protection, such as CBEP—which requires holistic, cross-media assessments of ecosystems and other communities—and the pragmatic need to measure success toward achieving environmental goals.

- Reducing the reporting burden on regulated entities by identifying redundant or unnecessary reporting requirements, while still ensuring that data needs for protecting public health and the environment are filled.

- Establishing a clear process for ongoing stakeholder involvement in critical information management issues.

- Working with Congress and stakeholders to identify and remedy statutory and regulatory barriers to EPA's ongoing efforts to streamline environmental reporting requirements and standardize data across all environmental databases.

By continuing to focus on these challenges while working closely with states and by following through on REI's strategic reforms, EPA can help bring about a much more efficient, powerful system for managing environmental data in the information age.

REI Priorities

Reengineering National Environmental Databases

Clear Water Act	Water Permit Compliance System	PCS
	Water Quality Information System	STORET
Safe Drinking Water Act	Safe Drinking Water Information System	SDWIS
Clear Air Act (CAA)	Aerometric Information Retrieval System (AIRS)	
	—Air Quality Subsystem	AIRS/AQS
	—AIRS Facility Subsystem	AIRS/AES
	CAA 112(r)Risk Management Plan Information System	RMP*Info
Resource Conservation and Recovery Act (RCRA)	RCRA Information System	RCRIS
	Biennial Reporting System	BRS
Federal Insecticide, Fungicide, and Rodenticide Act	National Compliance Database	NCDB
Comprehensive Environmental Response,Compensation, and Liability Act (CERCLA)	CERCLA Information System	CERCLIS
Emergency Response and Community Right-to-Know Act	Toxic Release Inventory System	TRIS
Multi-Media	Office of Enforcement and Compliance Assurance Docket	DOCKET
	Envirofacts Data Warehouse	EF

Establishing Environmental Data Standards

Year 2000 Date: Consistent numeric representation of calendar date to facilitate interchange of date data among information systems.

Facility Identification: Consistent terminology and format for identifying regulated entities such as factories and power plants in all databases.

Standard Industrial Classification Code and North American Industrial Classification System: Numerical coding systems established by the Office of Management and Budget and maintained by the Department of Commerce to classify businesses or industries by activity type.

Latitude/Longitude: Consistent format for identifying the location of regulated facilities.

Biological Taxonomy: Consistent terminology and format for identifying living things.

Chemical Identification: Consistent terminology and format for identifying chemicals.

1996 Grantees
1997 Grantees
1998 Grantees
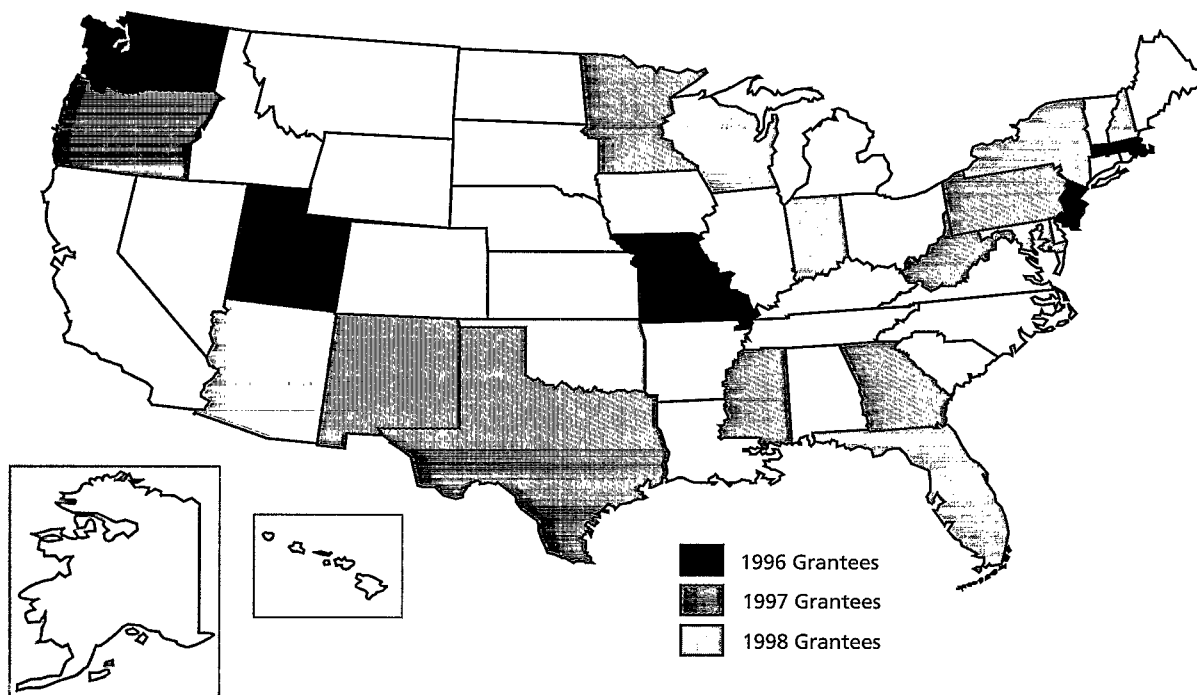
EPA's "One-Stop" State Partners

To help support state data reform projects, EPA provides funding in the form of demonstration grants through its One-Stop program. This program, named for the vision of a fully integrated, seamless system that allows reporting into a single, universally accessible database, is EPA's central program for collaboration on information reform projects with the States. To date, EPA has awarded One-Stop demonstration grants to 21 states. In 1996, grants were given to 5 states: Massachusetts, Missouri, New Jersey, Utah, and Washington (see below). In 1997, grants were awarded to another 8 states— Georgia, Minnesota, Mississippi, New Mexico, Oregon, Pennsylvania, Texas, and West Virginia. In 1998, grants were awarded to an additional 8 states: Arizona, Florida, Indiana, Maryland, Oklahoma, New Hampshire, New York, and Wisconsin.

As EPA Administrator Carol Browner has stated, "These grants demonstrate EPA's continued commitment to work with the states to develop common-sense, cost-effective national environmental policy. In addition to cutting reporting costs for industry and government, One-Stop reporting will facilitate the community right-to-know process by providing all citizens easy access to national, state, and local environmental information from their home computers."

Pathfinding Innovations in Washington State

The state of Washington, an EPA One-Stop grant recipient, believes that "information management efforts should be driven by the needs of users and that such efforts should both produce beneficial results in the short term and contribute to an overarching vision." To illustrate Washington's vision, the figure on page 7 shows how a One-Stop integrated system would help an environmental analyst working on a comprehensive management strategy for a particular watershed. Today, answering the series of questions posed (or any series of environmental questions) is often difficult and time-consuming. Based on a careful analysis of user needs, however, the state is developing new capabilities that allow ready access to cross-program information. In other words, these new capabilities will allow just the sort of integrated, multimedia application illustrated to be performed.

Washington is also working to reform environmental reporting from regulated facilities. One of its pilot projects developed software for electronic submission

of data on hazardous waste generators to replace a traditional paper-based system. Based on an existing software system developed by the U.S. 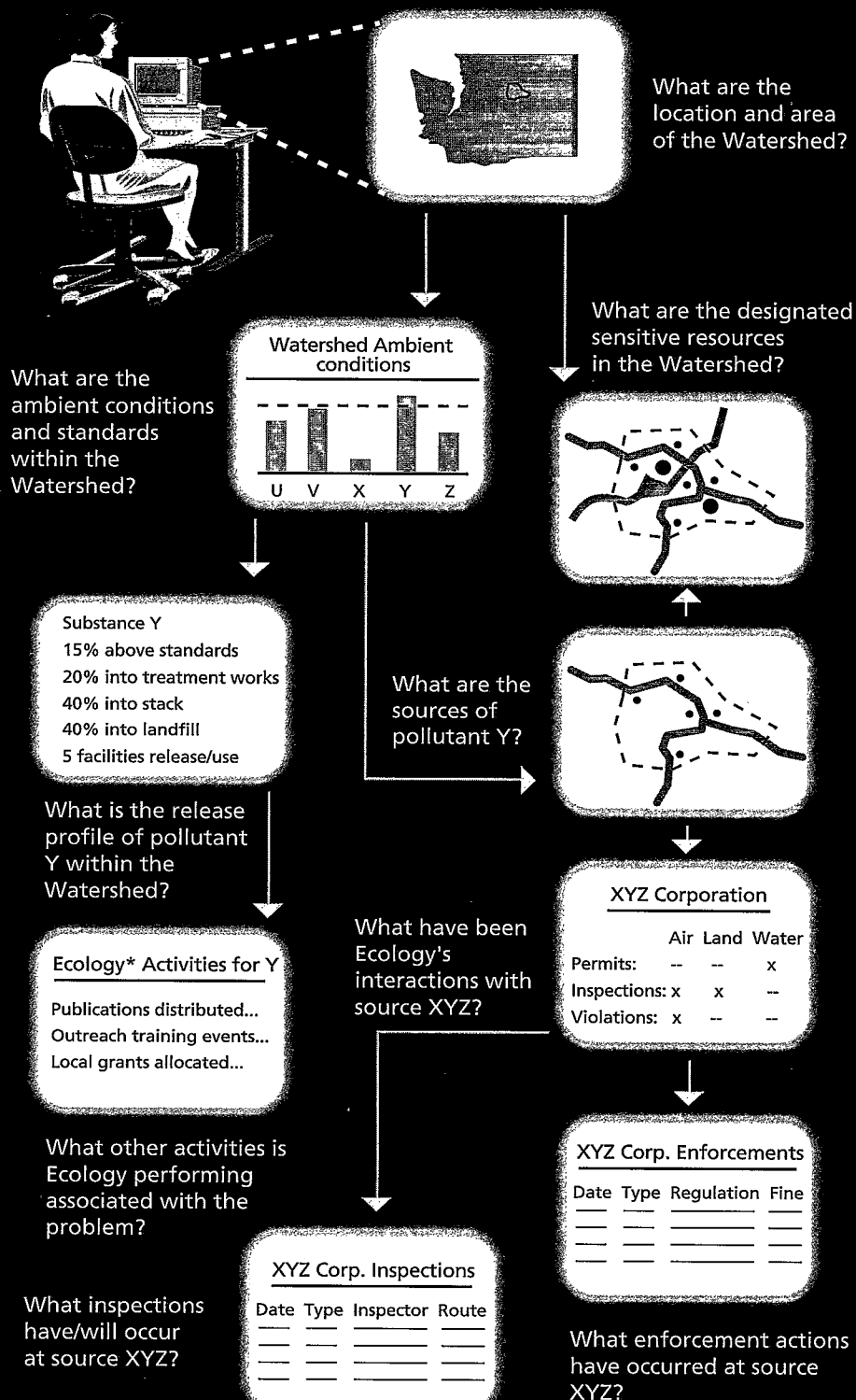Navy Bremeton Shipyard, Washington state developed a system that tracks, audits, formats, and electronically submits to the state all of the hazardous waste data required from facilities. Test runs by both large and small hazardous waste generators demonstrated significant improvements in data quality. Better data quality translates into less state investment in "data cleaning" and faster reporting to EPA. Feedback from software users indicates they are pleased by "getting it right" the first time and by finding the submission process made easier.

This application, known as the "Turbo-Waste" system, is now available over the Internet—at <www.wa.gov/ecology/hwtr/>. Ultimately, this software could be tailored to allow similar electronic submission capabilities for other regulated parties.
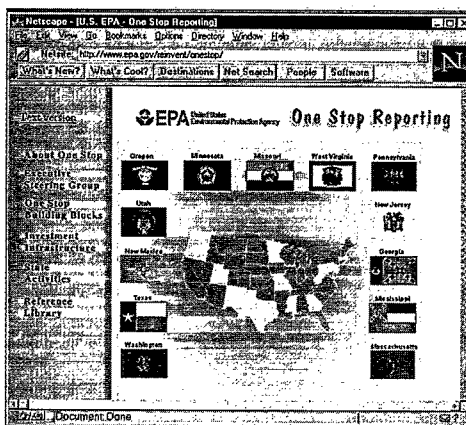
www.epa.gov/reinvent/onestop

Washington's One-Stop Vision:
A Powerful Tool for Watershed Management

What are the location and area of the Watershed?

What are the ambient conditions and standards within the Watershed?

Watershed Ambient conditions

U V X Y Z

What are the designated sensitive resources in the Watershed?

Substance Y
15% above standards
20% into treatment works
40% into stack
40% into landfill
5 facilities release/use

What are the sources of pollutant Y?

What is the release profile of pollutant Y within the Watershed?

What have been Ecology's interactions with source XYZ?

Ecology* Activities for Y

Publications distributed...
Outreach training events...
Local grants allocated...

XYZ Corporation

	Air	Land	Water
Permits:	--	--	x
Inspections:	x	x	--
Violations:	x	--	--

What other activities is Ecology performing associated with the problem?

XYZ Corp. Enforcements

Date	Type	Regulation	Fine

What inspections have/will occur at source XYZ?

XYZ Corp. Inspections

Date	Type	Inspector	Route

What enforcement actions have occurred at source XYZ?

*Ecology = Washington State Department of Ecology

Sector-Based Approaches to Data Reform—
Common Sense Initiative Projects

Under the Common Sense Initiative (CSI), EPA's program for exploring industry sector-based approaches to environmental management, several industrial sectors are pursuing reporting and information reforms. Some examples include:

Computers and Electronics Sector: The Texas Natural Resources Conservation Commission and CSI members are building an extensive sector-specific database listing each applicable environmental rule or regulation that requires reporting or record-keeping. They found 655 individual data requirements applicable at the federal level and 331 applicable at the state level, although not every requirement applies to every company. The "Recordkeeping and Reporting Requirements Database," now available online at <www.pwbrc.org> (click on "What's New?"), clarifies which reports and records a facility must file and maintain. It also helps interested stakeholders learn what information is available on a company's environmental performance. The next steps are to design, pilot test, and make available a single reporting form to replace the 13 separate environmental reports currently being filed.

Iron and Steel Sector: Using a small iron and steel "mini-mill" as a pilot plant, this CSI sector is working with the Utah Department of Environmental Quality (DEQ) to design and test a format for electronically reporting multi-media data directly into the DEQ database. The streamlined reporting process is expected to reduce transaction costs for regulators and for facilities, to enhance cross-media examination of pollution prevention opportunities, and to advance the Utah DEQ's efforts to improve environmental data management and make environmental information more accessible to the public.

Oil and Gas Sector: With the help of the Marathon Oil refinery in Texas City, Texas, the petroleum refining sector was able to take an in-depth look at all applicable air reporting requirements and, with feedback from the surrounding community, to assess whether facilities' reports were understandable to citizens. The project identified and recommended modifications for duplicative or obsolete reporting requirements and for addressing community needs. The project provided a clear picture of the complexity of reporting requirements and the redundancy in information being gathered, such as name and address. With this data and the results of community meetings in hand, project participants will develop a new air emissions reporting system—first at a single petroleum facility, with the ultimate goal of expanding the system to include other facilities and other media.