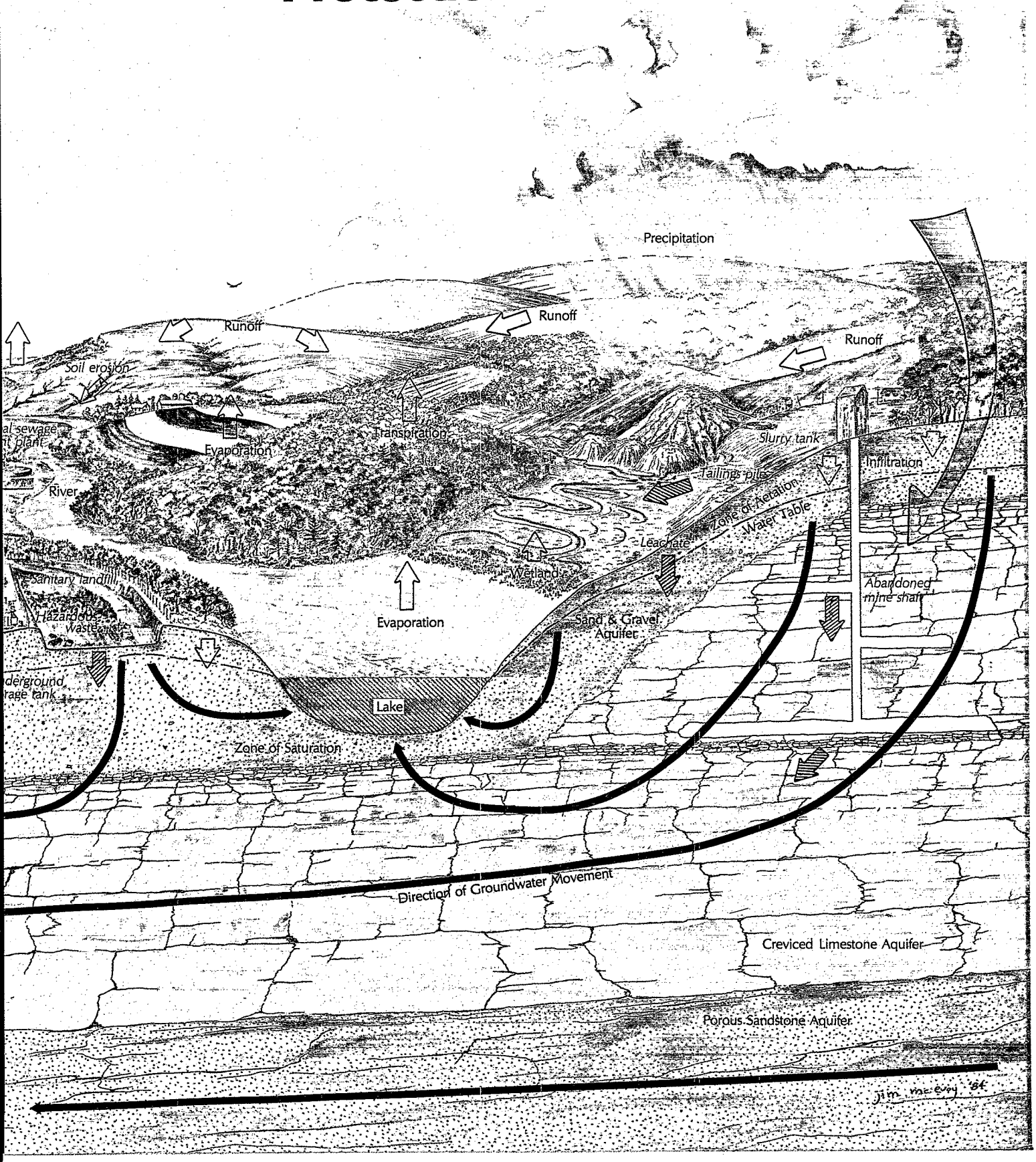
United States
Environmental Protection
Agency

Office Of Water
(WH-550G)

EPA 440/6-90-001
February 1990

EPA

Progress In Ground-Water Protection And Restoration



Progress in Ground-Water Protection and Restoration

Office of Water
Office of Ground-Water Protection
U.S. Environmental Protection Agency

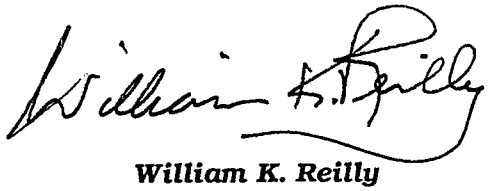
February 1990

ADMINISTRATOR'S PREFACE

The nation's ground water is a vitally important natural resource — as a source of drinking water for a major portion of our population, as a support system for sensitive ecosystems, and as a water supply source for industry and agriculture. Once contaminated, it is a resource that can pose substantial risks to human health, our economy, and our environment. And once contaminated it can prove enormously expensive to clean up.

Since issuing EPA's "Ground-Water Protection Strategy" in 1984, the Agency has made significant strides in the protection of ground-water resources, both in implementing our ground-water related statutory authorities and in developing new EPA initiatives and activities. States also have made great progress in developing their own ground-water protection strategies and wellhead protection programs.

Despite the progress already made in the protection and restoration of ground water, as documented in this report, much remains to be done -- especially with respect to preventing pollution of ground-water resources. On July 18, 1989, I formed a ground-water task force with the primary goal to develop a strategy for the direction EPA will take in ground-water protection. This strategy will incorporate recommendations and initiatives to ensure effective and consistent decision-making in all Agency actions affecting this resource, guide us as we deal with future ground-water issues, and assure that a clean and safe source of water will be available to all Americans and to the ecological systems on which we depend.



William K. Reilly

ACKNOWLEDGEMENTS

This document was prepared by the Office of Ground-Water Protection, Marian Mlay, Director, under the overall guidance of Ron Hoffer and Chuck Job. The project manager was John Simons. The document represents the combined input of a workgroup representing the Offices of Water; Solid Waste and Emergency Response; Air and Radiation; Pesticides and Toxic Substances; Research and Development; Policy, Planning and Evaluation; External Affairs; and EPA Regional Offices. The technical input and overall efforts of the workgroup members, which made it possible to complete this project and meet a tight schedule, are appreciated.

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CHAPTER 1: INTRODUCTION

Ground water was once widely thought to be virtually immune from contamination, and interest in ground water focused on the quantity of water that an aquifer yielded. In the late 1960s, synthetic organic chemicals were discovered in ground-water sources of drinking water in several states. Increasing discoveries of contaminated wells and environmental incidents in the 1970s reinforced the fact that ground water could be contaminated, and interest in ground water broadened to include the quality as well as the quantity of water available.

When William Ruckelshaus became U.S. Environmental Protection Agency (EPA) Administrator in 1984, he convened a task force to develop a ground-water strategy to clearly identify the difficult public policy issues concerning the protection of this nation's ground-water resources. This Ground-Water Protection Strategy, adopted in 1984, lays out approaches for achieving these four goals:

- Strengthen state ground-water programs;
- Cope with major, inadequately addressed ground-water problems;
- Create a policy framework for guiding EPA programs; and
- Strengthen internal EPA ground-water organization.

EPA has made significant progress in implementing these goals. This report provides an integrated presentation of what the EPA has accomplished in the protection and restoration of ground water since the issuance of the Strategy in August, 1984.

This chapter covers:

Chronology of Actions Taken to Protect Ground Water

EPA Organization to Enhance Ground-Water Protection

Organization of this Report

CHAPTER 1: INTRODUCTION

Chronology of Actions Taken to Protect Ground Water

As ground-water contamination problems received national attention, recognition of the need to protect this valuable resource increased. This need was reflected in the many laws passed by Congress and in other actions. For a perspective of legislation and events leading up to the present day, see the following chronological listing in Table 1.

Table 1

EVENT/KEY RESULTS

1972	1974	1976	1978	1980	1984
Clean Water Act (CWA)	**Safe Drinking Water Act (SDWA)**	**Resource Conservation and Recovery Act (RCRA)**	**Love Canal and Other Environmental Incidents**	**Comprehensive Environmental Response, Compensation and Liability Act (Superfund)**	**EPA Ground-Water Protection Strategy**
▪ Directed mainly to surface water quality ▪ Only indirect attention given to ground water	▪ Set standards for pollutants in public drinking water ▪ Regulated injection of wastes into wells ▪ Established Sole Source Aquifer Program	▪ Regulated hazardous waste disposal	▪ Showed vulnerability of ground water and heightened public concern	▪ Provided Federal program for cleanup of abandoned waste disposal sites and ground-water contamination	▪ Presented a consolidated statement of EPA ground-water policy and future activities
1984	**1986**	**1986**	**1987**	**1988**	**1989**
RCRA, Amended	**SDWA, Amended**	**Superfund Amendments and Reauthorization Act (SARA)**	**CWA, Amended**	**Federal Insecticide, Fungicide, & Rodenticide Act, Amended**	**Pollution Prevention Policy**
▪ Regulated underground storage tanks to control leaking	▪ Established Wellhead Protection Program and accelerated standard setting for public water supplies	▪ Established "Right-to-Know" laws on releases to environment	▪ Provided state grants for ground-water protection activities	▪ Streamlined re-registration of pesticides	▪ Established program to reduce or eliminate sources and volumes of pollution

CHAPTER 1: INTRODUCTION

EPA Organization for Ground-Water Protection

EPA's organizational structure for ground-water protection reflects the laws enacted by Congress. The offices described below have many functions outside the field of ground water; only their major ground-water related functions are highlighted here.

Office of Water

- Assists and evaluates Agency implementation of the Ground-Water Protection Strategy.
- Coordinates ground-water protection policy through the Office of Ground-Water Protection.
- Provides grants to states to develop ground-water protection strategies.
- Implements wellhead protection, sole source aquifer, and nonpoint source management programs.
- Sets overall Agency policy on ground-water data management.
- Addresses ground-water discharge to surface water in wetlands and marine and estuarine areas.
- Sets standards and implements the drinking water regulations affecting public water systems, including those using ground water as a source.
- Implements the Underground Injection Control (UIC) program.
- Sets standards for the land application and disposal of sewage sludge.
- Co-sponsors the National Survey of Pesticides in Drinking Water Wells.

Office of Solid Waste and Emergency Response

- Sets standards for the land disposal of hazardous wastes, including ground-water concentration limits for hazardous chemicals and ground-water monitoring requirements.
- Establishes requirements for identification and cleanup of active and abandoned hazardous waste sites.
- Implements a program to stop contamination resulting from leaking underground storage tanks.
- Takes enforcement action for ground-water related contamination.

Office of Pesticides and Toxic Substances

- Determines whether, and under what conditions, pesticides may be sold, and regulates their use and disposal, including potential effect on ground water.
- Sets standards for the use and disposal of toxic substances, including steps to protect ground water.
- Takes enforcement actions as required.
- Co-sponsors the National Survey of Pesticides in Drinking Water Wells.

Office of Air and Radiation

- Sets standards for radiation levels in ground water at sites of radioactive waste disposal and cleanup.

Office of Research and Development

- Guides and funds research in ground-water restoration and protection.

Office of Policy, Planning and Evaluation

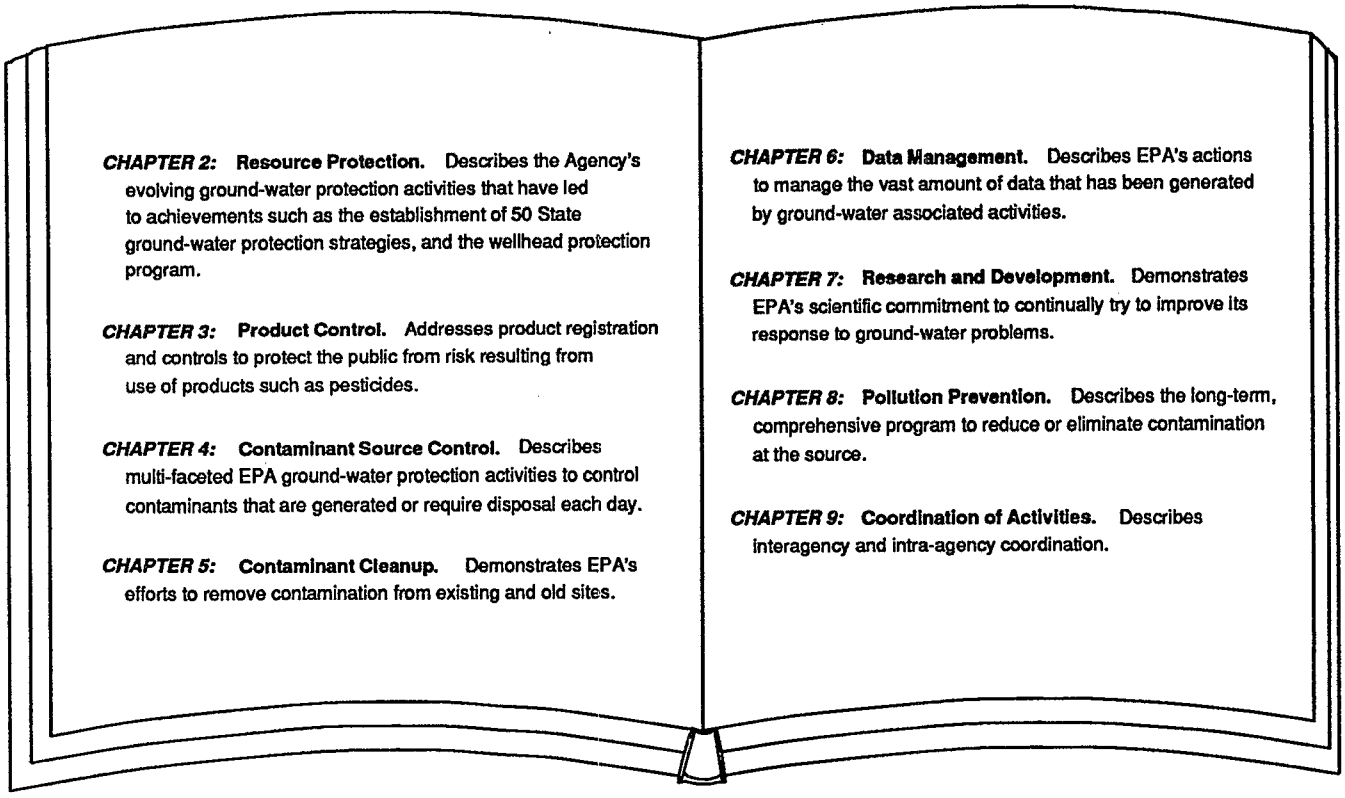
- Develops overall Agency policy on pollution prevention.
- Conducts policy studies on a variety of EPA issues with ground-water quality implications.
- Coordinates EPA's strategic planning for water resources.

CHAPTER 1: INTRODUCTION

Organization of this Report

As indicated previously, a variety of EPA program offices operating under a range of statutory authorities have responsibility for protecting the nation's ground water. This report is organized by cross-program functions, which provides a clear picture of the overall progress achieved by the Agency in ground-water protection and restoration. Exhibit 1 outlines the remainder of this report.

Exhibit 1



CHAPTER 2: **Resource Protection.** Describes the Agency's evolving ground-water protection activities that have led to achievements such as the establishment of 50 State ground-water protection strategies, and the wellhead protection program.

CHAPTER 3: **Product Control.** Addresses product registration and controls to protect the public from risk resulting from use of products such as pesticides.

CHAPTER 4: **Contaminant Source Control.** Describes multi-faceted EPA ground-water protection activities to control contaminants that are generated or require disposal each day.

CHAPTER 5: **Contaminant Cleanup.** Demonstrates EPA's efforts to remove contamination from existing and old sites.

CHAPTER 6: **Data Management.** Describes EPA's actions to manage the vast amount of data that has been generated by ground-water associated activities.

CHAPTER 7: **Research and Development.** Demonstrates EPA's scientific commitment to continually try to improve its response to ground-water problems.

CHAPTER 8: **Pollution Prevention.** Describes the long-term, comprehensive program to reduce or eliminate contamination at the source.

CHAPTER 9: **Coordination of Activities.** Describes interagency and intra-agency coordination.

CHAPTER 2: RESOURCE PROTECTION

The maxim, "An ounce of prevention is worth a pound of cure," is especially true when applied to ground water. To clean up one contaminated wellfield could cost many times more than establishing a ground-water protection program for an entire state. Thus, the goal of resource protection is to prevent contamination from occurring in the first place, with the primary focus on areas most vulnerable to pollution. Resource protection is a combination of individual, local, state and federal activities ranging from land-use control to public education.

This chapter covers:

- **State Ground-Water Protection Strategies**
- **Wellhead Protection**
- **Sole Source Aquifer Program**
- **Drinking Water Standards**

CHAPTER 2: RESOURCE PROTECTION

State Ground-Water Protection Strategies

EPA's Strategy recognizes that the most effective way to increase national institutional capability to protect ground water is to strengthen state programs. State and local governments have the primary role in ground-water protection because of the importance of land use and water allocation issues in comprehensive protection of the resource. In addition, currently there is no comprehensive federal ground-water protection statute. Specifically, EPA's role is to foster development of state ground-water protection programs and strategies, and to support implementation of ground-water protection programs by providing technical guidance and conducting research.

Since 1985, EPA has provided funding under section 106 of the Clean Water Act to develop ground-water protection strategies based on each state's individual problems and needs. The strategies provide an overall policy and planning framework to protect ground water for its highest beneficial use, and address such topics as public education, ground-water data management, legislative and regulatory development, resource assessment, ground-water classification, and point and nonpoint source contaminant controls. Guidance for development of the strategies is provided by EPA, drawing on reports from groups such as the National Ground-Water Forum and the Urban Institute.

Accomplishments:

- The states have received approximately $7 million per year since 1985, a total of $35 million, for ground-water strategy development.
- All states, U.S. territories, and the District of Columbia have prepared ground-water strategies.
- Thirty-three states passed legislation incorporating elements of, or entire state strategies.
- EPA completed draft guidelines for ground-water classification to assist states in making more consistent decisions affecting ground water, and to provide them with an example to use in developing their own ground-water classification systems for priority setting and regulatory decisions.
- Twenty-two states have developed formal ground-water classification systems to guide their planning and regulatory decisions; another 11 have informal or implicit classification systems.
- EPA supported an assessment of state ground-water protection strategies by the Urban Institute.

CHAPTER 2: RESOURCE PROTECTION

Wellhead Protection

The Wellhead Protection (WHP) Program is EPA's program to comprehensively address resource protection for public water systems. Established under Section 1428 of the Safe Drinking Water Act, wellhead protection is an innovative approach that is unlike most other ground-water programs in that it focuses on the resource requiring protection, rather than on a limited set of contamination sources. Furthermore, the program focuses on a very important part of ground-water resources; the specific areas that support wells or wellfields used to supply drinking water for public systems. This focus on public water systems will protect approximately 90 percent of the total amount of ground water used for drinking in the United States. Each state must prepare a WHP Program and submit it to EPA for review. Local government participation is critical for effective WHP Programs. Although each state WHP Program must contain specific elements, EPA recognizes that states must have flexibility to tailor program details to best suit their individual needs and circumstances.

At a minimum, the Safe Drinking Water Act requires each state's WHP Program to:

- Specify the roles of state and local governments and public water suppliers.
- Delineate wellhead protection areas for each well or wellfield.
- Identify sources of contaminants within each WHP area.
- Develop management approaches to protect the water supply within WHP areas from those contaminants.
- Develop contingency plans for each public water supply system in the event of well or wellfield contamination.
- Locate new wells properly to minimize potential contamination.
- Ensure public participation in WHP program development.

Once a state has an approved WHP program, other federal agencies controlling sources of contamination in the wellhead protection area must comply with the requirements of the program.

Accomplishments:

- Completed guidance to states on developing a state Wellhead Protection Program and methods of delineating WHP areas.
- Received 29 state wellhead protection submittals for EPA review and approval by January 1990.
- Conducted 12 training courses for state and local representatives around the country on methods for delineating WHP areas and developing local management tools for wellhead protection.
- Included in key EPA drinking water regulations recognition of the relationship of state wellhead protection areas and areal assessments around public water wells, focussing on the common need to remove these sources of contamination.
- Developed a series of technical assistance documents ranging from delineation methodologies for complex ground-water factors to state and local financing.

CHAPTER 2: RESOURCE PROTECTION

Sole Source Aquifer Program

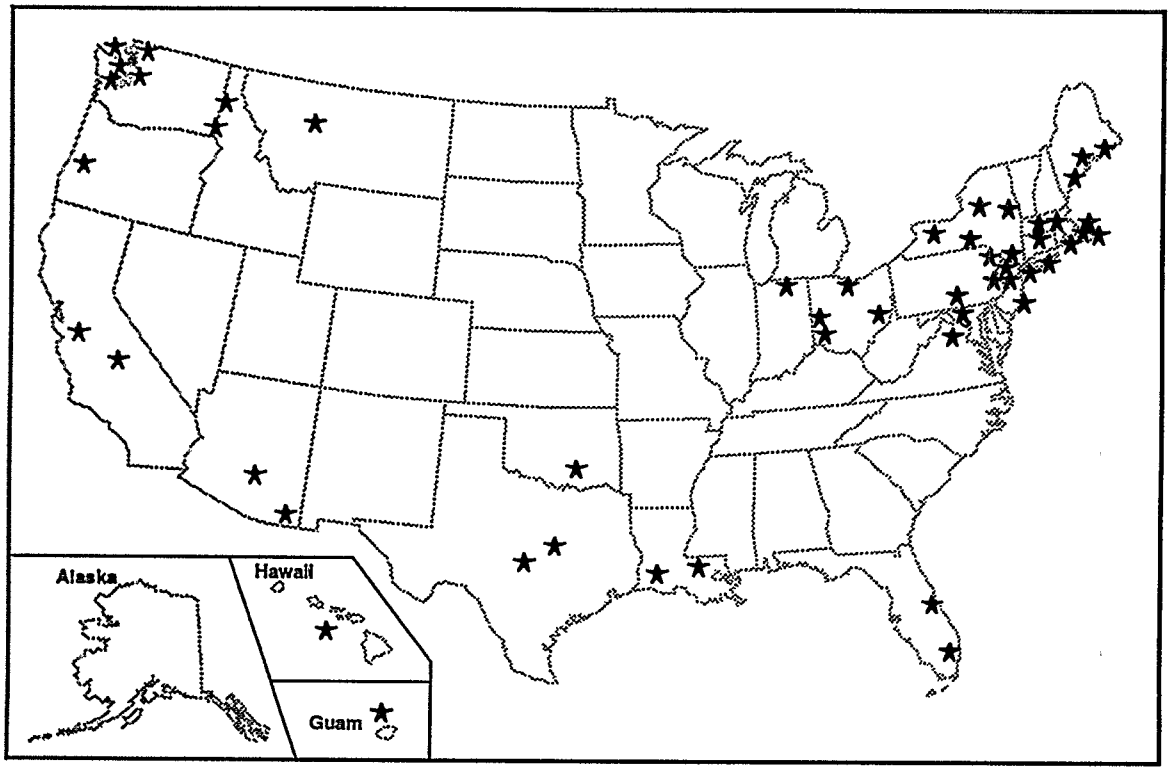
The Sole Source Aquifer (SSA) Program was established under Section 1424(e) of the Safe Drinking Water Act (SDWA) of 1974. The program allows individuals and organizations to petition the EPA to designate aquifers as the "sole or principal source" of drinking water for an area. The primary purpose of SSA designation is to provide EPA review of federal financially assisted projects planned for an area to determine their potential for contaminating the aquifer in the area. The SDWA Amendments of 1986 added Section 1427 to "establish procedures for development, implementation and assessment of demonstration programs designed to protect critical aquifer areas located within designated sole source aquifers." No funds have been appropriated for this program, although grant-related regulations for identifying critical aquifer protection areas have been issued. For a map of designated sole source aquifers, see Exhibit 2.

Accomplishments:

- Designated 52 SSAs since 1974, serving over 22 million people.
- Prepared and distributed SSA petitioner guidance to the public describing the hydrogeologic and drinking water data needed to make a SSA determination.
- Reviewed federally financially assisted projects in designated SSAs.

Exhibit 2

SOLE SOURCE AQUIFERS
SEPTEMBER 1989



CHAPTER 2: RESOURCE PROTECTION

Drinking Water Standards

In this country, we are fortunate to be able to drink water from public water supply systems with little concern for contracting a water-borne disease or exposure to long-term health risk. The safety of drinking water is determined by testing its chemical composition against EPA standards called maximum contaminant levels (MCLs). The Safe Drinking Water Act establishes a specific timetable for EPA to set MCLs and regulations for 83 specific contaminants. At the same time an MCL is set for a contaminant, MCL goals are set. MCL goals are non-enforceable health goals set at levels that cause no adverse effects and allow an adequate margin of safety. MCLs are set as close to the MCL goals as is achievable in practice, using the best available technology. EPA also issues health advisories (HAs) for drinking water contaminants for which no regulations currently exist. Each HA contains information on the nature of the adverse health effects associated with the contaminant, and gives information on analytical and treatment techniques.

These standards and advisory levels are also used as the target concentrations down to which chemical levels in ground water must typically be reduced at Superfund and other waste disposal sites. Resource protection includes taking actions, such as implementing a wellhead protection program, to ensure that chemical concentrations in ground water do not increase to the MCLs.

Accomplishments:

- Issued proposed or final regulations on 55 MCLs to date (see Tables 2 and 3).
- Issued 144 HAs in proposed or final form, including 62 HAs on pesticides being studied in the National Pesticide Survey.
- Proposed regulations requiring assessments for sources of contamination in the area around public water supply wells. These studies could be implemented by states through approved wellhead protection programs.
- Identified more than 6,000 community ground-water systems per year (of the 59,000 total) that were in violation of regulations and took steps to bring them back into compliance.
- Reduced the number of significant noncompliers (SNCs) with water quality violations by approximately 50 percent from 1985 to 1988. (SNCs are water supply systems having a history of more serious violations.)
- Initiated an effort to mobilize resources throughout the drinking water community to foster the action-oriented partnerships needed to support implementation of the new drinking water standards.

Table 2

PRIMARY DRINKING WATER STANDARDS

Contaminants	Health Effects	MCL[1]	Sources
Microbiological			
Total Coliforms (Coliform bacteria, fecal coliform, streptococcal, and other bacteria)	Not necessarily disease producing themselves, but can be indicators of organisms that cause assorted gastroenteric infections, dysentery, hepatitis, typhoid fever, cholera, and others; also interfere with disinfection process.	1 per 100 milliliters	human and animal fecal matter
Turbidity	Interferes with disinfection	1 to 5 NTU	erosion, runoff, and discharges
Inorganic Chemicals			
Arsenic	Dermal and nervous system toxicity effects	.05	geological, pesticide residues, industrial waste and smelter operations
Barium	Circulatory system effects	1	
Cadmium	Kidney effects	.01	geological, mining and smelting
Chromium	Liver/kidney effects	.05	
Lead	Central and peripheral nervous system damage; kidney effects; highly toxic to infants and pregnant women	.05[2]	leaches from lead pipes and lead-based solder pipe joints
Mercury	Central nervous system disorders; kidney effects	.002	used in manufacture of paint, paper, vinyl chloride, used in fungicides, and geological
Nitrate	Methemoglobinemia ("blue-baby syndrome")	10	fertilizer, sewage, feedlots, geological
Selenium	Gastrointestinal effects	.01	geological, mining
Silver	Skin discoloration (Argyria)	.05	geological, mining
Flouride	Skeletal damage	4	geological, additive to drinking water, toothpaste, foods processed with flourinated water
Organic Chemicals			
Endrin	Nervous system/kidney effects	.0002	insecticide used on cotton, small grains, orchards (cancelled)
Lindane	Nervous system/kidney effects	.004	insecticide used on seed and soil treatments, foilage application, wood protection

[1] In milligrams per liter, unless otherwise noted.
[2] Agency considering substantially lower number.

Table 2

PRIMARY DRINKING WATER STANDARDS (cont'd)

Contaminants	Health Effects	MCL[1]	Sources
Methoxychlor	Nervous system/kidney effects	.1	insecticide used on fruit trees, vegetables
2,4-D	Liver/kidney effects	.1	herbicide used to control broad-leaf weeds in agriculture, used on forests, range, pastures, and aquatic environments
2,4,5-TP Silvex	Liver/kidney effects	.01	herbicide (cancelled in 1984)
Toxaphene	Cancer risk	.005	insecticide used on cotton, corn, grain
Benzene	Cancer	.005	fuel (leaking tanks), solvent commonly used in manufacture of industrial chemicals, pharmaceuticals, pesticides, paints and plastics
Carbon tetrachloride	Possible cancer	.005	common in cleaning agents, industrial wastes from manufacture of coolants
p-Dichlorobenzene	Possible cancer	.075	used in insecticides, moth balls, air deodorizers
1,2-Dichloroethane	Possible cancer	.005	used in manufacture of insecticides, gasoline
1,1-Dichloroethylene	Liver/kidney effects	.007	used in manufacture of plastics, dyes, perumes, paints SOCs
1,1,1-Trichloroethane	Nervous system problems	.2	used in manufacture of food wrappings, synthetic fibers
Trichloroethylene (TCE)	Possible cancer	.005	waste from disposal of dry cleaning materials and manufacture of pesticides, paints, waxes and varnishes, paint stripper, metal degreaser
Vinyl chloride	Cancer risk	.002	polyvinylchloride pipes and solvents used to join them, waste from manufacturing plastics and synthetic rubber
Total trihalomethanes (TTHM) (chloroform, bromoform, bromo-dichloromethane, dibromochloromethane)	Cancer risk	.1	primarily formed when surface water containing organic matter is treated with chlorine

[1] In milligrams per liter, unless otherwise noted.

Table 2

PRIMARY DRINKING WATER STANDARDS (cont'd)

Contaminants	Health Effects	MCL[1]	Sources
Radionuclides			
Gross alpha particle activity	Cancer	15 pCi/L	radioactive waste, uranium deposits
Gross beta particle activity	Cancer	4 mrem/yr	radioactive waste, uranium deposits
Radium 226 & 228 (total)	Bone cancer	5 pCi/L	radioactive wate, geological
Other Substances			
Sodium	Possible increase in blood pressure in susceptible individuals	None (20 mg/l reporting level)	geological, road salting

[1] In milligrams per liter, unless otherwise noted.

Table 3

SECONDARY DRINKING WATER STANDARDS

Contaminants	Suggested Levels	Contaminant Effects
pH	6.5 - 8.5	Water is too corrosive
Chloride	250 mg/l	Taste and corrosion of pipes
Copper	1 mg/l	Taste and staining of porcelain
Foaming agents	0.5 mg/l	Aesthetic
Sulfate	250 mg/l	Taste and laxative effects
Total dissolved solids (hardness)	500 mg/l	Taste and possible relation between low hardness and cardiovascular disease; also an indicator of corrosivity (related to lead levels in water); can damage plumbing and limit effectiveness of soaps and detergents
Zinc	5 mg/l	Taste
Flouride	2.0 mg/l	Dental flourosis (a brownish discoloration of the teeth)
Color	15 color units	Aesthetic
Corrosivity	non-corrosive	Aesthetic and health related (Corrosive water can leach pipe materials, such as lead, into drinking water.)
Iron	0.3 mg/l	Taste and staining of laundry
Manganese	0.05 mg/l	Taste and staining of laundry
Odor	3 threshold odor number	Aesthetic

Secondary Drinking Water Standards are unenforceable federal guidelines regarding the taste, odor, color - and certain other non-aesthetic effects - of drinking water. EPA recommends them to the States as reasonable goals, but Federal law does not require water systems to comply with them. States may, however, adopt their own enforceable regulations governing these concerns. To be safe, check your State's drinking water rules.

CHAPTER 3: PRODUCT CONTROLS

Usually, EPA protects the environment and the health of citizens by removing pollutants from the environment. Some pesticides and toxic substances, however, are allowed to be introduced into the environment because it has been determined that benefits derived from their use outweigh the risks incurred. But the release of these materials into the environment and the exposure to humans and ecosystems must be carefully controlled to ensure that the risks associated with their use continue to be within acceptable limits. Ground-water contamination is one of the major risks that can result from release of pesticides or toxic substances into the environment.

This chapter covers:

Pesticides

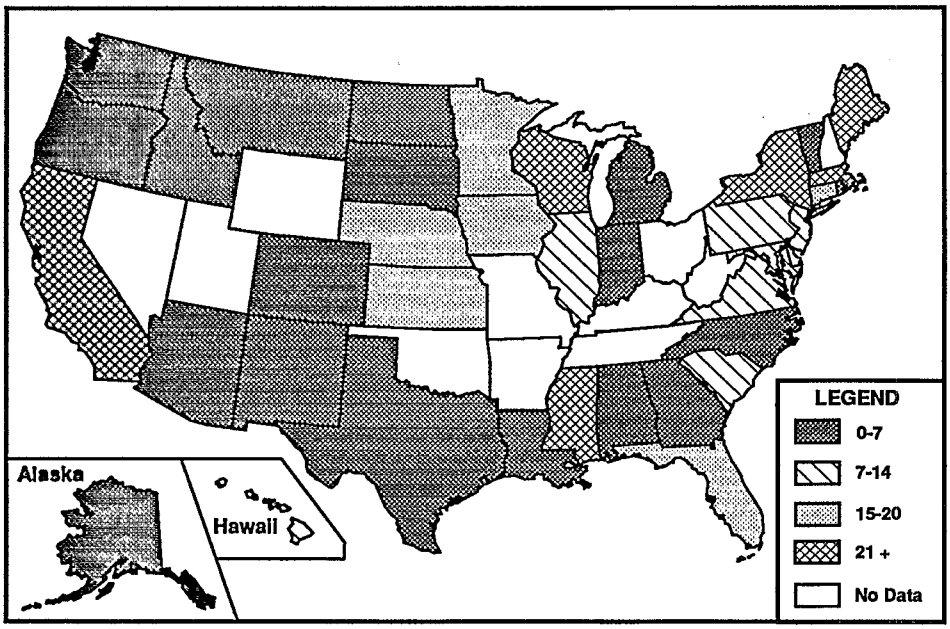
Toxic Chemicals

CHAPTER 3: PRODUCT CONTROLS

More than 25,000 pesticide products, containing about 600 active ingredients, are registered by EPA for use in the U.S. Yearly production is approximately 1.1 billion pounds. About 77 percent of all pesticides in this country are applied to land in agricultural production and some have the potential to find their way into and contaminate ground water. In 1988, EPA confirmed that normal agricultural usage had contributed to contamination of the ground water by at least 46 pesticides in at least 26 States. (See Exhibit 3.)

Exhibit 3

NUMBERS OF PESTICIDES FOUND IN GROUND WATER AS A RESULT OF AGRICULTURAL PRACTICE



* Figures contain both confirmed and unconfirmed data attributed to agricultural uses.

Accomplishments:

- Proposed EPA's Pesticides in Ground-Water Strategy to lay out the conceptual framework to address the prevention of pesticides in ground water. Workshops were conducted to develop the Strategy and criteria documents for designing state management plans. The strategy:
  - Delineates EPA's role relative to the states and other federal agencies. The states will be given the lead role in the local management of pesticides.
  - Uses standards and advisory levels developed under the Safe Drinking Water Act as reference points for pesticides management.

Accomplishments (cont'd)

- Sponsored the National Survey of Pesticides in Drinking Water Wells, a statistical survey designed to determine the presence of pesticides and nitrates in drinking water wells nationally:
  - Sampling 1,350 community and domestic drinking water wells in 50 States from 1988-1990 for 127 pesticides and nitrates.
  - Information in the survey included characteristics of wells, hydrogeological vulnerability, and pesticide and fertilizer history.
- Provided training and certification for pesticide applicators in every state. Training included major factors causing ground-water contamination.
- Developing in 1990 a Restricted-Use Rule which identifies pesticides posing potentially serious hazards to applicators or the environment, including ground water, and which require trained, certified applicators.
- Conducted "Special Reviews" of pesticides that may present unreasonable risk to the ground water or general environment (e.g., aldicarb, alachlor).
- Developed draft guidance on ground-water monitoring study designs for pesticide registrants required to monitor ground water for pesticide active ingredients.
- Developed the Pesticides in Ground Water Data Base which contains the results of monitoring studies conducted by federal and state agencies, universities and pesticide registrants.
- Extended the requirement for ground-water monitoring data in support of pesticide registrations.
- Set up pesticide cooperative agreements with, and provided funding to, all states for ground-water protection activities related to pesticides.
- Required scientific studies on the ground-water leaching potential for over 140 pesticides.

CHAPTER 3: PRODUCT CONTROLS

Toxic Chemicals

Under authority of the Toxic Substances Control Act (TSCA), EPA regulates approximately 65,000 chemicals used in commerce. Many of these chemicals have the potential, through improper use or disposal, to contaminate ground water. If any of these chemicals are suspected of causing problems, EPA performs a risk analysis of the chemical which may result in placing restrictions on the use of the chemical. Additional information may also be collected on any suspect chemical, including ground-water information, that may lead to use restrictions, or in extreme cases, to an outright ban, such as was done in the case of polychlorinated biphenyls (PCBs).

Newly developed or imported toxic chemicals are also reviewed for unreasonable risk. If problems exist, more data is collected and use restrictions may be imposed.

Accomplishments:

- Since 1979, reviewed about 12,000 submissions for new chemicals; about 10 percent of these submissions required some form of action or regulation.
- Since 1979, performed a preliminary analysis of risk for about 4000 existing chemicals that triggered concerns.
- Developed techniques for hazard assessment of chemicals based on Structure Activity Relationships (SARs) which can be used when data on the chemical is lacking.
- Published a Rule in 1988 called the Comprehensive Assessment Information Rule (CAIR) that allows the collection of detailed and comprehensive information. Under CAIR, if ground-water contamination is or may be a problem, information can be collected for risk identification, assessment and regulation of the chemical substance. The Agency is presently collecting data on about 20 chemicals under CAIR.

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Everyday, at thousands of locations across the U.S., chemical wastes are produced. Regulatory controls placed on the handling, storage, and disposal of these wastes reduce their potential as a threat to the environment and reduce each person's risk of exposure to contamination. Contaminant source controls include design features, standards, or prohibitions on release of chemical wastes from regulated facilities. These facilities typically treat, store, or dispose of wastes. In the first year of reporting (1987) under the Toxics-Release Inventory (TRI) for more than 300 chemicals, facilities reported the release of 18 billion pounds of chemicals to the air, water, land, or into underground wells; an additional 4.6 billion pounds of chemicals were transferred off-site (e.g., to sewage systems for disposal). Almost half the total amount of TRI releases and transfers (9.6 billion pounds) was discharged to surface water. An additional 3.2 billion pounds were disposed of by underground injection. Of the total TRI chemicals released to the land, underground injection accounted for 56 percent. Releases to underground wells, surface water, and land may have a high potential for ground-water contamination if inadequately controlled.

This chapter covers:

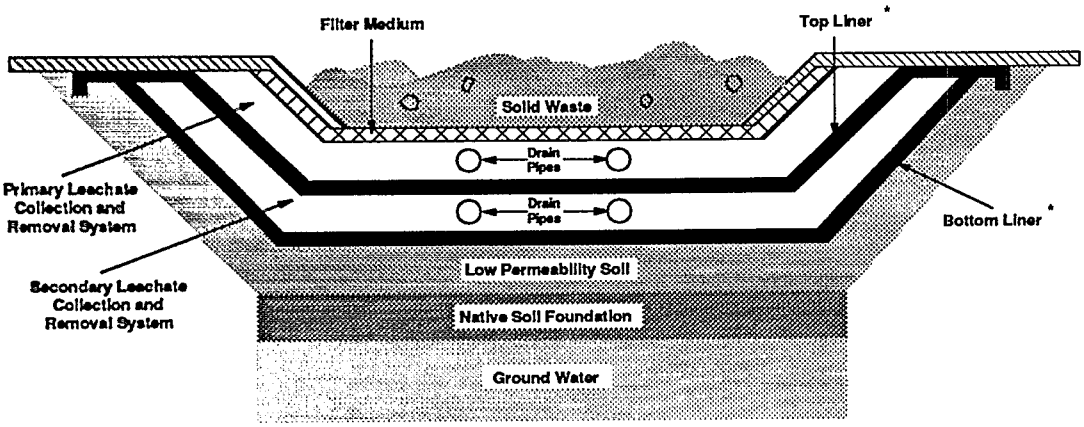
CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Hazardous Waste Management and Disposal

EPA estimates that about 275 million metric tons of hazardous wastes are handled each year at about 3000 facilities. Until the 1970s, the land was used for dumping a variety of hazardous and nonhazardous wastes at uncontrolled sites across the country. We now know that this indiscriminate dumping threatens not only the land, but also the quality of the surrounding air, surface water, and ground water. Today, facilities that treat, store or dispose of hazardous wastes must obtain a state or federal permit that includes ground-water protection standards and monitoring requirements. (For an example of a hazardous waste landfill, see Exhibit 4.)

Exhibit 4

DOUBLE LINER SYSTEM FOR A LANDFILL



* Flexible Membrane Liner

Accomplishments:

- Since 1985, conducted an average of 1,925 ground-water monitoring and compliance inspections at land disposal facilities annually.
- Completed major guidance documents explaining regulatory requirements in the areas of establishing ground-water standards (alternate concentration limits), evaluating ground-water monitoring systems, evaluating compliance and enforcement, setting design standards, investigating releases to ground water, and remediating contaminated sites.
- Since 1985, proposed and/or adopted regulations affecting ground water that:
  - Banned disposal of certain hazardous wastes in land disposal facilities.
  - Set waste management facility design and location standards, including monitoring network design.
  - Improved data submission and analysis procedures.
  - Modified the list of compounds monitored in ground water.
  - Provided early detection of releases and tailoring monitoring requirements to site conditions.
  - Provided more protective closure standards for interim status facilities.
  - Evaluated ground-water data.
- Since 1985, conducted 57 inspector training programs for ground-water monitoring, enforcement, corrective action, and facility assessment.

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Solid Waste Disposal

There were more than 11 billion tons of solid waste generated in 1986 and managed in some 227,000 solid waste disposal facilities. This included 160 million tons of municipal solid waste, 126 million tons of which were disposed of in 6,034 municipal solid waste landfills. Only twenty-five percent of these facilities have ground-water monitoring capabilities. Although this waste is not considered hazardous and is not regulated as such, common household and industrial wastes such as cleaners, automobile parts, paint thinners, and pesticides have characteristics of hazardous waste and have a high potential to contaminate ground water if not handled properly. Case studies of 163 municipal solid waste landfills revealed ground-water contamination at 146 (90 percent).

Accomplishments:

- Proposed revised regulations, to be issued in early 1990, that require more stringent controls on landfills, including ground-water monitoring during the active life of the landfill, at closure, and after closure.
- Completed a study on characterization of municipal solid waste in the U.S.
- States will be required to set ground-water standards and remediation levels based on the value of the resource, hydrology, damage to the environment, and human health risk.

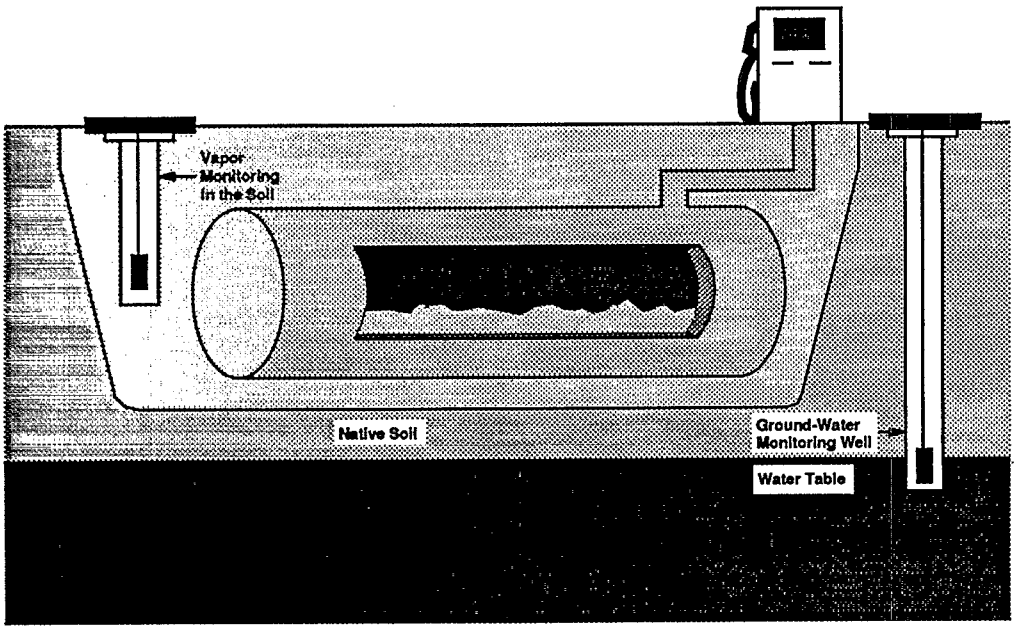
CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Underground Storage Tanks

Underground storage tanks (USTs), which are used to store petroleum or hazardous chemicals below the surface of the ground, can leak and contaminate soils and ground water. About 400,000 USTs of an estimated total of 5-6 million are thought to be leaking. Products released from these leaking tanks threaten ground water. EPA regulates about 30 percent of all tanks that store petroleum or certain hazardous materials. Tanks not covered by the regulations include farm and residential tanks holding less than 1,100 gallons of motor fuel for noncommercial uses, tanks storing heating oil used on premises, septic tanks, and tanks holding less than 110 gallons. For an example of an underground storage tank using a monitoring system to protect ground-water, see Exhibit 5.

Exhibit 5

UNDERGROUND STORAGE TANK WITH MONITORING WELLS



Accomplishments:

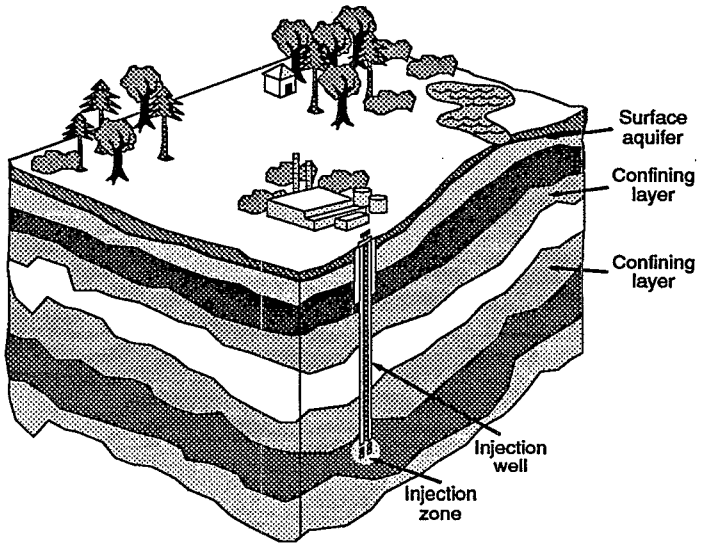
- Completed a state-by-state inventory of underground storage tanks.
- Promulgated new tank performance standards, and requirements for release detection, release reporting and investigation, corrective action, tank closure, financial responsibility and state program approvals. As a result, extensive replacement of old tanks has occurred.
- Signed cooperative agreements with almost all states for states to receive funds for cleaning up sites contaminated by leaking USTs.

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Underground injection wells are used for a variety of purposes, ranging from the disposal of various waste fluids to the extraction of mineral and hydrocarbon resources. In the proper setting, injection wells are an effective tool for safe waste management. For an example of a deep injection well for hazardous waste, see Exhibit 6.

Exhibit 6

DEEP INJECTION WELL FOR WASTES



EPA has defined five broad classes of injection well practices. See Exhibit 7.

Class I wells are deep wells that inject hazardous, industrial or municipal wastes below the lowermost underground source of drinking water. This source is defined as an aquifer either currently being used to supply a public water system, or containing water of sufficient quantity to supply a public water supply system and containing less than 10,000 parts per million of total dissolved solids. There are more than 500 Class I wells nationally, approximately 200 of which are regulated specifically for injection of hazardous wastes.

Class II wells are used in oil and gas operations and include activities such as injection of fluids for the enhanced recovery of oil and gas and disposal of fluids associated with these processes. There are more than 164,000 of these wells. Class II wells that have been abandoned and not properly plugged, or operated improperly can pose a significant ground-water risk as pathways for contamination of ground water.

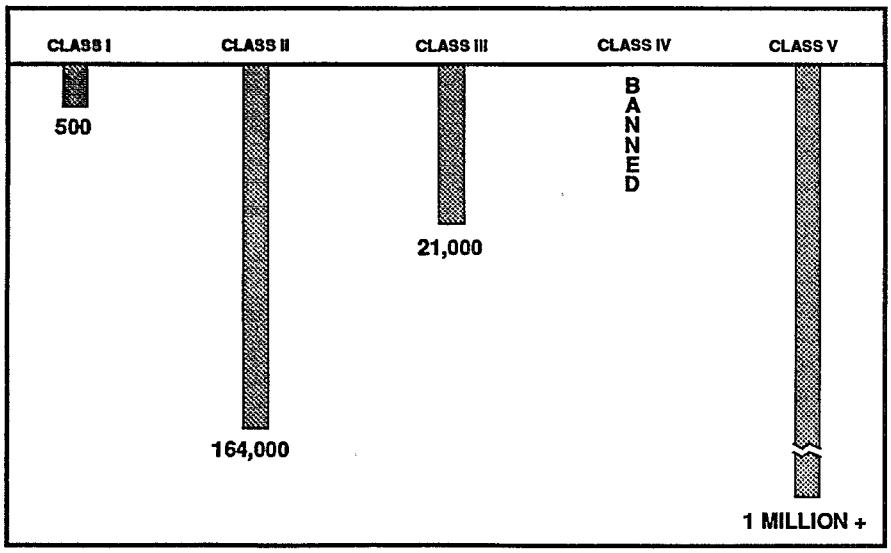
Class III wells inject fluids to remove minerals, such as salt, sulfur or uranium. Accurate inventories of these wells are difficult to maintain because such a well's useful working life may be as short as a few weeks. Current inventories indicate there are more than 25,000 Class III wells nationally.

Class IV wells inject hazardous waste directly into or above an underground source of drinking water. These wells were banned at the onset of the UIC program because of their obvious risk to human health and the environment.

Class V wells encompass all other types of wells and include activities such as agricultural and storm drainage; and septic systems associated with industrial, commercial and multifamily dwellings. Many of these activities discharge directly into shallow aquifers and may cause ground-water contamination. Currently, EPA has data on 180,000 Class V wells; many more are known to exist.

Exhibit 7

NUMBER OF UNDERGROUND INJECTION CONTROL (UIC) WELLS



Accomplishments:

- EPA and the states together regulate a universe of more than 1/3 million injection wells.
- Established requirements for state programs that prohibit unauthorized injections; ensure the protection of underground sources of drinking water; and specify construction, operating, monitoring and reporting requirements.
- Regular inspection and testing of Class I, II and III wells are in effect nationally.
- Under the UIC program, in FY 1988, EPA and the states:
  - Conducted 94,850 inspections
  - Performed 36,470 mechanical integrity tests of wells
  - Found 26,002 violations
  - Took 41,448 enforcement actions
  - Returned to compliance 10,147 wells
- Adopted the provisions of the Resource Conservation and Recovery Act (RCRA) amendments which ban the injection of untreated hazardous waste unless a demonstration has been made that there will be no migration of hazardous materials from the injection zone.

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Sewage Sludge Use and Disposal

Sewage sludge is a solid waste by-product of wastewater treatment. Municipal wastewater treatment plants currently generate 7.7 million dry metric tons each year. This sludge sometimes contains hazardous wastes and must meet disposal standards under the Solid Waste Act. It is often disposed of in a landfill. Most sludge, however, does not contain contaminants at toxic levels and is better viewed as a valuable resource that can be used as a fertilizer in agriculture and silviculture or processed into compost and used as a soil conditioner. If handled improperly, however, sludge disposal on the land or in the water has the potential to contaminate ground water.

Accomplishments:

- Proposed regulations for facilities generating sewage sludge and identified 5,000 facilities for future regulation.
- Issued final regulations in 1989 for state programs, including requirements for ground-water monitoring data.
- Proposed regulations giving standards for maximum concentrations of pollutants allowed in sewage sludge intended for disposal in landfills or spreading on land; a key concern was to protect vulnerable ground water.

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Septic Tank Management

For domestic disposal, most households in rural areas and many in suburban areas rely on septic systems. As of 1980, approximately 23 million domestic septic systems were in operation in the U.S., discharging about one billion gallons of wastewater annually. One-half million new systems are installed each year. Among the seven sources of ground-water contamination most frequently reported by the states and territories, septic tanks seem to be of greatest concern. The degree of potential risk to ground water depends upon local hydrogeology and the size, design, installation, operation, and maintenance of the system. A 1980 estimate indicates that up to one-third of the nation's septic systems may be operating improperly. Except for large septic tank systems regulated as Class V UIC wells, EPA does not regulate septic tanks.

Accomplishments:

- Prepared technical guides for local communities to design and plan local septic systems to minimize risks of ground-water contamination (see reference list in Appendix B).

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Radioactive Waste Control

Radioactive wastes are produced every day in the U.S. by a wide variety of facilities, such as national defense and federal research facilities, hospitals, commercial industrial facilities, and nuclear power reactors. These wastes have accumulated over many decades and are typically disposed of by the Department of Energy (for federally generated wastes) and licensees of the Nuclear Regulatory Commission (for commercially generated wastes). Approximately 200,000 cubic meters of low-level radioactive waste are generated annually. The Department of Energy operates six major and several smaller low-level radioactive waste disposal sites. There are three operating commercial low-level radioactive waste disposal sites but there may be as many as ten or more in the next few years. Disposal of low-level waste and high-level waste can lead to ground-water contamination if precautions are not taken. In addition, uranium and thorium mill tailings are located at 50 sites nationwide; about half of these sites are still in operation. Rain and runoff water can leach the radioactive, as well as the nonradioactive, hazardous constituents in the tailings into the ground water. Radioactivity poses a special threat to ground water because of the longevity of the radionuclides, their ability to migrate with ground water, and their ability to induce serious health effects.

Accomplishments:

- Established ground-water protection standards for active uranium and thorium mill tailings sites. Standards for inactive mill tailings sites are under review by the Office of Management and Budget prior to formal proposal.
- Established ground-water protection standards for the disposal of high-level waste. EPA is re-promulgating its high-level waste disposal standard, which will contain ground-water protection provisions.
- Developed proposed ground-water protection standards for the management and disposal of low-level waste. These standards are under review by the Office of Management and Budget prior to formal proposal.

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Drinking Water Requirements

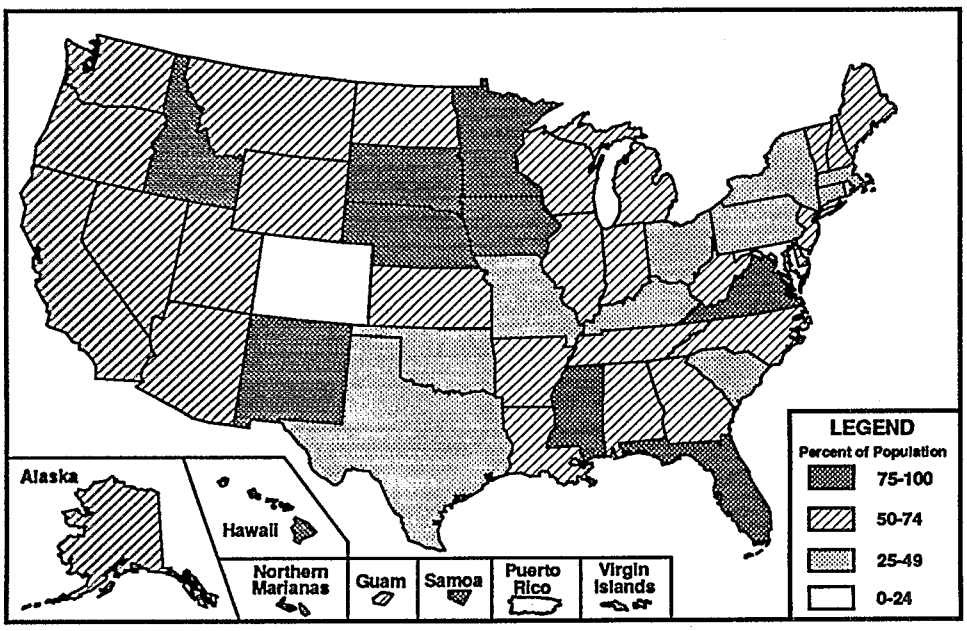
Approximately 74 million people, or 40 percent of the U.S. population, receive their drinking water from public water supplies that rely on ground water. This does not include the rural population, which is almost totally dependent on ground water from private wells for their drinking water. EPA regulates the quality of public water supplies by requiring regular monitoring, public notification of contamination, and specific timeframes for removal of the contamination. For percentages of state and territory populations served by ground water for private use, see Exhibit 8.

Accomplishments:

- Completed a 1988 national inorganic and radionuclide chemical survey which supplied information on occurrence of inorganic chemicals and radionuclides in approximately 500 ground-water systems.
- Established and issued proposed or final MCLs for 55 potential drinking water contaminants (counting microbiological contaminants as one group).
- Issued final regulations on MCLs for volatile organic chemicals (July 1987), fluoride (April 1986), surface water treatment (June 1989), and coliform (June 1989).
- Plan to propose or promulgate regulations by 1992 to cover organic chemicals, synthetic organic chemicals, lead and copper, radionuclides, and disinfectants and disinfection by-products.
- Increased state and federal enforcement of drinking water requirements.

Exhibit 8

PERCENTAGE OF STATE AND TERRITORY POPULATIONS SERVED BY GROUND WATER FOR PRIVATE USE



Source: 1988 State 305(b) Water Quality Reports or 1986 USGS National Water Summary

CHAPTER 4: CONTAMINANT SOURCE CONTROLS

Dredge and Fill Control for Wetlands

The United States is losing one of its most valuable, and perhaps irreplaceable, resources - the nation's wetlands. Once regarded as wastelands, wetlands are now recognized as important resources to people and the environment. Of the estimated 200 million acres of wetlands that existed in the U.S. prior to European settlement, only 99 million acres remained by the mid 1970s. Wetlands slow the surface flow of water and reduce flooding, provide habitat to ducks and other wildlife, filter pollutants, and in many cases, act as recharge sites for ground water or as discharge sites depending on the location and hydrology of the individual wetland sites. Contaminants in dredge and fill material and the subsequent loss of wetlands can therefore affect ground-water quality.

Accomplishments:

- Initiated the National Wetlands Policy Forum that was conducted by the Conservation Foundation at which a policy was adopted of "no net loss of wetlands." This policy will be applied to regulatory decisions under the Clean Water Act, Section 404, which requires approval from EPA before any modification is made to wetlands.
- Developed, in cooperation with the U.S. Army Corps of Engineers, the Wetlands Evaluation Technique (WET). WET provides specific methods for analyzing ground-water recharge and discharge functions.
- Issued regulations for states to assume the Section 404 Dredge and Fill Program of the Clean Water Act to control the volume and quality of dredge and fill materials before removal and disposal.

CHAPTER 5: CONTAMINANT CLEANUP

Ground-water contamination has occurred in every state. The full extent of the contamination is not known, but the discovery of more contamination continues. A major source of contamination is the legacy of abandoned waste sites around the country, particularly hazardous wastes sites. In other cases, contamination created by spills or other accidental releases has caused severe ground-water contamination problems. The federal and state regulatory communities now are faced with the tasks of cleaning up these sites and fostering voluntary or enforcement-directed cleanup by the private sector.

This chapter covers:

Superfund Sites

Hazardous Waste Management Facilities

Nonhazardous Land Disposal Facilities

CHAPTER 5: CONTAMINANT CLEANUP

Superfund Sites

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund as it is known, is one important tool in EPA's response to the nation's hazardous waste problem. Since the creation of Superfund in 1980, approximately 31,000 hazardous waste sites have been identified. Of the sites at which investigations have been completed, approximately 42 percent involve ground-water contamination, most of which affects or threatens ground water that is currently used or potentially usable for drinking water.

In the Superfund process, after a site is identified, a preliminary assessment is made to determine if there is an imminent threat requiring immediate attention. Any time a threat is imminent, EPA can take prompt action to remove the source of contamination and control the risk. If the threat is not imminent, the site is ranked considering various factors. Ground water is one of three major factors considered in scoring a site for future consideration. The scoring considers the extent of actual or potential contamination of the ground water and the population that could be affected. Sites that receive high "scores" on the ranking factors are placed on a National Priorities List (NPL). These sites are then studied to determine the best remedial action. Sites presenting the most acute risks to human health are given the earliest and most aggressive action.

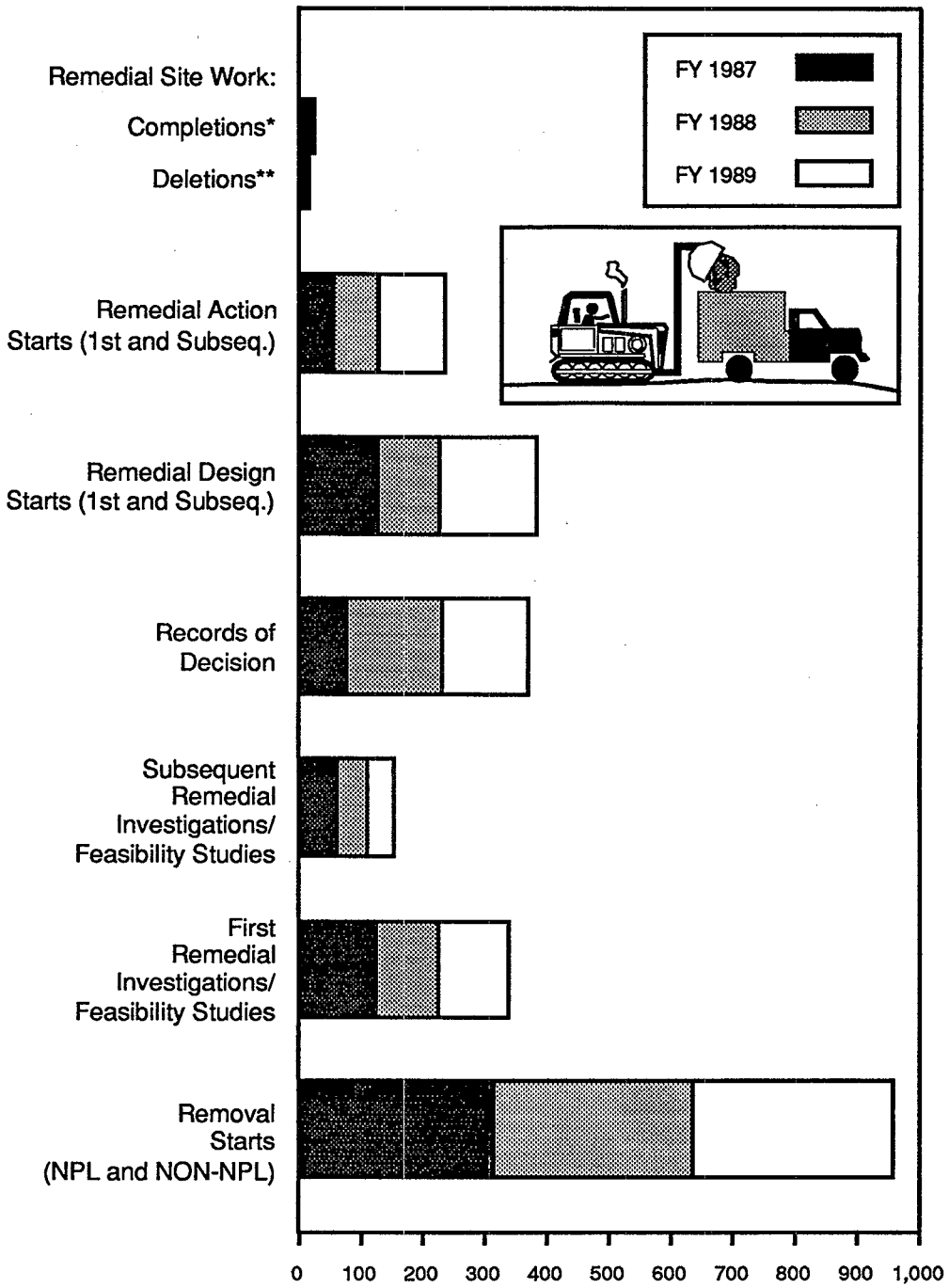
When contamination of ground water is involved, cleanup often takes longer than anticipated because its complex nature makes results difficult to predict. Ground-water monitoring is a key element in understanding the problem and planning the cleanup. Data must be collected on a variety of parameters such as type and movement of contaminants, and the hydrogeology of the site. Data collection is often done by using monitoring wells, which are costly and sometimes difficult to employ successfully. Many of the cleanup methods that are used push the limits of technology, and experience is lacking in their effectiveness and time requirements. If drinking water wells are found to be contaminated, EPA may determine it is necessary to provide an alternate source of drinking water to protect human health. For major Superfund program accomplishments, see Exhibit 9.

Accomplishments (1980-1989):

- Conducted preliminary assessments at most of the 30,844 identified sites (i.e., 93 percent).
- Conducted more than 1,000 removal actions (prompt action to remove the source of contamination when risk is imminent).
- Evaluated about 9,000 sites to determine if they should be included on the National Priorities List (NPL).
- Placed 951 sites on the NPL, and proposed addition of 179 sites to the list.
- Began work (including assessment) at 89 percent of the NPL sites.
- Completed remedial investigation feasibility studies at 319 sites, implemented 117 remedies, and deleted 16 sites as no longer presenting a risk.
- Issued a guidance document on remedial actions for contaminated ground water at Superfund sites.

Exhibit 9

SUMMARY OF FY 1987-89 SUPERFUND ACCOMPLISHMENTS (FUND AND ENFORCEMENT)



* FY 87=9, FY 88=7, FY 89=8

** FY 87=3, FY 88=6, FY 89=6

CHAPTER 5: CONTAMINANT CLEANUP

Hazardous Waste Management Facilities

When rainfall or runoff percolates into a waste site, it can pick up hazardous substances from the waste and carry them into the underlying ground water. Or, even worse, the waste itself can come into contact with the aquifer. As of late 1988, there were 1,162 hazardous waste land disposal facilities in the U.S., many of which had contaminated ground water. Under the Resource Conservation and Recovery Act (RCRA), Subtitle C, these land disposal facilities are required to obtain permits either to continue operating or to close, and waste must be treated to reduce toxicity. To obtain a permit, ground-water monitoring is required during the life of the permit to determine if contamination has entered the ground water, and to determine the effectiveness of any ground-water corrective action. Approximately 39 percent of applications for operating permits were denied because of ground-water concerns.

The vast majority of hazardous waste facilities are in the process of closing. There are two types of facility closures: "clean" closures in which all the hazardous waste is removed from the facility prior to closing, and landfill closures in which the hazardous waste remains in place and stringent long-term ground-water monitoring is required to assure no future contamination will occur.

Accomplishments as of December 1988:

- 86 percent of all hazardous waste disposal facilities are slated to close.
- Completed 853 facility assessments at closing land disposal facilities.
- Issued 174 operating permits.
- Denied 81 operating permits.
- Conducted 116 facility investigations.
- Completed 6 corrective action remedies.
- Provided training workshops to all Regional offices on investigations of ground-water contamination.

CHAPTER 5: CONTAMINANT CLEANUP

Nonhazardous Land Disposal Facilities

Of the 951 Superfund sites, 231 are municipal landfills. EPA is in the process of establishing a framework for federal, state, and local government cooperation for the management of solid waste. The federal role is to establish the overall regulatory direction, provide minimum standards for the protection of human health and the environment, and provide technical assistance to states for planning and developing sound solid waste management. The actual implementation of the programs remains a state and local function.

EPA expects to issue final regulations for municipal solid waste landfills in early 1990. These regulations require ground-water monitoring systems and include corrective action requirements to ensure that ground-water contamination at new and existing landfills will be detected and cleaned up as necessary to protect human health and the environment. The owner or operator of the landfill is required to conduct a corrective action assessment if contaminant levels are exceeded. The state will be required to evaluate corrective action measures, select the remedy, establish corrective action standards, and set the corrective action schedule. The owner or operator is required to carry out corrective action until the state determines that ground-water protection standards have been met.

CHAPTER 6: DATA MANAGEMENT

Effective management of our nation's ground-water resources by all levels of government depends on adequate and accessible information. A vast amount of ground-water data, collected from a multitude of sources, does exist; however, the quality of the data is not always known, the standards under which they were collected varies, and easy access to the data is not always possible. In an effort to improve ground-water data management, EPA has been working to:

- Develop common data standards;
- Improve access to ground-water data across programs; and
- Enhance ground-water data analysis capabilities.

Accomplishments:

- Developed a minimum set of data elements for ground water to promote consistency between data collections and to facilitate data sharing and cross-media analyses. The set consists of 22 data elements, including geographic, well/spring, and sample/analysis descriptors. EPA has adopted an Agency policy which requires the collection of at least this set whenever EPA or its contractors collects ground-water data. EPA has been working with members of the ground-water community to encourage adoption of the minimum set.
- Developed a set of "indicators" that can be used to track progress and set priorities in ground-water protection efforts. These indicators cover such areas as: public drinking water supplies, hazardous waste sites, waste sites and industrial sites, and nonpoint sources of nitrate and pesticide contamination.
- Modified and enhanced STORET, EPA's national database for water quality information, by updating the system to more readily accept ground-water data, and adding user-friendly menu-driven functions.
- Sponsored a series of pilot projects at the county, state, and regional levels which demonstrate the effective use of Geographic Information Systems (GIS). Several Regional offices are actively incorporating GIS into their ground-water protection efforts.

CHAPTER 7: RESEARCH AND DEVELOPMENT

EPA ground-water research serves two functions: it supports program office regulatory and technical assistance needs, and it builds a longer term scientific underpinning for future Agency needs and priorities. The research supports seven program offices, EPA's ten Regions, and a number of cross-media offices and task forces. EPA is increasing its emphasis on transferring technologies and providing technical assistance to state and local agencies that must apply new knowledge and technologies to improve the protection of ground-water resources from man-made contamination.

EPA ground-water research is underway in four areas:

- Monitoring: to develop, evaluate and adopt geochemical and geophysical techniques.
- Transport and transformation: to predict the physical movement of water and contaminants in the subsurface, which is incorporated into predictive models of contaminant behavior and potential exposure to humans and the environment.
- "In situ" remediation: to develop methods to recover contaminants from, or to enhance, subsurface treatment.
- Underground source control: to address protocols for injection well practices to control leakage to ground water.

The research program also funds certain "initiatives" to quickly build the scientific basis of key Agency thrusts. Wellhead protection research is one such initiative. This program contains a number of technical elements such as the hydrogeologic delineation of protection areas and the assessment of potential contaminating sources. To carry out wellhead protection responsibilities, the states must develop approaches to assess the risk to human health of contamination from various categories of sources, and develop management criteria to reduce the threat from such activities. To support these activities, research is needed to improve methods for detecting and monitoring ground-water contamination, predicting the transport and transformation of pollutants in ground water, and using "in situ" technologies to remediate ground-water contamination.

Accomplishments:

- Invested $22.6 million in ground-water research in FY 1989; the 1990 budget is similar, and includes $810 thousand for a research initiative in wellhead protection.
- Provided technical support on 232 ground-water investigations and remedial projects, and responded to numerous inquiries through a Superfund Technology Support Project since 1987.
- Provided assistance to states in developing wellhead delineation models and management strategies for wellhead protection areas.
- Advanced the understanding of the biology of subsurface environments, progressing from a rudimentary understanding to a point where control of biological processes is possible in certain situations — knowledge valuable in cleaning up contaminated aquifers using bioremediation techniques.
- Developed a new computer model that provides a method of screening a geographical data base to identify sites vulnerable to ground-water pollution. The model allows rapid evaluation of soils to determine the leaching potential of pesticides, toxic and other chemicals.

CHAPTER 8: POLLUTION PREVENTION

EPA recently established a pollution prevention program with the principal charge of developing a policy and integrating pollution prevention into Agency program activities. The Agency has issued a proposed policy that highlights a hierarchy of pollution prevention in terms of source reduction, environmentally sound recyling, treatment and disposal. Currently the program is funding several pilot projects. Reducing and eliminating the quantity and sources of pollution will be a significant means of reducing contamination of the nation's ground-water resources.

Accomplishments:

- Issued a proposed Pollution Prevention Policy for public comment.
- Proposed approximately $12 million for 1991 and 1992 to fund pilot projects to examine the feasibility of preventing pollution, with approximately $2 million each year going to ground-water related projects.
- Awarded almost $4 million in grants to states for development or support of prevention programs, and at least $6 million is proposed for FY 1990.

CHAPTER 9: COORDINATION OF ACTIVITIES

The broad spectrum of authority for ground-water protection, including CERCLA, RCRA, FIFRA, CWA, SDWA and TSCA, makes it essential that ground-water activities be coordinated both within EPA and among the federal and state agencies.

The Agency has a new emphasis on improving interagency and intra-agency actions dealing with the threat to ground-water from agricultural chemicals.

To help achieve coordination with other federal agencies, EPA is working closely with the U.S. Department of Agriculture (USDA), the Department of the Interior (DOI), and other federal agencies on the President's Water Quality Initiative to improve management of agricultural chemicals and wastes. The Agency has established an internal Agricultural Policy Committee to coordinate and better integrate its environmental programs with USDA agricultural programs. Emphasis is being placed on coordinating research in the Midwestern corn and soybean belt. Further, EPA is coordinating research efforts with all the other agencies doing ground-water research through the Inter-agency Subcommittee on Ground-Water of the Federal Coordinating Committee on Science, Engineering, and Technology. Finally, EPA continues to work with other agencies to implement EPA's regulatory, technical assistance, and technology transfer responsibilities through the Federal Roundtable and through hundreds of other coordination efforts.

EPA Coordination Activities with Other Federal Agencies and States:

- As part of the President's Water Quality Initiative, headed by USDA, joined in the new Mid-Continent Initiative to study the impact of agricultural chemicals on ground water.
- Memorandum of Understanding (MOU) with the U.S. Geological Survey (USGS) which includes an EPA-USGS Coordination Committee to facilitate information exchange and resolve differences between agencies. A second MOU with USGS addressed ground-water research, training, and monitoring.
- Federal Coordinating Council for Science, Engineering, and Technology established an Inter-Agency Committee on Ground Water and prepared a report which presents a compilation of federal, scientific, and technical activities in ground water.
- The Ground Water Subcommittee of the Inter-Agency Committee on Water Data meets bimonthly to discuss interagency ground-water data needs and issues, and is attended by EPA, DOI, and USGS.
- The National Coordinating Workshop of National Water Quality Assessment meets biannually, and is attended by EPA, DOI, and USGS.
- Cooperating with USGS to determine types of hydrogeological maps needed by federal, state, and local environmental managers.
- Participates in a cooperative agreement with USGS to conduct interdisciplinary field site investigations of processes affecting the movement of hazardous waste through the subsurface.
- Participated on several workgroups with DOI, USDA, and other agencies on underground injection wells.
- Works on underground injection control programs on federal lands with DOI.

Target	Applicable Law	Regulation or Guidance	Status	Ground-Water Protection
Synthetic Organic Chemicals (SOCs) and Inorganic Chemicals (IOCs)	Safe Drinking Water Act	Phase I - 8 Volatile Organic Chemicals Phase II - 38 Synthetic Organic Chemicals and Inorganic Chemicals	Phase I - Final 1987 Phase II - Proposed 1989	Public well vulnerability assessment of hydrogeology and contaminant migration.
Bacteria-Viruses	Safe Drinking Water Act	Filtration and Disinfection; Turbidity, Giardia Lamblia, Viruses, Legionella, and Heterotrophic Bacteria	Final 1989	Wellhead protection assists in meeting requirements to avoid filtration of public well water.
Total Coliform	Safe Drinking Water Act	Total Coliform, incl. fecal coliform and E. Coli (40 CFR 141)	Final 1989	Wellhead protection is one means to comply with MCL.
Sole Source Aquifer	Safe Drinking Water Act	Sole Source Aquifer Designation Petitioner Guidance	Final 1987	Identifies data necessary to designate a sole source aquifer.
Wellhead Protection Area Delineation	Safe Drinking Water Act	Guidelines for Delineation of Wellhead Protection Areas	Final 1987	Describes methods to use in delineating Wellhead Protection Areas around public water supply wells.
Wellhead Protection Program	Safe Drinking Water Act	Guidance for Applicants for State Wellhead Protection Program Assistance Funds Under the Safe Drinking Water Act	Final 1987	Describes process for States to submit Wellhead Protection Programs for EPA approval.
Injection Wells	Safe Drinking Water Act	40 CFR Parts 124, 144, 145, 146, 147	Final	Specifies controls for injection wells.
Pesticides	Federal Insecticide, Fungicide, and Rodenticide Act as amended (FIFRA) (7 USC 136)	Procedures for Registration of Pesticide	Final 1988	New registration procedures involved ground-water assessment.
Pesticides	FIFRA	Pesticide Registration Procedures; Pesticide Data Requirements (40 CFR parts 152, 153, 156, 158, 162)	Final 1988	Revises procedures for the registration of pesticide products under FIFRA.
Toxic Substances	Toxic Substance Control Act (TSCA) (15 USC 2601)	Procedures for Evaluating Chemicals	Final 1976	TSCA section 4 can be used as testing authority for toxic substances if required.
Toxic Substances	Toxic Substance Control Act	Comprehensive Assessment Information Rule (40 CFR 704)	Final 1988	Can collect data on ground-water contamination if it is a problem.
Sludge	Clean Water Act	Technical Standards for the Use and Disposal of Sewage and Sludge (40 CFR 257-258)	Proposed in the Federal Register, 2/6/89	Sets standards for the concentration of constituents in sludge for monofilling.
Solid Waste	Resource Conservation and Recovery Act	Solid Waste Disposal Facility Criteria (40 CFR 257-258)	Proposed in the Federal Register, 8/30/88	Prohibits location of Municipal Solid Waste Disposal Facilities in sensitive environments; allows states to establish points of compliance based in part on ground-water resource evaluation.
Hazardous Waste	Resource Conservation and Recovery Act	General Ground-Water Monitoring Requirements at Disposal Sites (40 CFR 264)	Final 1987	Specifies ground-water monitoring location and frequency.
Hazardous Waste	Resource Conservation and Recovery Act	Technical Enforcement Guidance Document	Final 1988	Describes in detail monitoring well placement, construction and sampling procedures.
Hazardous Waste	Resource Conservation and Recovery Act	Statistical Analysis of Ground-Water Monitoring Data	Final 1989	Describes how to evaluate RCRA ground-water monitoring data.
Hazardous Waste	Resource Conservation and Recovery Act	Alternate Concentration Limit Guidance	Final 1987	Describes how to establish ground-water protection standards.

Appendix A

EPA REGULATIONS & GUIDANCE FOR GROUND-WATER PROTECTION

(Cont'd)

Target	Applicable Law	Regulation or Guidance	Status	Ground-Water Protection
Petroleum and Hazardous Substances	Resource Conservation and Recovery Act	Regulations for Underground Storage Tanks; Technical Requirements and State Program Approval; Final Rules (40 CFR 280-281)	Final 1988	Sets standards for leak detection, leak prevention and corrective action.
Petroleum	Resource Conservation and Recovery Act	Regulations for Underground Storage Tanks Containing Petroleum; Financial Responsibility Requirements and State Program Approval Objective; Final Rule (40 CFR 280-281)	Final 1988	Establishes requirements for demonstrating financial responsibility for corrective action and third party compensation.
Radioactive Materials	Atomic Energy Act	Regulations for Uranium / Thorium Mill Tarlings Active Sites (40 CFR 192)	Final 1983	Provides concentration limits for disposal and cleanups.
General Contaminants	Clean Water Act	Clean Water Act Section 404 Program Definition and Permit Exemptions; Section 404 State Program Regulation (40 CFR Parts 232-233)	Final 1988	Procedures and criteria used in approving, reviewing and withdrawing approval of state 404 programs.
Hazardous Substances	CERCLA	Guidance on Remedial Actions for Contaminated Ground-Water at Superfund Sites (40 CFR 300, Subpart F)	Interim Final 1988	Describes Remedial Action Process for ground water.
Hazardous Substances	CERCLA	Hazard Ranking System (HRS) for Uncontrolled Hazardous Substance Release (40 CFR 300, Subpart F); Appendix A of National Oil and Hazardous Substances Contingency Plan	Proposed 1988	Includes ground-water pathway in preliminary screening and ranking of Superfund sites.
Hazardous Substances	CERCLA	National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300)	Proposed 1989	Establishes process for Superfund Site cleanup.
Hazardous Substances	CERCLA	Corrective Action for Releases to Ground Water from Regulated Waste Units (40 CFR 264, 270)	draft Proposal 1989	Establishes procedures for correcting ground-water contamination at active waste management sites.

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