# Underground Storage Tanks:

# Building On The Past To Protect The Future


1984-2004
20 YEARS OF PROGRESS
PROTECTING AMERICA'S ENVIRONMENT
20th ANNIVERSARY

EPA 510-R-04-001

# Word From The Assistant Administrator

Twenty years ago hundreds of thousands of underground storage tanks leaking petroleum were contaminating community drinking water supplies. Since then, EPA's underground storage tank program has contributed to a remarkable national success story by protecting our nation's soil and groundwater from leaking tanks.

Partnerships have been the cornerstone of the program's success. Our intergovernmental and private partnerships involving states and tribes have resulted in closing over 1.5 million substandard tanks, cleaning up over 300,000 releases of environmental contaminants, and reducing the number of new releases.

In fact, over 18,500 cleanups were completed in Fiscal Year 2003; this represents a 17 percent increase in the number of cleanups completed over the previous year. There also has been an improvement in preventing releases and detecting leaks. Approximately 12,000 new releases were reported in Fiscal Year 2003 - about 60 percent lower than the annual historical average of approximately 27,000.

But we cannot rest on this record. There is still more we can do by working with facility owners and operators in preventing releases and detecting them more quickly when they occur. With renewed commitment and strong partnerships, we will continue to identify solutions to both old and new challenges related to underground storage tanks.

Marianne Lamont Horinko
Assistant Administrator
Office of Solid Waste and Emergency Response

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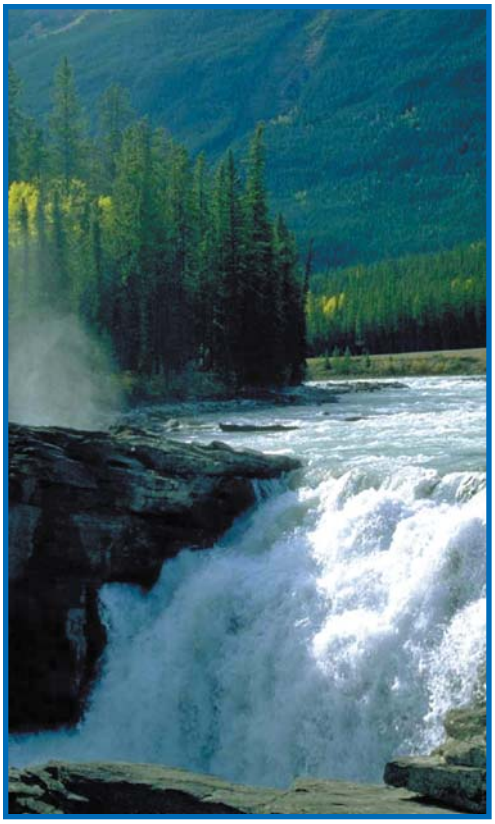
# Executive Summary

This year, the national underground storage tank program celebrates its 20th anniversary. The purpose of this report is to celebrate 20 years of strong partnerships, highlight some of our extraordinary accomplishments, and offer a short program history, so that as we look to the future we can continue in the strong tradition of our past.

In 1983, the CBS program *60 Minutes* aired a story called "Check the Water." The report brought national attention to families suffering from the effects of gasoline leaking from underground storage tanks. Less than a year later, Congress passed and the President signed a new law designed to protect the public from these and other petroleum releases.

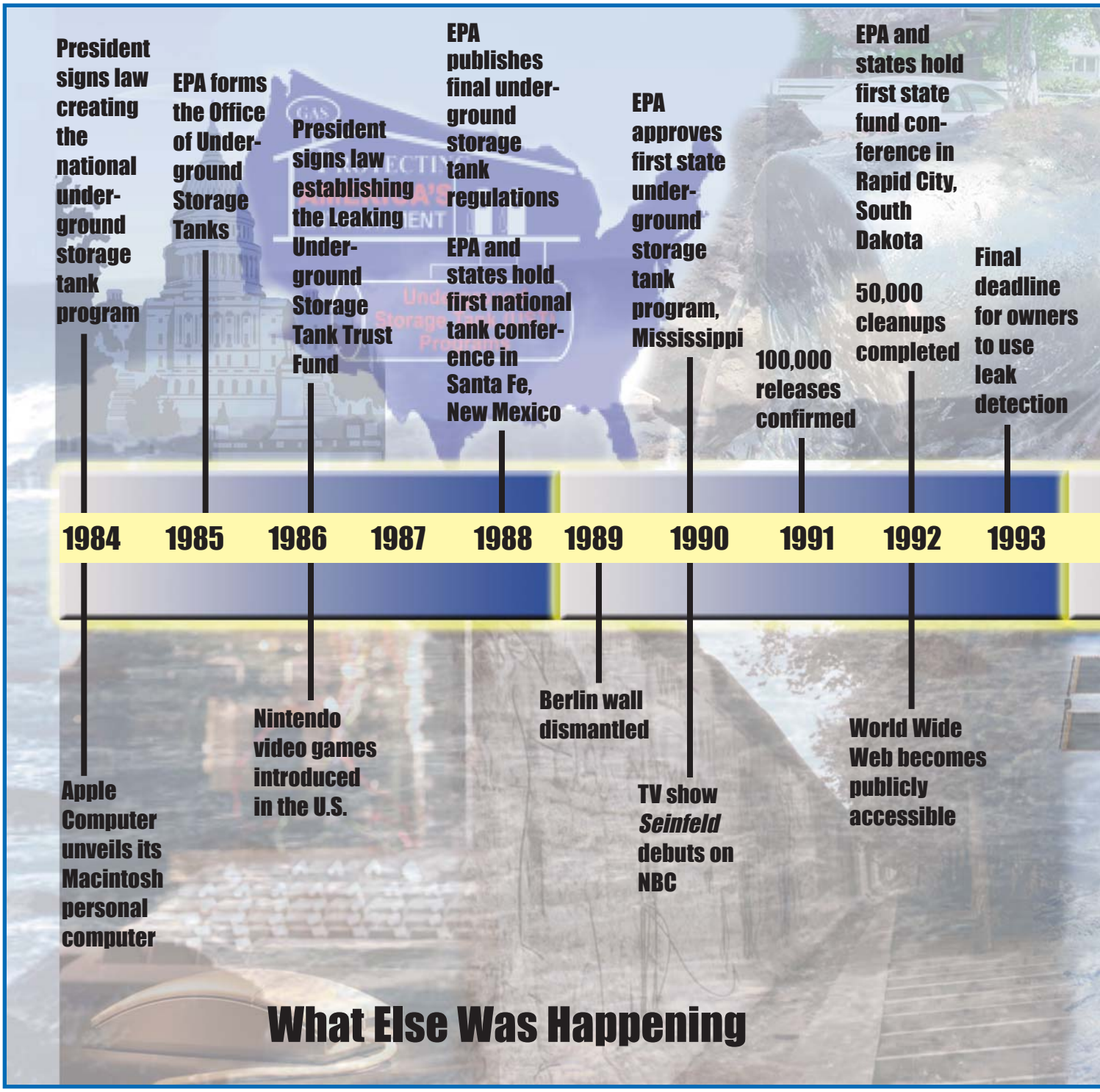
With this new law in place, the U. S. Environmental Protection Agency (EPA) faced the daunting task of regulating the nation's two million underground tanks storing petroleum and certain hazardous substances. The Agency responded quickly and creatively. Because of the number of tanks, the diversity of ownership, and the need for strong state involvement, EPA designed a program that was unlike any other regulatory program at the time. In less than four years, EPA built a new federal program – one noteworthy for its protective but flexible performance-based regulations; its aggressive approval of qualified state programs; its vigorous outreach and education; and its strong partnerships with states, tribes, industry, and many other partners still involved to this day.

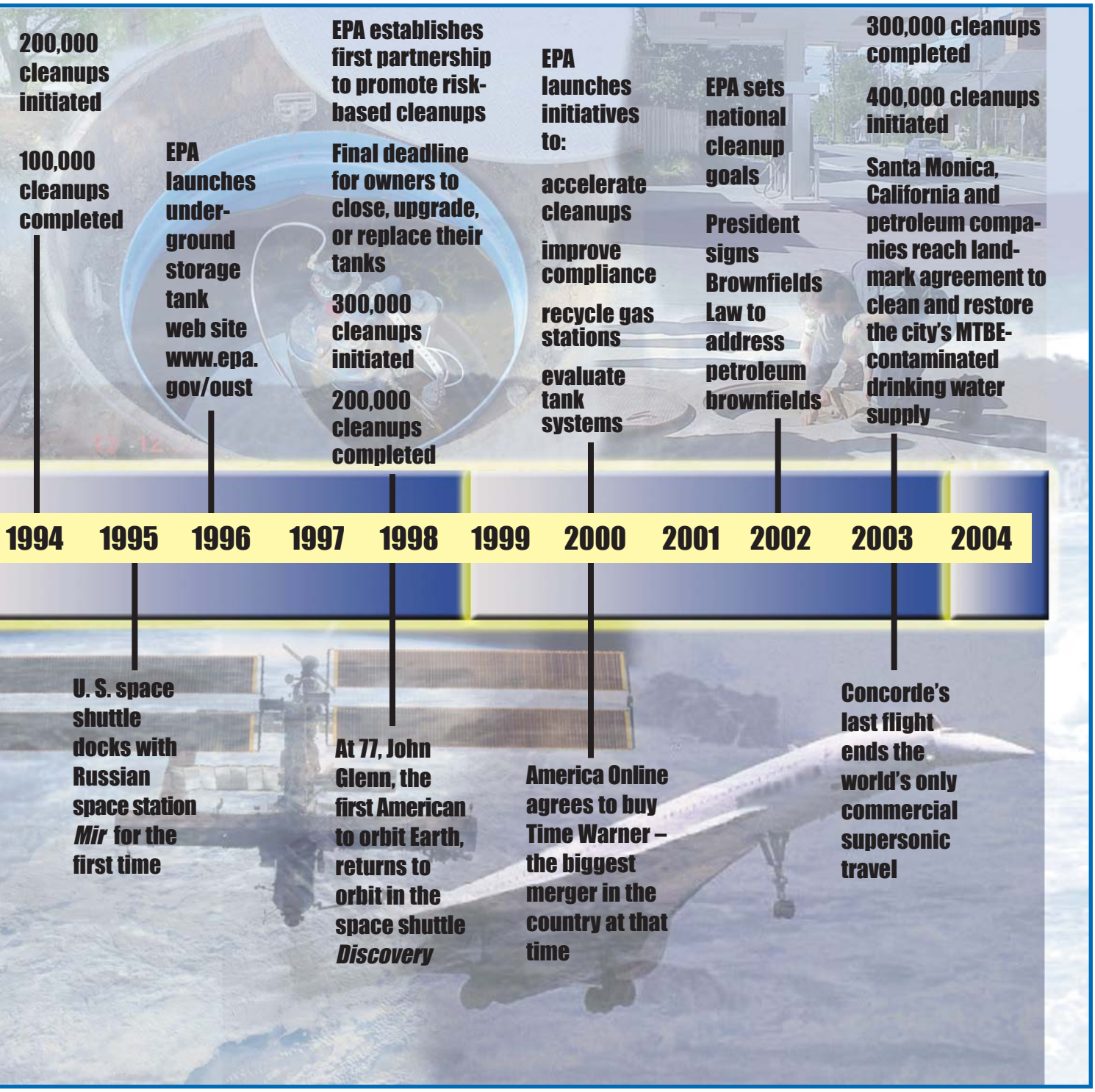
Through these partnerships, we have found new ways to tackle old problems. And because of this innovative spirit, we have successfully met many of the expectations Congress and the President had in 1984 when the program was created. Together, EPA, states, tribes, and industry have closed 1.5 million old, unsafe tanks and have upgraded or replaced nearly all other underground storage tanks. Of the 400,000 plus known leaks, nearly 70 percent have been cleaned up; the number of new leaks being discovered each year has dropped dramatically, from a high of over 66,000 in 1990 to roughly 12,000 last year.



As we celebrate the 20th anniversary and enter the third decade of our program, new challenges lie ahead. These challenges include cleaning up and encouraging reuse at 200,000 or more abandoned gas stations and petroleum brownfield sites littering our cities and countryside; cleaning up more than 100,000 remaining known releases at active sites; and improving operational compliance at every site to prevent new releases. Today's and tomorrow's challenges may be as tough, if not tougher, than what we faced before. As we face them, we will need to rely, even more, on our creativity and our enduring partnerships.

# Milestones In The Underground Tank Program




1994
200,000 cleanups initiated
100,000 cleanups completed
1995
U. S. space shuttle docks with Russian space station *Mir* for the first time
1996
EPA launches underground storage tank web site www.epa.gov/oust
1997
1998
EPA establishes first partnership to promote risk-based cleanups
Final deadline for owners to close, upgrade, or replace their tanks
300,000 cleanups initiated
200,000 cleanups completed
At 77, John Glenn, the first American to orbit Earth, returns to orbit in the space shuttle *Discovery*
1999
2000
EPA launches initiatives to:
accelerate cleanups
improve compliance
recycle gas stations
evaluate tank systems
America Online agrees to buy Time Warner – the biggest merger in the country at that time
2001
2002
EPA sets national cleanup goals
President signs Brownfields Law to address petroleum brownfields
2003
300,000 cleanups completed
400,000 cleanups initiated
Santa Monica, California and petroleum companies reach landmark agreement to clean and restore the city's MTBE-contaminated drinking water supply
Concorde's last flight ends the world's only commercial supersonic travel
2004

# Underground Storage Tanks - A Program Of Partnership, Innovation, And Results

The Hatfields, an average American family, lived in Canob Park, Rhode Island about 12 miles from Providence. In 1980, this family had a big problem – they could not use their tap water. They couldn't drink it, bathe in it, or cook with it. Their well was contaminated with gasoline that migrated from the neighborhood gas station, just a quarter of a mile from their house. In December 1983, their story aired on the CBS show, *60 Minutes*.

Buried gasoline tanks gained the national spotlight when *60 Minutes* released its investigative report, "Check the Water". That report revealed other neighbors in Canob Park were in the same situation – gasoline leaking from underground storage tanks was contaminating their drinking water.

That report and similar stories prompted Congress to swiftly enact legislation to create federal standards to regulate these tanks. In November 1984, a year after the *60 Minutes* report aired, President Reagan signed into law Subtitle I of the Resource Conservation and Recovery Act (RCRA). The new subtitle required the U. S. Environmental Protection Agency (EPA) to develop a comprehensive regulatory program for underground storage tanks (USTs) storing petroleum and certain hazardous substances. In 1986, Congress and the President went one step further and created the Leaking Underground Storage Tank (LUST) Trust Fund to pay for the cleanup of releases from these tanks.

*"With the right balance between technology, industry, federal, state, private and public forces, you can get a lot done. The UST program is an example where we found the right balance. I'm very proud that I had a role in it."*

**Senator David Durenberger, Minnesota**
Introduced UST legislation in the U. S. Senate

## Creating A Program To Implement The New Law

EPA quickly set out to develop a national underground storage tank program to implement the new law. From the beginning, EPA realized the immensity of the task. No one knew

*"The UST regulated community is a very diverse group. They range from small, one-station operations to big oil companies. Large companies have many resources and understand that environmental compliance is one of the costs of doing business. EPA understood that smaller operations needed more environmental compliance assistance and technical support."*

**Lee Thomas**
EPA Administrator, 1985-89

the exact number of underground storage tanks subject to the federal law. Estimates were in the millions, and thought to be located in every Zip Code in the United States. While some of these tanks were already regulated by local and state fire codes and health standards, the regulations were often inconsistent and incomplete. The new federal regulatory program would fill the regulatory gaps and dwarf existing programs that EPA administered.

EPA knew there would never be enough resources at the federal level to fully implement the program, to inspect every tank, and to oversee the cleanup of every release. To succeed, EPA needed to heavily involve states in implementing the program. EPA and states would have to become close partners.

To understand the technical problems with underground storage tanks, EPA reached out to a wide range of experts – state and local officials, leaders from environmental groups, tank manufacturers, equipment installers, environmental consultants, gas station owners and operators, and many others. EPA sought their ideas and welcomed their input. EPA wanted the regulations to address the real problems with underground storage tanks, be easily implemented by states, and understood by tank owners.

EPA didn't stop there. Perhaps one of the most novel ideas, especially 20 years ago, was to reach out to companies like Century 21, McDonald's, ServiceMaster, and 7-Eleven to see if the recipe for their success would work for the underground storage tank program. To the Agency's surprise, while each company's line of business was different, they all shared a common thread – a franchise business arrangement. This arrangement allowed each company to set corporate policies

and standards to ensure product consistency and the same level of service, regardless of where stores were located. At the same time it gave individual stores flexibility to develop and implement marketing strategies tailored to their specific needs. It was clear to these companies this approach worked because it used the strengths and knowledge of both the franchisees, who ran the businesses daily, and the franchiser, who provided national policy, crucial support services, and technical assistance.

EPA was convinced a franchise approach would work for the underground storage tank program because we faced issues similar to Century 21 – the need to develop a national program with a consistent set of standards that could be implemented by all 50 states. So, EPA set out to develop a national program based on the franchise approach, with the Office of Underground Storage Tanks (OUST) being the national franchiser and EPA regional offices working directly with states, the franchisees.

As the national franchiser, EPA's recipe for success included four key ingredients: promulgating performance-based federal regulations; aggressively approving qualified state underground storage tank programs; fullfilling EPA's responsibilities in Indian Country; and providing vigorous compliance assistance and outreach.

## EPA's Regulatory Program

In 1985, when EPA began developing its new regulatory program for underground storage tanks, the stakes were very high. The Agency had to quickly promulgate effective and workable regulations that would prevent underground storage tanks from leaking and clean up leaks that had occurred.

Congress had laid out its expectations less than a year earlier. On February 29, 1984 in the words of Senator David Durenberger, one of the principal sponsors of Subtitle I in the U.S. Senate, Congress wanted assurances that "*new tanks are built and installed as they should be and that old tanks are operated and maintained so that the possibility of leaks is minimized. Leaks which do occur should be detected quickly so that the chance of contami-*

*nation is low.*" Eight months later on October 5, 1984 Congressman Jim Florio, one of the key sponsors of the legislation in the U.S. House of Representatives, articulated his vision stating that, "*implementation of these safeguards during the next decade and removal of leaking tanks will, in my view, go a long way toward preserving America's most precious natural resource, its freshwater aquifers.*"

*"We wanted to be sure that the regulations were practical. When OUST was developing the regulations we always thought of the 16-year old gas station worker measuring the tanks at 6 a.m. on a cold day. Will he do what we are asking him?"*

**Ron Brand**
First Director, Office of Underground Storage Tanks

With these expectations in mind, the Agency worked quickly to develop and promulgate new underground storage tank regulations. In less than four years from start to finish, EPA met the challenge. It wasn't easy. EPA knew that because of the magnitude of the underground storage tank problem, a traditional regulatory program would not work. With over two million petroleum and hazardous substance tanks in the ground – most of which were old bare steel tanks, many already corroding and causing leaks – the Agency knew a prescriptive one-size-fits-all regulation would not work.

*"EPA sought industry out and industry made attempts to provide accurate and comprehensive information."*

**Jeff Leiter**
Former Co-chair of the Tank Coalition

Instead, the Agency set off on a path to craft regulations that were flexible, performance-based, technology forcing, and perhaps most importantly, reflected the needs of states who would be the principal implementors of the program. As active co-regulators, states needed the flexibility to implement the federal regulations and set their priorities in a way that would address their unique circumstances and needs. States could go beyond the federal regulations, and some states did in order to protect sole source aquifers or environmentally sensitive areas. And the regulated

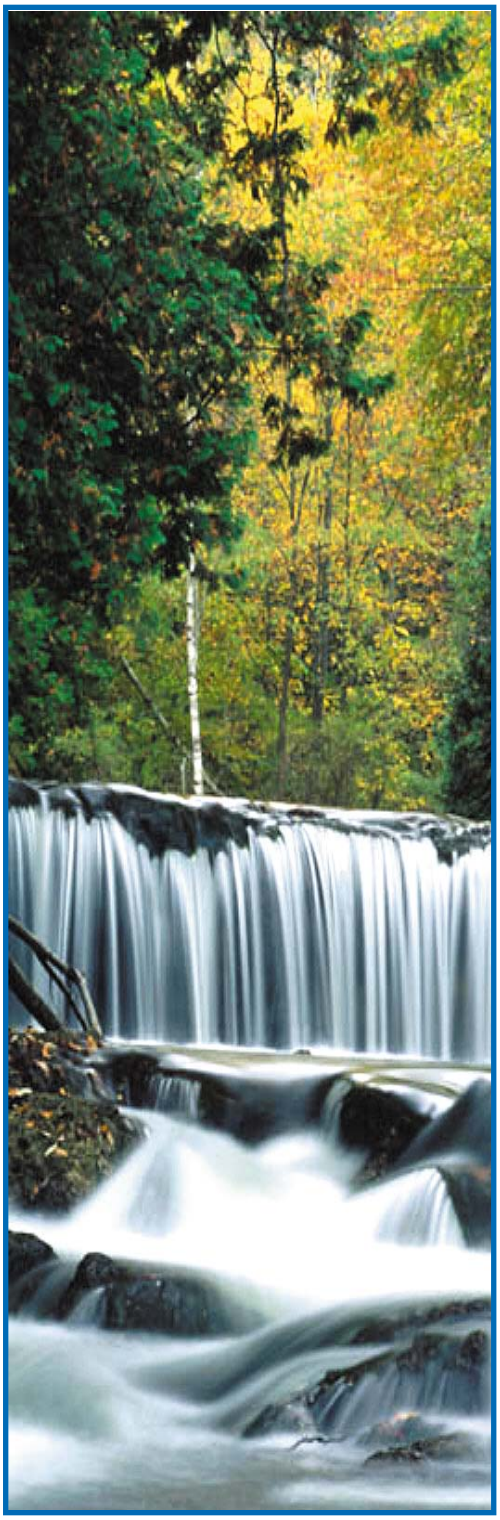
community needed flexibility to choose among effective release prevention and leak detection equipment. At the same time, the federal regulations needed to ensure flexibility didn't come at the expense of protectiveness for all Americans. The regulations had to assure a basic level of protection for everyone regardless of where the tanks were located.

Following hundreds of meetings, information gathering efforts, and countless hours of writing, EPA promulgated its regulations in the fall of 1988. The preamble and the regulations, covering 165 pages in the *Federal Register*, spelled out the rationale for the regulations, requirements, deadlines, options, and areas of flexibility available to the regulated community. The regulations required tank owners to cathodically protect or otherwise close, upgrade, or replace their tanks within ten years and put in place one of several leak detection methods within five years. For leaks that had occurred, the regulations required owners to report them and clean them up according to state-specific standards that are protective of human health and the environment. Owners also had to choose one of several financial assurance mechanisms to demonstrate they had the financial resources to pay for the cleanups.

As comprehensive and technical as these regulations were for tank owners, the regulations were designed to achieve three simple goals:

- **Prevent leaks** by requiring owners to close or upgrade old substandard tanks or install new, better, and safer tanks that won't easily corrode and leak.
- **Detect leaks** quickly by requiring owners to replace or supplement wooden dip sticks and other old, outdated leak detection methods.
- **Clean up leaks** quickly and safely by requiring tank owners to have the financial resources to do so.

These three simple but important goals, and the regulations promulgated in 1988 designed to meet these goals, continue to work for the program today.



## Strong Emphasis On Approving State Programs

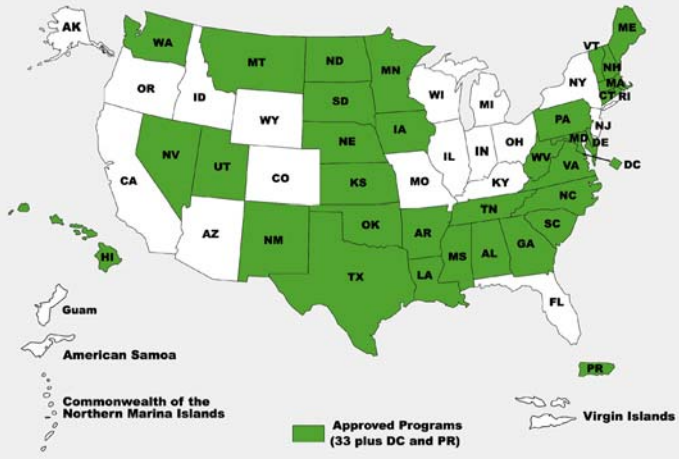
As sound as EPA's new regulations were, the Agency realized that aggressive implementation of the program was the key to success. With over two million regulated storage tanks buried all across America, it was clear that the job was too big for the federal government to implement alone. In fact, in the same February 29, 1984 speech (quoted earlier), Senator Durenberger laid out his expectations on the floor of the U.S. Senate. "*It is my expectation*," he said "*that this program will be run by the State governments with very little Federal involvement.*"

*"Having our own state program allowed us to come up with innovative solutions to solve UST problems that were unique to our state."*

**Michael Kanner**
UST Manager
Minnesota Pollution Control Agency

It was clear 20 years ago states had to play the key role in implementing the underground storage tank program and overseeing and enforcing the regulations. EPA would only succeed in implementing the program if states succeeded. To meet Congress' expectations and EPA's desire for full state

**Currently 33 states, the District of Columbia and the Commonwealth of Puerto Rico have EPA approved UST programs.**



implementation, the Agency had to develop rules that would encourage states to seek formal approval to run their state underground storage tank program in lieu of the federal program. With so many corroding tanks and so many known and yet-to-be-discovered releases, the Agency had to design a process to get qualified states approved quickly and with minimal disruption to their existing work.

Just as the Agency had done with the technical regulations, EPA took a different approach for approving state underground storage tank programs. Because of the nature and magnitude of the tank problem and the importance of getting qualified states approved quickly, the Agency designed a streamlined process for approving qualified state programs. Instead of requiring a burdensome and time-consuming line-by-line comparison between federal and state tank regulations, the Agency would review a state program against eight program specific objectives related to leak prevention, leak detection, cleanup, and financial assurance. States demonstrating that their standards in the eight areas were no less stringent than the federal regulations would be approved, provided their programs regulate the same universe of federally regulated tanks, and they had adequate enforcement.

In July 1990, EPA approved Mississippi as the first state to run its own underground storage tank program in lieu of the federal program. Today, 33 states, the District of Columbia, and the Commonwealth of Puerto Rico have EPA approved programs. With rare exceptions, all other states are implementing their own tank programs under EPA cooperative agreements.

## Fulfilling EPA's Responsibilities In Indian Country

Although the vast majority of the nation's underground storage tanks are regulated by states, tanks in Indian Country present a different challenge. For the roughly 2,600 active tanks in Indian Country, EPA is responsible for directly implementing the underground storage tank regulations. Although the number of tanks in Indian Country is relatively small in com-

parison to today's nearly 700,000 tanks nationwide, EPA is approaching its responsibility in the same manner and with the same purpose.

As the Agency did with states, EPA built strong partnerships with tribes and tribal consortia, and continues to strengthen these partnerships. Through these partnerships, EPA provided and still provides technical support, financial resources, and compliance assistance. Over the last decade, EPA provided over $9 million to tribes and tribal consortia to train their own staff and to develop and manage their own underground storage tank programs. And to further support tribes, EPA conducts approximately 200 tank site inspections annually, oversees cleanup activities, and where appropriate undertakes cleanups.

*"EPA provides real support to tribal tank compliance problems – the Agency's assistance is part of the solution, not a barrier to success. EPA approaches new and innovative tribal programs with an open mind and willingness to turn ideas into reality."*

**Bobby Short**
Environmental Programs,
Inter-Tribal Environmental Council

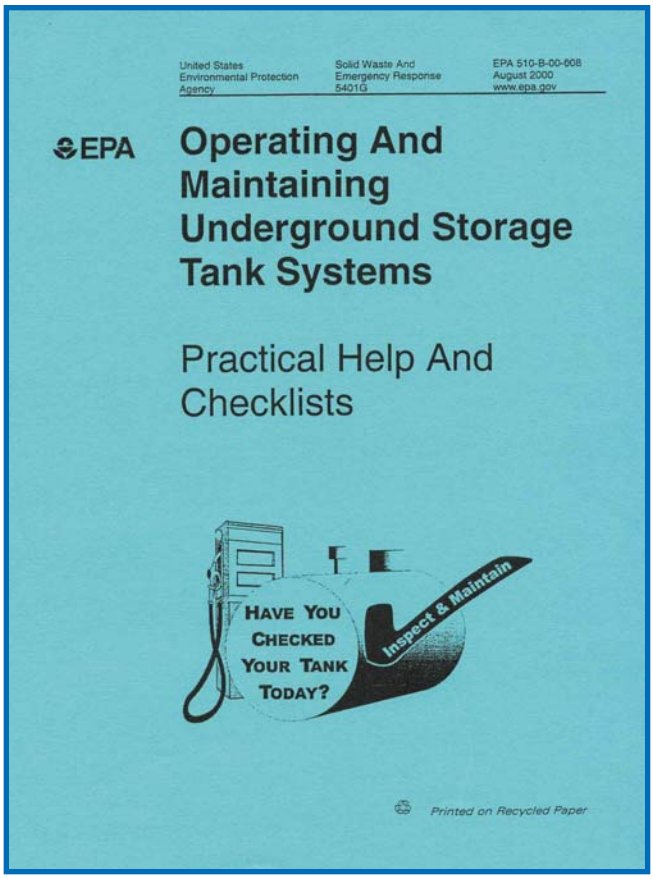
Through these partnerships, EPA and tribes have made considerable progress during the past 20 years. Almost 5,200 old, unsafe storage tanks in Indian Country have been permanently closed, most leaks are promptly reported, and almost 60 percent of all known releases have been cleaned up. Today, nearly all owners of gas stations and other regulated sites in Indian Country have the required equipment in place and most operate it properly.

## Compliance Assistance And Outreach Make A Difference

By developing and implementing the technical and state program approval regulations, and building partnerships with tribes and tribal consortia, EPA was well on its way towards creating a successful regulatory program for underground storage tanks. But the fourth and final ingredient for success, compliance assistance and outreach, was just as challenging and important. The owners and operators of underground

storage tanks had to be educated about the new regulations. Tank owners spanned the spectrum from the largest oil companies to the smallest mom-and-pop gas stations. As is still the case, the federal government also owned tanks, as did state, local, and tribal governments, convenience stores, taxicab companies, bus companies, state transportation authorities, fire departments and many others. Some were large, sophisticated companies and organizations with legions of lawyers and environmental engineers on staff. Others were one-person operations with little or no knowledge of environmental regulations. EPA had to reach all of these owners and provide them with the tools to understand the regulations so they could comply.

EPA began by writing the regulations in plain language before that concept was well known or generally accepted. That alone was a big step, but EPA did more. The Agency produced dozens of documents that explained the regulations in language so simple that a large and diverse audience could read and understand the requirements. EPA also developed documents explaining how to do things correctly like inventory control and leak detection. In 1990, EPA published its first outreach document in Spanish in order to reach the diverse tank owner community. Some of the more popular documents included:




- *Musts for USTs* – a comprehensive, easy-to-read summary of the federal requirements for underground storage tanks focusing on installation, release detection, spill, overfill, and corrosion protection, corrective action, closure, reporting, and recordkeeping requirements.
- *Operating and Maintaining Underground Storage Tank Systems: Practical Help and Checklists* – a manual to help owners and operators understand how to properly operate and maintain their underground storage tank systems.

- *Dollars and Sense* – a booklet providing a plain language summary of owner and operator financial responsibilities under the federal regulations.
- *Straight Talk on Tanks: Leak Detection Methods for Petroleum USTs and Piping* – a booklet summarizing various leak detection methods for underground storage tanks and piping as well as the regulatory requirements for leak detection.

EPA needed a distribution network to reach the diverse and large group of owners and operators. So, EPA turned to its partners in the program – states, tribes, and private industry – to help publicize and distribute thousands of free copies of these and other documents. Today, EPA is taking advantage of the internet by making most publications available on the Web at http://www.epa.gov/oust/pubs/index.htm.

Along with publications, EPA also organized, co-sponsored, and continues to host with states, two annual conferences. These national conferences provide a good opportunity for EPA, states, tribes, and others to share experiences and improve the program. Both conferences provide a forum to exchange information on new technologies and regulatory innovations at all levels of government. And they provide a place for stakeholders from across the nation to share their success stories and lessons learned, which leads to better compliance and more effective cleanup.

*"EPA maintains an atmosphere of open communication and encourages stakeholders to voice their opinions about their experiences. States, industry, and EPA are encouraged to learn from each other and to share successes and challenges."*

**Kathy Stiller Banning**
Delaware UST Manager and Co-Chair of the Association of State and Territorial Solid Waste Management Officials Tank Subcommittee

# A Measure Of Our Success

In 1984, the Congressional Research Service (CRS) published a study about the enormous regulatory task EPA and states faced. CRS noted in its study:

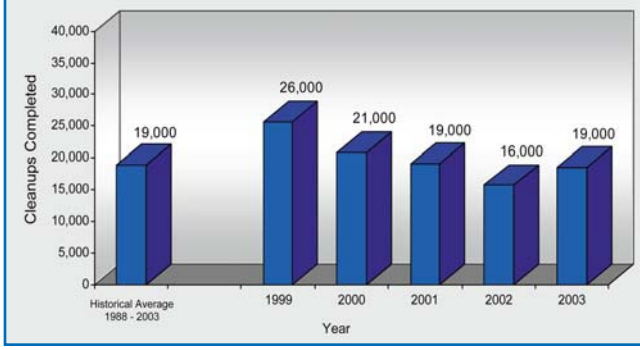
"*An estimated 1.4 million underground tanks in the United States store gasoline. An unknown additional number of tanks store a variety of petroleum products .... Of the 1.4 million underground tanks storing gasoline, approximately 85 percent are made of steel with no corrosion protection and were buried over 20 years ago. Although few data exist, some petroleum industry experts estimate that 75,000 - 100,000 of these underground gasoline tanks may currently be leaking ... into the ground and groundwater supplies and perhaps up to 350,000 tanks may be leaking within the next five years.*"

Twenty years later, the accuracy of the CRS estimates is remarkable. EPA now knows there were over 2.1 million underground storage tanks and over 400,000 releases have since occurred. As a result of the federal regulations, strong state and tribal partners, aggressive outreach, and the combined efforts of our public and private partners, we have made tremendous progress in tackling the problems described by CRS in 1984.

Working together, EPA and its partners have closed over 1.5 million old, substandard tanks and cleaned up over 300,000 petroleum leaks, almost 70 percent of all releases. Through our combined efforts, we have averaged almost 19,000 completed cleanups annually. This has not been easy. Cleaning up BTEX (benzene, toluene, ethylbenzene, and xylene – the basic contaminants in gasoline) is tough enough; but in the mid-1990s states began to discover MTBE (methyl tertiary butyl ether – a gasoline additive) in the nation's groundwater.

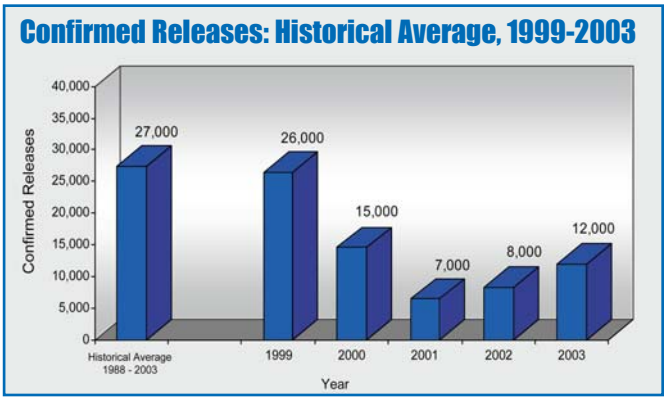
We have now found MTBE in many places and, if left unchecked, MTBE can cause significant groundwater contamination problems. And while MTBE is frequently detected, Santa Monica, California and Long Island, New York were the first cities to experience widespread contamination

**Cleanups Completed: Historical Average, 1999-2003**




All numbers rounded to nearest thousand.

**Confirmed Releases: Historical Average, 1999-2003**



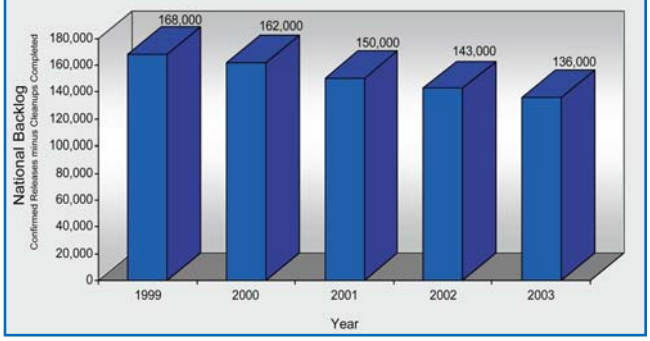

All numbers rounded to nearest thousand.

*"Twenty years later, the unconventional programs developed by EPA's UST program have proven to be effective at protecting public health and the environment."*

**Tom Dunne**
EPA Office of Solid Waste and Emergency Response
Associate Administrator

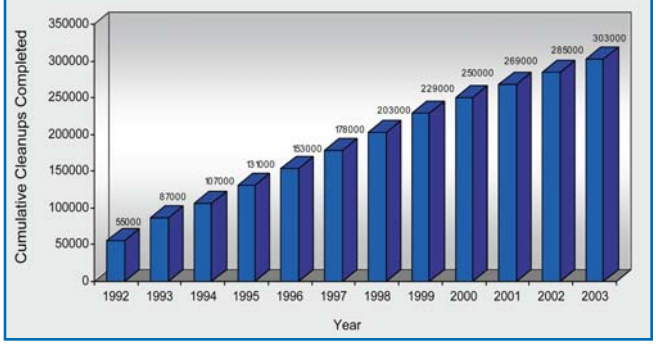
affecting large populations. Up to 300,000 residents were affected in Santa Monica and 2.6 million people were affected in Long Island. Like many other challenges the tank program faced, by working together and relying on each partners' strengths, we are beginning to make a difference in these and other areas. EPA's financial and technical assistance had a great impact in Santa Monica where a landmark MTBE settlement was reached last year between the city and several major oil companies. In the words of Wayne Nastri, Regional Administrator of EPA Region 9, "*The Santa Monica agreement proves that when all levels of government – local, state and federal work together, we serve the common good and produce a comprehensive solution to a difficult problem.*"

**Decreasing UST National Cleanup Backlog, 1999-2003**




**All numbers rounded to nearest thousand.**

**National UST Cleanups Completed, 1992-2003**




**All numbers rounded to nearest thousand.**

On the prevention side, the results are just as impressive. Through combined efforts, nearly all substandard tanks have been closed, replaced, or upgraded. And because of these improvements, our nation has seen a dramatic drop in new releases. Over the history of the underground storage tank program, EPA and states have discovered just over 27,000 new releases a year and as many as 66,000 in 1990. In 2003, we discovered approximately 12,000 confirmed releases, about 60 percent less than the historical average. This dramatic reduction in the number of releases proves the tank program is making a difference.

Much of this reduction is due to better designed tanks and improved compliance on the part of the regulated community. Twenty years ago, CRS believed that 85 percent of the buried tanks were made of bare steel without any corrosion protection. Today, nearly all underground storage tanks are cathodically protected or have been replaced with newer and better tanks. And tank owners have done more than close, upgrade, or replace their older tanks. At the end of 2003, tank owners were operating their spill, overfill, corrosion protection, and leak detection equipment properly at more than 70 percent of all tank sites.

# Commitment To Finding Innovative Solutions

*"The UST regulations ensured a market which provided incentives for those manufacturing tanks, piping and leak detection systems to develop new and better products."*

**Sullivan Curran P.E.**
Executive Director, Fiberglass Tank and Pipe Institute

Statistics alone cannot fully capture the collective success of the underground storage tank program. The performance-based tank regulations were technology-forcing, encouraging industry to develop newer and better methods to prevent, detect, and clean up leaks. In the same vein, EPA encourages and supports states, tribes, and local partners to continuously look for new and better ways to prevent leaks and clean them up quickly and effectively. This proactive attitude has paid off in keeping the tank program fresh with new ideas even after 20 years. And while program innovations came from many sources, states have been at the forefront in developing new approaches. Pay for performance contracting, risk-based corrective action, and state trust funds are three of the most innovative and noteworthy solutions.

## Pay For Performance

In the program's early years, many state officials were looking for a faster, streamlined approach for completing cleanups. After attending the annual national tank conference, a manager from New Mexico's tank program came up with a new idea of paying contractors for their performance rather than for their time and materials. Following the conference, pay for performance contracting, more popularly known as PFP, was born. Other states have adopted and expanded that concept for their own use.

PFP contracting holds the contractor accountable by tying contractor payments to meeting firm, measurable cleanup goals. By doing so, cleanups are often faster, less expensive, and more likely to rely on new, more effective cleanup methods. As an added benefit, there is less paperwork and a lighter administrative load because there is no need for extensive reviews of contractor billings.

In pay for performance cleanups, contractors are paid a set amount of money for reaching specific contamination reduction goals (within a set time limit), which are predetermined by state cleanup experts.

### *Successes*

South Carolina has been a trendsetter when it comes to the use of PFP contracting. The state first used PFP contracting in 1997 and quickly made it an integral part of its approach to cleaning up leaks from underground storage tanks. South Carolina has not only seen a reduction in the amount of time required for cleanups, but has also been getting the same or higher quality work while paying less. South Carolina reports an average savings of $215,000 per site cleanup with reduced staff project management time needed. The state's ability to set clear time lines for cleanup and to monitor contractors' progress is the key to success. South Carolina mandates quarterly reports from contractors on contamination levels and ensures cleanup projects remain on track for completion. The state's PFP program has been so effective that South Carolina was awarded an Engineering Excellence Award by the Consulting Engineers of South Carolina Association.

Similar success has occurred throughout the country. Many states have used the example set by South Carolina to develop PFP programs of their own. Florida, Utah, Georgia, California, Vermont, Oklahoma, Nebraska, and others have also taken the initiative and developed unique approaches to PFP contracting.

## Risk-Based Corrective Action

Risk-Based Corrective Action (RBCA) is a streamlined approach that integrates exposure and risk assessment practices with traditional components of the corrective action process to ensure that appropriate and cost-effective remedies are selected and that limited resources are properly allocated.

During the 1980s, EPA, states, and tribes faced the daunting task of assessing and cleaning up hundreds of thousands of leaks quickly and effectively. It became obvious that because of the number of leaks, EPA and states needed a way to set priorities. So over the course of two years, EPA – along with partners from states, industry, and the American Society for Testing and Materials – developed Risk-Based Corrective Action (RBCA). This tool helps states evaluate

the cleanup priority of each site based on relative risks to human health and the environment. Today nearly all states use risk-based decision making to protect human health and the environment.

### *Successes*

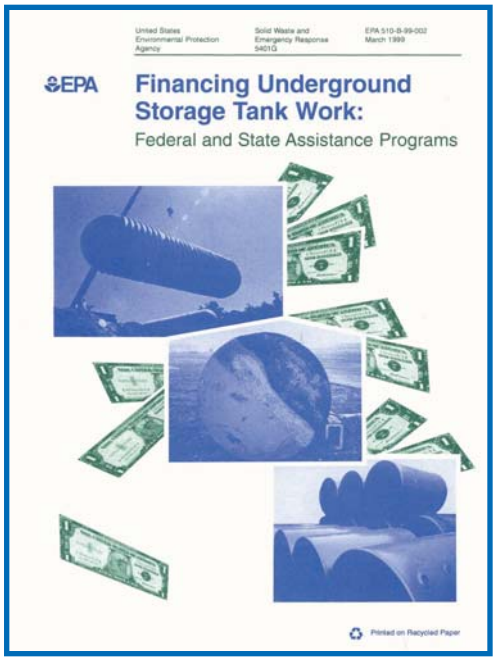
The benefits of applying risk-based decision making to cleanups is perhaps best illustrated in a March 2000 study, published by the American Society for Testing and Materials. The study highlighted risk-based cleanup programs in Illinois, Iowa, Texas, North Carolina, and Utah and evaluated each program's performance from 1990 to 1999. Astonishingly, the study showed that immediately following implementation of risk-based decision making, four of the five pilot states observed a dramatic spike in annual number of cleanups completed and, in some circumstances, a decline in their backlog of cleanups to be completed. Utah's cleanup completion rate increased by 120 percent during the first year. The monetary benefits of risk-based decision making were also encouraging. Between 1994 and 1998, remediation costs in Texas dropped by 77 percent for soil-only sites (median cost reduced to $24,000 per site from $80,000 per site) and by 58 percent for low risk groundwater impact sites (to $107,000 per site from $250,000 per site).

Risk-Based Decision Making is a process that UST implementing agencies can use to:

- Focus site assessment data gathering.
- Categorize or classify sites.
- Determine what, if any, further action is necessary to remediate a site.
- Help establish cleanup goals.
- Decide on the level of oversight provided to cleanups conducted by UST owners and operators.

## State Trust Funds

The financial responsibility regulation EPA promulgated in 1988 required tank owners to show they have the financial resources to clean up a site if a release occurred. The regulation gave owners a variety of compliance options. Unfortunately, private insurance was not widely available or was extremely costly, especially for small businesses. Additionally, private insurance did not cover the costs of cleaning up the thousands of known releases.



## *Successes*

To create a way to pay for cleaning up known releases and to meet the financial responsibility requirements, one of the most creative tools – state trust funds – was born. No federal mandate required states to create these funds. But state officials, seeing how their peers in other states had responded to the needs of their tank owners, especially small businesses, developed their own funds.

While each state fund is somewhat different, they all enable tank owners to comply with the financial responsibility requirements and provide money to clean up releases.

By all accounts, these funds have worked. Today 40 states have funds that provide money to clean up underground storage tank releases. States raise and spend more than $1 billion annually. And, over the life of the program, states have spent more than $11 billion to help clean up more than 300,000 petroleum releases.

# Continuing Challenges

Twenty years ago, the Hatfields of Canob Park, Rhode Island and countless other Americans in other states had to live with the effects of leaking underground storage tanks from nearby gasoline stations, convenience stores, and other locations. No one knew where all of these tanks were located, what they were made of, or whether they were leaking. It was not uncommon in 1984 that the first and only sign gasoline had leaked from an underground storage tank was a strong odor coming out of the shower or a bad taste from the tap water.

It took swift Congressional and Presidential action to enact federal legislation to create a national underground storage tank program. Twenty years ago, EPA's first major challenge was how to implement this new legislation. Given the size of the regulated universe, the unknown number of leaks, and the great diversity of owners, EPA had to adopt new approaches, write the regulations, and implement the national program. Based on the franchise approach, EPA built strong partnerships with states, tribes, and private industry to tackle this problem. By many measures, the program has succeeded and served the nation well. Through these partnerships, we have made great progress by designing better and safer tanks, cleaning up two-thirds of all leaks, and cutting the number of new leaks by 70 percent.

*"EPA made a sincere effort to involve stakeholders in developing UST regulations. Anyone who was interested and thought they had something valuable to add was allowed to voice their suggestions. EPA has created UST regulations that have survived, been understood, and substantially complied with."*

**Robert Renkes**
Executive Vice President and General Counsel
for the Petroleum Equipment Institute

But as the tank program celebrates its 20th anniversary, there is still much left to be done. Some of the new challenges that lie ahead include improving operational compliance, completing cleanups, minimizing leaks from new and upgraded tanks, and cleaning up and reusing abandoned gas stations and other petroleum brownfields. By carrying on the original principles

of partnerships and innovation that were established 20 years ago and tested and strengthened over time, together we will continue to find new ways to solve the challenges of today and tomorrow.

## Improving Operational Compliance

While tremendous strides have been made in reducing the number of new releases, thousands of newly discovered leaks still occur each year. The lack of proper operation and maintenance is one of the major causes of new releases. EPA and states are working together on several major efforts to address the challenge.

One way to improve operational compliance is to increase the frequency of tank inspections. A few states conduct annual inspections, but most inspect tanks on average less than once every three years. To increase the number of inspections, some states have developed innovative methods such as the use of certified third party inspectors or contracting with local fire and health departments. We need to explore these and other methods.


In addition to conducting more inspections, we need to ensure inspectors are well trained. Well-trained inspectors are integral to helping owners and operators achieve and maintain operational compliance. To meet this need, EPA and states are developing web-based training for federal and state tank inspectors and site cleanup managers. The on-line modules, available later this year, will provide basic instruction for tank inspectors and cleanup managers. EPA is planning to complete more advanced modules in future years.

Over the years, EPA has produced dozens of compliance assistance documents to help owners and operators deal with a wide variety of tank topics. Continuing that effort, EPA and states are developing an easy-to-use, model workbook that can be tailored to individual states and used by tank owners to determine if they are in compliance and identify what needs to be done to reach and maintain compliance.

## Completing Cleanups


EPA and its partners have made enormous progress by cleaning up over 300,000 contaminated sites. Still, 130,000 contaminated sites need to be cleaned up. EPA and our partners are committed to cutting this number in half by 2007 and continuing the legacy of finding faster, more innovative, and less costly ways to get the job done.

EPA is helping states and tribes reach their cleanup goals by characterizing the types of sites that still need to be cleaned up. The Agency is also taking a targeted and intensive look at how to move difficult cleanups forward and get them completed. This review should help identify fresh approaches for expediting cleanups. EPA is also encouraging multi-site cleanup approaches and wider use of pay for performance contracts, both of which accelerate cleanups and reduce costs and administrative burdens.

As is the case for inspectors, EPA and states have a continual need to train new staff who oversee cleanups. Well-trained staff are integral to ensuring cleanups are initiated and completed properly. EPA and states are developing introductory, web-based training, available later this year, for federal, state, and tribal site cleanup staff. More advanced modules are being planned for the future.

While EPA and states are focusing efforts on completing cleanups, there is still a need to ensure that sites not yet cleaned up are managed properly to protect human health and the environment over the long-term. Tracking and enforcing institutional controls that lay out limitations for using sites are key to managing contaminated sites responsibly over time. EPA and states are continuing their partnership to develop tools which improve long-term site management.

## Minimizing Leaks From New And Upgraded Tank Systems

Over the past 20 years, EPA and its partners have closed over 1.5 million old, outdated underground storage tanks. Today, nearly all underground storage tank systems in this country

have the required leak prevention and leak detection systems and are less likely to corrode and leak than the tank systems of the previous generation. Nevertheless, many new tank systems are continuing to leak. While we don't know how many are leaking or all of the reasons, we are beginning to learn that some of the problems are due to faulty equipment, improper installation, and lack of proper operation and maintenance of the equipment.

Anecdotal information indicates that releases from piping, as well as spills and overfills during delivery, are still prevalent and releases from dispensers have emerged as a leading source of contamination. States again have been in the forefront of addressing these problems. In addition to taking proactive program and regulatory steps to improve tank system performance, several states have undertaken studies to quantify tank system performance.

EPA is also evaluating tank system performance and working with state and industry partners to determine the primary sources and causes of problems. Once completed, this evaluation will help EPA, states, and industry guide future training efforts; identify research needs; focus inspection resources; and improve tank system installation methods, operation and maintenance procedures, and underground storage tank system equipment.

This effort is essential to ensure we not only retain the significant improvements we've made over the past 20 years, but continue to move the program forward toward a better and cleaner future. This commitment to continuous improvement has been a hallmark of the underground storage tank program since its inception and continues to be a driving force within the program.

## Cleaning Up And Reusing Petroleum Brownfields

For the past 20 years, regulating tanks at active gas stations and other fueling sites has been the principal focus of the underground tank program. But old abandoned gas stations can be

eyesores and blight communities. The 2002 Brownfields Law is giving EPA, states, cities, entrepreneurs, and community leaders an opportunity and new tools to clean up and return to productive reuse many of the 200,000 abandoned petroleum sites scattered throughout America. Using the foundation upon which the underground storage tank program was built – partnerships, creativity, and hard work – we can meet this new challenge.

*"The entire petroleum brownfields agenda is a critically important task of the UST program and is a major part of the vision for the future."*

**Timothy Fields**
Former Office of Solid Waste and Emergency Response Assistant Administrator

In 2000, building on the success of the Brownfields program, EPA created USTfields and began in earnest to focus on abandoned petroleum sites. EPA provided almost $5 million to fund 50 USTfields pilots. Three years later, EPA awarded almost $23 million for 102 new petroleum grants, under the 2002 Brownfields Law. These grants are helping states and cities assess, cleanup, and reuse petroleum brownfields. Some communities are already seeing results. In Nashua, New Hampshire, New England's largest bicycle dealer is now located on a cleaned up petroleum-contaminated industrial site. In Trenton, New Jersey, the city reclaimed an abandoned gas station and built a new firehouse.

In addition to the grants, EPA and states are continuing their legacy of developing and disseminating innovative tools to address petroleum brownfields. Issuing a Ready-for-Reuse determination is one such tool. It is being used in Sayre, Oklahoma and in other places to acknowledge that the site has been cleaned up and is ready and available for a particular type of reuse. Site inventories are helping bring property owners together with end users who may want to use the property. And Triad is a comprehensive approach for planning, managing, and implementing area-wide cleanups quickly and efficiently.

Ultimately, we need to strengthen our existing partnerships and build new ones to meet the new petroleum brownfields challenge. In some ways, this challenge may be tougher than oth-

Located in a part of Chicago with minimal green space, the West Ogden Pocket Park was formerly a service station. The site was an eyesore and contained a derelict building used for illegal dumping and 11 USTs that ranged in size from 600 to 10,000 gallons. Cooperation between the Chicago Department of Buildings, Department of the Environment, and Department of Transportation led to tank removal, site remediation, and restoration. In the summer of 2001, the West Ogden Pocket Park opened, adding much needed green space to the neighborhood.

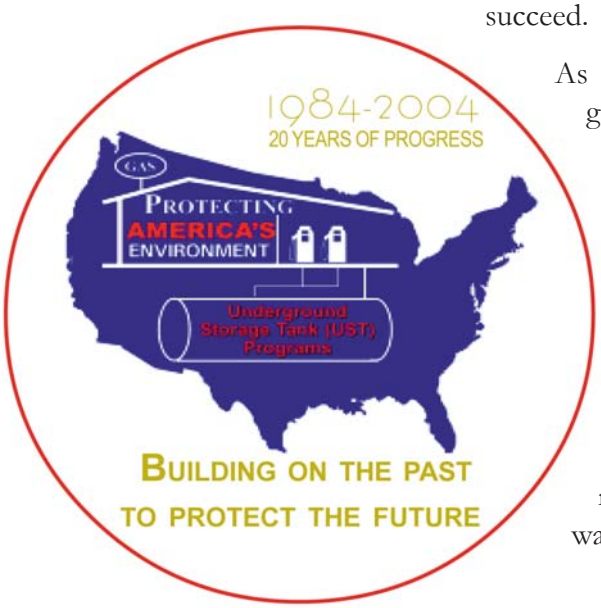
ers because of the need to include additional partners – property owners, end users, bankers, cleanup contractors – as well as traditional regulatory partners. Even though developing these partnerships is time consuming, some are already in place and making progress. Through a new partnership with Habitat for Humanity, the City of Oakland, California, and EPA, an old gas station with four buried tanks was cleaned up. Now in its place are four new homes for low income families.

By expanding old partnerships, creating new ones, developing user-friendly tools, and taking advantage of the new opportunities in the Brownfields Law, EPA, states and other public and private partners can clean up and reuse thousands of old abandoned gas stations.

## Meeting New Challenges

*Partnerships, innovative solutions, cooperation, feedback, striving to improve.*

Over the last 20 years, EPA used these principles to set in place a framework and foundation for partnerships to successfully manage America's tank systems. And the choices we made and used throughout the program's history helped us succeed.




As we enter the third decade of the underground storage tank program, new challenges lie ahead and a great deal more work needs to be done. We are committed to continuing the past ideals that have taken the tank program to where it is today. And we are dedicated to ensuring continued success in protecting the nation's environment and human health from underground storage tank releases. With the continued support of our partners, we will keep our nation's land and water safe for our and future generations.

# Reflections

*"EPA sought technical expertise from all sources - tank owners and vendors, state and local government agencies, and franchise operations. We sought to fully understand the operation of these tanks and find ways to improve the process from within."*

**Louise Wise**
Former OUST Division Director responsible for developing the regulations

*"We worked towards compromises that would achieve tank standards while being realistic about what it would mean for those actually doing the work."*

**Carrie Wehling**
One of the original EPA lawyers who worked on the UST regulations

*"Outreach was of great importance in the underground storage tank program from the very beginning, since our mission was to try to change the tank management practices of 175,000 owners and operators with very diverse backgrounds and education levels. To get people's attention, we created, for example, a lively brochure called Musts for USTs that explained the new tank management requirements in very simple and clear terms and even used cartoons depicting comical scenes to make the text interesting to read."*

**Helga Butler**
The first OUST Branch Chief of Communications

*"Many of the principles that led to the success of the UST program (customer orientation, continuous improvement, flexibility, partnerships) were considered quite innovative, even rebellious, in the mid-1980s. Today, these principles have become commonplace in many of EPA's programs."*

**John Heffelfinger**
One of the original OUST staff members

*"The theme of the office was to make states successful. We appreciated how OUST empowered states and offered tools and flexibility so that states could find creative solutions to UST challenges."*

**Bill Torrey**
EPA New England Regional UST Program Manager

**United States Environmental Protection Agency**

**Office of Solid Waste and Emergency Response**

**Office of Underground Storage Tanks**

**www.epa.gov/oust**
**March 2004**