



Report to Congress on a Compliance Plan for the Underground Storage Tank Program

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Office of Underground Storage Tanks

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Executive Summary

Request By Congress to Develop Compliance Plan

On October 13, 1999 in its fiscal year (FY) 2000 Appropriations Committee Conference Report, Congress directed the U. S. Environmental Protection Agency (EPA) to prepare and submit to Congress by May 1, 2000 a compliance plan regarding the underground storage tank (UST) program. In particular, the conferees requested the compliance plan (which is to include cost estimates): identify underground storage tanks that are not in compliance with Subtitle I of the Solid Waste Disposal Act; identify underground storage tanks in temporary closure; determine the ownership of underground storage tanks not in compliance or in temporary closure; and determine the plans of owners and operators to bring such tanks into compliance or out of temporary closure. Congress also asked that for tanks for which no owner can be identified, EPA describe how those tanks will be brought into compliance or closed permanently. In this plan, EPA devotes a chapter to each of the topics that Congress identified.

Interest in the UST Program

Effective December 22, 1998, owners and operators were required to ensure their substandard USTs were upgraded (with spill, overflow, and corrosion protection), met new tank standards, or were properly closed. There has been a great deal of interest – from Congress, industry, media, and other affected parties – as to whether owners and operators are complying with this deadline. Because this requirement is one of the major components of a comprehensive approach EPA has taken in working to prevent, detect, and clean up releases from underground storage tanks, it is easy to understand why compliance with the December 22, 1998 requirements has generated attention.

Major Findings of the Compliance Plan

As discussed in Chapter 1 of this plan, state agencies are the primary implementors of the UST program, except when a state has not adopted regulations, and in Indian Country where EPA has responsibility for implementing the program. As a result, EPA consulted with state UST managers as the Agency developed this plan. These managers have considerable knowledge about UST compliance in their states and how to improve compliance with UST requirements. The Agency also consulted with EPA regional managers responsible for program implementation in Indian Country.

While there are similarities among state programs, states are encouraged to adapt their programs to meet their specific needs and conditions. As a result, there is considerable variety in state approaches, which is a major strength of the UST program. This diversity, however, presented significant challenges in preparing this compliance plan which needed to be general

enough to be applicable nationwide, yet recognize the differences among the states. The diversity among the state programs made it difficult at times to make cost estimates. In several cases, EPA had to make assumptions (which are listed in Appendix A) to arrive at cost estimates. EPA consulted with state UST managers to make the most reasonable assumptions warranted.

Congress directed EPA to include five topics in this compliance plan. Below is a brief discussion of the major findings for each topic.

Identify Underground Storage Tanks That Are Not in Compliance with Subtitle I of the Solid Waste Disposal Act

Inspecting All Facilities

Chapter 2 discusses the approach EPA developed for identifying USTs that are not in compliance and includes determining whether they have the required equipment and whether they are properly operated and maintained. Since most USTs already have the proper equipment, the major focus of the approach is proper operation and maintenance of that equipment. A one-time inspection of all UST facilities can determine compliance, but routine inspections would be more successful in ensuring continued compliance. On average, states inspect each facility approximately every three to four years. The additional cost for more frequent inspections over and above what is currently expended is significant:

- The cost of an initial inspection, including inspector training, in one year would be approximately \$93 million;
- The annual cost of routine inspections every year thereafter would be approximately \$70 million;
- The cost of inspecting every facility in two years, including inspector training, would be approximately \$63 million, or \$31.5 million per year;
- The annual cost of routine inspections every two years thereafter would be approximately \$20 million;
- The cost of inspecting every facility in three years, including inspector training, would be approximately \$44 million, or \$14.7 million per year;
- The annual cost of routine inspections every three years thereafter would be approximately \$9 million.

The one year inspection cycle may be infeasible due to the significant staff increases that would be required. For the three year inspection cycle, Chapter 2 also discusses using a prioritization system for inspections based on the likelihood of facility noncompliance and location in environmentally sensitive areas. Facilities posing the greatest potential threat would be inspected more frequently. While frequent inspections of all facilities would yield the highest compliance rate, prioritizing inspections based on indicators of risk such as compliance history

and location in sensitive environmental areas would be more cost effective for any given level of resources. Table 1 summarizes the costs, over and above existing spending levels, for conducting one, two, and three year inspections at all facilities.

Table 1
Overview of Estimated Additional Costs for Inspecting All Facilities

Inspection Cycle	1 year	2 year	3 year
Initial Inspection Cost, Including Training	\$93 million	\$63 million over 2 years (\$31.5 million per year)	\$44 million over 3 years (\$14.7 million per year)
Continuing Inspection Cost	\$70 million per year	\$20 million per year	\$9 million per year

Inspecting Only Facilities Not Known to be Equipped to Meet the 1998 Requirements

There has been a great deal of interest in compliance with the December 22, 1998 deadline for spill, overfill and corrosion protection and EPA is often asked about the number of UST systems that are equipped to comply with these requirements. As a result, the Agency divides out the costs to inspect all facilities (with registered and/or unregistered USTs) where implementing agencies are uncertain whether or not the necessary equipment exists to meet the 1998 requirements for spill, overfill, and corrosion protection. The cost to inspect only those facilities would be approximately \$30 million if done in one year, approximately \$15 million (\$7.5 million per year) if done over two years, and approximately \$10 million (\$3.3 million per year) if done over three years. These costs are over and above existing spending levels. Please note these inspections are targeted only at facilities where there is a question about whether or not the system is equipped to comply with the 1998 requirements. While at these targeted facilities, however, inspectors would also inspect for other requirements including those related to operation and maintenance.

EPA also includes in this plan the costs to inspect only those facilities with registered USTs where implementing agencies are uncertain whether or not the necessary equipment exists to meet the 1998 regulatory requirements for spill, overfill, and corrosion protection. The cost to inspect those facilities would be approximately \$11 million if done in one year, approximately \$4 million (\$2 million per year) if done over two years, and approximately \$2 million (\$0.7 million per year) if done over three years. These costs are over and above existing spending levels. Table 2 summarize the costs for conducting one, two, and three year inspections at only those

facilities not known to be equipped to meet the 1998 requirements for spill, overflow and corrosion protection.

Table 2
Overview of Estimated Additional Costs for Inspecting Only Facilities Not Known to be Equipped to Meet the 1998 Requirements

Inspection Cycle	1 year	2 year	3 year
Inspection Cost - Registered and Unregistered Facilities (Includes Initial Training Cost)	\$30 million	\$15 million over 2 years (\$7.5 million per year)	\$10 million over 3 years (\$3.3 million per year)
Inspection Cost - Registered Facilities Only (Includes Initial Training Cost)	\$11 million	\$4 million over 2 years (\$2 million per year)	\$2 million over 3 years (\$0.7 million per year)

Identify Underground Storage Tanks in Temporary Closure

Chapter 3 discusses the approach EPA developed for identifying USTs in temporary closure. All USTs in temporary closure must be registered. Therefore, these USTs can be identified through the implementing agency’s database and through the inspections of all facilities discussed above. The Agency estimates no additional costs associated with identifying these USTs.

Determine the Ownership of USTs Not in Compliance or in Temporary Closure

Chapter 4 examines determining the ownership of USTs not in compliance or in temporary closure. Determining the ownership of most registered USTs, including those in temporary closure, is relatively straight-forward and can be determined by a review of the implementing agency’s databases or through the inspections of all facilities described in Chapter 2. Determining the ownership of abandoned unregistered USTs can be difficult, although many states would assign ownership of abandoned USTs to the current property owner. In Chapter 2, EPA suggests an approach of using summer hires to: identify unregistered USTs and perform an initial screening through an examination of real estate and property tax records in order to identify owners. The cost of identifying the unregistered USTs is included in the costs discussed in Chapter 2. The cost of an initial examination of existing records to determine ownership of unregistered USTs is approximately \$170,000. Due to the difficulty of making an estimate, EPA does not include the cost for state UST inspectors to locate and contact the property owners before states perform an inspection.

Determine the Plans of Owners and Operators to Bring Such Tanks Into Compliance or Out of Temporary Closure

Chapter 5 discusses how to determine the plans of owners and operators to bring USTs not in compliance or in temporary closure into compliance or out of temporary closure. In general, implementing agencies can determine the plans of owners and operators through the inspections of all facilities discussed in Chapter 2 and through follow-up activity that would occur after the inspections. The cost estimates for Chapter 2 include the initial follow-up and issuing warning letters and notices of violation. This is often sufficient to secure compliance. However, formal enforcement will be needed in many cases of non-compliance. The Agency has not estimated enforcement costs for purposes of this report. However, enforcement activity could be a substantial cost.

Describe How Tanks for Which No Owner Can Be Identified Will Be Brought into Compliance or Permanently Closed

Chapter 6 describes how tanks for which no owner can be identified will be brought into compliance or permanently closed. In this chapter, EPA also includes an analysis of those tanks for which the owner is financially insolvent. (EPA has defined USTs for which there is no owner or the owner is financially insolvent as orphaned USTs.) Identifying legal owners of abandoned tanks can usually be accomplished. However, because permanent closure or remediation to clean up a release may be costly, many of the owners will not have the financial resources necessary to bring their USTs into compliance. The Agency estimates the total cost to conduct site assessments (\$5,000 per site) and associated cleanups (\$40,000 per site) of orphaned UST sites is approximately \$675 million. EPA believes approximately one half of this, or more than \$335 million, can be paid for by state funds and the remaining costs would need to be funded from other sources.

Currently, neither EPA nor most states have the authority to close registered or unregistered orphaned USTs when there is no release. If that authority was available, however, EPA believes the closure costs for USTs without releases would be approximately \$70 million.

Conclusion

States and EPA have made significant progress over the past 15 years in developing and implementing a comprehensive regulatory UST program, which includes overseeing the permanent closure of approximately 1.3 million federally-regulated substandard USTs. As of September 1999, approximately 400,000 releases from federally-regulated UST sites have been reported; work has begun on approximately 346,000 of those sites and completed at almost 229,000 of them.

Even though substantial progress has been made, considerable work – such as improving the compliance rates of active USTs – remains to be accomplished. Regular and frequent inspections are the best way to achieve improved compliance rates and maintain high compliance rates. Considerable work also needs to be accomplished to permanently close orphaned USTs and, where necessary, remediate releases from them. The following chapters in this compliance plan discuss the approaches and estimated costs for accomplishing this important work.

Chapter 1

Introduction to The Federal Underground Storage Tank Program

Congressional Mandate

In 1984, Congress amended the Resource Conservation and Recovery Act (RCRA) to include Subtitle I in response to a growing threat from releases from underground storage tanks (USTs). Leaking USTs can cause fires or explosions as well as contaminate nearby groundwater. Because of these threats and the fact that approximately 50 percent of the nation's population depends upon groundwater for their drinking water, Subtitle I directed EPA to develop and implement comprehensive regulations to protect human health and the environment from leaking USTs.

The Federal UST Program

As EPA established the UST program, it was faced with some unique challenges. The regulated universe was immense, amounting to more than 2 million regulated USTs. Many of the USTs were old, made of bare steel, and subject to corrosion which is a major cause of release. Many of the regulated facilities were owned and operated by small businesses not accustomed to dealing with complex regulations or what would become increasingly complex UST systems. Finally, the UST industry was in the midst of technological changes. The impending regulations had to take into account yet-to-be determined changes.

Given the large number of UST facilities, tank systems, and potential cleanup needs, EPA believed that many aspects of the regulatory program would be most effectively carried out at the state level. Based on the experience of states that had already been operating UST regulatory programs, EPA learned it takes several years for most owners or operators to understand, plan, and arrange to meet new regulatory requirements.

EPA believed a phased-in approach was needed to allow sufficient time for owners and operators to respond to the new federal regulations. The federal regulations establish comprehensive requirements for managing a wide range of USTs. EPA designed the regulations to reduce the number of releases, increase the ability to quickly detect and minimize contamination, and ensure adequate cleanup of contamination.

While EPA developed a comprehensive program, it is important to note that many USTs are not covered by the program. For example, Congress in Subtitle I excluded several types of tanks from the definition of an underground storage tank. Most important of these are farm and residential tanks of 1,100 gallons or less capacity holding motor fuel used for noncommercial purposes and tanks storing heating oil on the premises where stored. In the late 1980s, there

were approximately 2.7 million of these heating oil tanks and an estimated 300,000 farm and 100,000 residential tanks excluded. While there is no current estimate of the number of tanks excluded from the definition of an UST, they still comprise a large number and are likely to easily exceed the number of federally regulated USTs. Some state programs regulate some of these tanks, especially home heating oil tanks, although not necessarily to the same extent as they regulate federally regulated USTs.

In addition to tanks excluded from the definition of UST, EPA excluded certain UST systems from the regulations. Among the excluded UST systems are certain wastewater treatment tank systems, those whose capacity is 110 gallons or less, those containing *de minimis* concentrations of regulated substances, and any UST system holding hazardous wastes listed or identified under Subtitle C of the Solid Waste Disposal Act. (Hazardous waste tanks are regulated under Subtitle C.) Some UST systems are deferred from portions of the regulations. Among these are UST systems containing radioactive material that are regulated under the Atomic Energy Act of 1984, airport hydrant fueling distribution systems, and UST systems with field constructed tanks. Some state programs regulate some categories of USTs excluded or deferred from the federal regulations.

Initially, EPA focused on designing the program and promulgating the regulations. The Agency has taken an active presence in making improvements to the program; helping the states implement the program in their jurisdictions; and directly implementing the program in Indian Country and where states do not have regulations. This work has involved building and strengthening an effective state-federal partnership discussed below. EPA continues to undertake a wide range of direct implementation responsibilities as well as developing additional training and assistance documents to benefit owners and operators and state personnel. Over the past decade or so, EPA – partnering with states and industry – has distributed more than one million copies of various publications to help improve owners’ and operators’ understanding of and compliance with the regulations. The Agency also provides states with electronic versions of many publications so they can produce the publications themselves and make changes specific to the needs and requirements of the state. EPA also carries out initiatives which benefit the entire UST program, such as the current priority to evaluate the effectiveness of UST systems and identify improvements to ensure continued and enhanced protection of human health and the environment.

An Effective State-Federal Partnership

From the onset, the federal UST program was faced with regulating a huge universe of USTs. EPA recognized that the nature of the UST problem and the work involved in effective direct implementation of the regulations by EPA would overwhelm the Agency’s capabilities and resources. As a result, EPA designed the UST program to be implemented primarily by states, since they were better able to provide oversight and the constant regulatory presence required to

effectively manage this program. (EPA is responsible for implementing the UST program in Indian Country and when a state has not adopted regulations.) This decentralized approach was needed to ensure real gains in protecting human health and the environment.

This state-EPA partnership has made significant progress in addressing the UST problem. Since the inception of the program, when there were more than two million federally regulated USTs, more than 1.3 million substandard USTs have been closed. As a result of those closures, the substandard tanks are no longer sources of actual or potential releases which could harm human health and the environment. As of September 30, 1999, the federally-regulated tank universe was about 760,000, of which states and EPA report approximately 85 percent were in compliance with the spill, overfill, and corrosion protection portion of the regulations (1998 requirements).

States have reported nearly 400,000 confirmed releases from USTs. Cleanups have been initiated for approximately 346,000 releases and almost 229,000 cleanups have been completed. More than 20,000 cleanups are completed annually. Even with this record of success, many thousands of cleanups remain to be completed.

According to the information provided by states and EPA regional offices, owners and operators have made a great deal of progress in complying with the spill, overfill and corrosion protection requirements. However, EPA and states need to accomplish additional important work to improve the compliance rate and have more UST systems better equipped to prevent releases. In addition, substantial work needs to be done to improve the compliance rate with the leak detection requirements. Many states estimate that the operational compliance rate with the leak detection requirements is approximately 60 percent. (These requirements were phased in between 1989 and 1993.) Constant efforts, including increased inspections by states and EPA, will be necessary to improve this compliance rate.

There are several basic steps EPA and states have taken, and continue to take, to foster compliance with the regulations. The first is to thoroughly and repeatedly educate and inform the regulated community about the requirements and the options for complying. The second is to monitor compliance through inspections or other means. Where necessary and appropriate, the final step is to use enforcement or other incentives to ensure compliance. EPA and states have made tremendous efforts in educating and assisting the regulated community. Collectively, EPA and states have distributed more than one million compliance assistance documents, sponsored training for owners and operators, maintained hotlines and web sites, and provided compliance assistance while visiting facilities. Educating the regulated community is a continuing challenge, especially in ensuring they operate and maintain their UST systems properly. EPA and states have also been actively working to monitor compliance, which is often done through facility inspections, though the enormous size of the regulated universe makes compliance monitoring a significant challenge. While much progress has been made in ensuring compliance, additional

monitoring will be required to identify the full scope of compliance, and continued periodic inspections will be necessary to ensure UST systems remain in compliance. This report focuses primarily on enhancing compliance monitoring, both for registered and unregistered USTs. Enforcement is discussed further in Chapters 2 and 5.

Preparing the Compliance Plan

From the beginning of the UST program, EPA designed the federal UST program to be implemented primarily by the states. More specifically, the UST program has adopted a franchising approach, which provides a unique cooperative venture between EPA and state governments whereby the states manage the daily business of running the program and EPA provides national guidance, assistance, and leadership. This was done in part because of the huge universe of USTs that needed to be regulated. For more than a decade, EPA and states have worked to develop an effective partnership to regulate USTs. The Agency has used this successful partnership to help develop this compliance plan for Congress. Initially, in December 1999, nine state UST managers met with staff from EPA to help develop the basic framework of the compliance plan and help estimate some of the most important cost factors. Subsequently, EPA asked nine other states a short series of questions to help verify the cost estimates and provide information on some additional factors that appeared to be central to developing the compliance plan. EPA had further discussions with the December 1999 representatives from the nine states to ensure the validity of the approach as well as the cost estimates. EPA contacted other state managers individually to obtain guidance on how to deal with specific issues with which they had considerable experience or particular expertise. EPA received many useful ideas from the discussions with state managers and internal Agency reviews. The Agency made numerous useful changes and improvements to the final compliance plan and cost estimates as a result of the many helpful suggestions.

In reviewing this compliance plan, it is important to keep in mind that the federal regulations set the framework and minimum requirements for the UST program. States are allowed and encouraged to improve upon this framework and to adapt it to meet state-specific needs. The diversity in state UST programs is one of the major strengths of the overall national effort to prevent and remediate releases from USTs. However, this diversity also presents challenges when preparing this compliance plan called for by Congress. The compliance plan needs to be general enough to be applicable nationwide, recognizing the diversity among the states, and yet specific enough to provide a realistic approach to address the issues raised in the FY 2000 Appropriations Committee Conference Report language. The diversity among states presents formidable challenges, particularly in making cost estimates to carry out the compliance plan. Not only are there differences in basic factors, such as wage scales, that can affect cost estimates, there are also differences in states' approaches, regulations, and laws that can have important effects on cost issues. As a result, in preparing the compliance plan, EPA made a wide variety of assumptions on several factors that affect the cost estimates. In every case, the Agency

attempted to make the most reasonable assumption warranted. EPA's assumptions and cost estimate calculations are described in Appendix A.

EPA is responsible for implementing the UST program in Indian Country. There are more than 2,700 active USTs in Indian Country and there have been 1,100 confirmed releases. The work involved with ensuring compliance with these UST has not been addressed separately in this compliance plan, but has been incorporated into the overall analysis and cost estimates.

As EPA developed the compliance plan, it was clear from the beginning there are significant differences in the status of USTs, as well as the many ways in which the universe of USTs can be divided for analysis. For example, most USTs are registered with the implementing agency; however, there is an important subset of USTs which are not registered, including those that have been abandoned and an owner does not legally exist or it is difficult to determine the owner. For ease of analysis and understanding in this compliance plan, EPA has broken down the universe of USTs into four broad major groups:

Active Registered: These are USTs that are registered with the implementing agency and are actively used. This is the largest portion of the total UST universe, and the portion that will be the most straight-forward to address. The population of active registered USTs is approximately 722,000.

Abandoned Registered: These are USTs that are registered with the implementing agency, but which are no longer being used and for which the owner is not working to permanently close the USTs. These USTs may be abandoned largely because owners and operators were financially unable to meet spill, overfill, and corrosion protection requirements. These USTs pose a challenge in that the owner is either disinclined or financially unable to comply, and is often difficult to locate. EPA estimates there are approximately 38,000 abandoned registered USTs.

Active Unregistered: These USTs are not registered with the implementing agency, but are actively used. The obvious challenge is identifying these USTs. Once located, it will be relatively easy to identify the owner or operator who can be held responsible for compliance. EPA estimates there are approximately 38,000 active unregistered USTs.

Abandoned Unregistered: This is the most diverse and complicated group of tanks to address. These USTs have never been registered with the implementing agency, and have not been in use for an indefinite period of time. The regulatory requirements for these USTs varies greatly. USTs taken out of operation before the effective date of the regulations (December 22, 1988) are not required to meet the prevention and detection requirements. USTs that were taken out of operation before 1974 were not even required to be registered. However, if the implementing agency deems that any previously closed

UST poses a current or future threat to the environment, the UST owner can be required to perform a site assessment and, if necessary, corrective action. The first challenge with these USTs is locating them. For those located, the second challenge is identifying and finding the owner. Finally, many of these tank owners will either resist regulatory responsibility, or be financially unable to comply. For the purposes of this report, USTs for which there is no known or financially viable owner will be classified as orphaned. EPA estimates there are approximately 152,000 abandoned unregistered USTs.

As of September 1999, there were approximately 760,000 registered USTs, some of which have been abandoned. While no one knows how many of these have been abandoned, based on the professional judgment of state UST managers, EPA estimates approximately 5 percent, or 38,000 active USTs have been abandoned. It is even more difficult to determine, or even estimate, the unregistered USTs. This is especially true of the abandoned unregistered USTs which are located throughout the nation. Although there are other ways to divide the UST universe, EPA believes the breakdown into four broad major groups is the most useful for analyzing the issues in this plan. In the following five chapters, the Agency discusses the five topics Congress directed EPA to consider by analyzing compliance and ownership issues for the four groups of USTs discussed above.

Chapter 2

Identifying Underground Storage Tanks That Are Not in Compliance with Subtitle I of the Solid Waste Disposal Act

Introduction

Compliance with the Subtitle I regulations has received a substantial amount of interest in recent years because of the December 22, 1998 deadline which required all existing underground storage tanks (USTs), including connected underground piping and ancillary equipment, be upgraded with spill, overfill, and corrosion protection; meet new tank standards; or be properly closed. There are a variety of other Subtitle I requirements that apply to UST owners and operators, including: notification, release detection, closure, financial responsibility, and release reporting and response. These requirements constitute a comprehensive approach to preventing, detecting, and cleaning up releases. In the initial chapters of this report, EPA focuses on compliance with the prevention and detection requirements described above, rather than the cleanup requirements. In Chapter 6 EPA discusses site assessment and clean up needs and costs.

EPA estimates that as of September 30, 1999, 85 percent of USTs were in compliance with the 1998 requirements for spill, overfill, and corrosion protection, and 60 percent with the leak detection requirements that were phased in from 1989 through 1993. These are based on estimates states provided EPA. In order to determine compliance with the preventative requirements, including proper operation and maintenance, generally every UST will have to be inspected. Unregistered USTs will first have to be located. For purposes of this analysis, EPA discusses three different inspection cycles – at one year, two year, and three year intervals – for inspecting all USTs, and assesses the costs and advantages of each inspection cycle. Most state inspection cycles average three to four years, but those states with frequent inspection cycles (once every 12 to 18 months) have significantly higher compliance rates than the national average. Please note that most of the states who assisted in preparing this plan stressed the need to do regular – ideally annual – inspections, because regular inspections are the best way to ensure the highest degree of compliance. Leak detection and corrosion protection systems can be complex and require diligence on the part of tank owners and operators. Frequent inspections foster the necessary diligence. Inspections also offer opportunities for inspectors to educate owners and operators on important compliance issues. This combination of incentive and education will ultimately lead to the maximum compliance rates, thus minimizing the risk of future releases. (See Appendix B on Third-Party Inspection Programs.)

While a substantial field presence (e.g., inspections) provides a deterrent effect and is a significant factor in ensuring compliance, an effective enforcement program is often required to return non-compliant USTs to compliance. However, EPA has not incorporated enforcement

activities into the analysis in this plan. Enforcement efforts will vary greatly depending upon the severity of the violations, the existence, cooperation, and financial capability of the UST owners, as well as the variety of enforcement mechanisms available to both EPA and states. If an enforcement action is required, attorney support, expert witnesses, or follow-up activities will be needed to sustain an enforcement action. The cumulative cost of these activities could be significant.

Registered USTs - Active and Abandoned

To determine compliance, inspectors will need to visit every facility which has a registered UST that has not been permanently closed; USTs that have been permanently closed are assumed to be in compliance with Subtitle I. State, territorial, and EPA regional databases will generally have accurate information about the location of registered USTs. Thus, the costs associated with determining compliance can be estimated by determining the inspection resources required to visit and perform a thorough inspection at every facility. Please note EPA assumes every inspector is devoted nearly full time to facility compliance inspections, even though in the real world, most inspectors perform a variety of functions.

EPA developed cost estimates for inspecting every facility at one, two, and three year intervals. The Agency provides the calculations of the cost estimates for these inspection cycle intervals in Appendix A under Calculation 2.

Unregistered USTs - Active and Abandoned

In order to identify the compliance status of unregistered USTs, the USTs must first be located; this has traditionally been an imposing challenge for EPA and states. There are also various categories of unregistered USTs, and each category creates a different set of challenges. To simplify the analysis, EPA categorized these USTs as either active or abandoned. Please note that not all unregistered USTs are out of compliance. Owners of USTs taken out of operation before January 1, 1974 were not required to notify the implementing agency. In addition, any UST closed before December 22, 1988 was not required to comply with the prevention and detection requirements in Subtitle I. If, however, the implementing agency determines that a release from any previously closed UST poses a current or potential threat, the owner can be required to close the tank in accordance with the Subtitle I closure requirements, including a site assessment and any necessary cleanup. EPA further addresses this situation in Chapter 6. Nevertheless, it is important to locate as many of these USTs as possible.

There are a variety of approaches that can be used to identify unregistered USTs. Many USTs simply cannot be identified, and they will not come to the states' attention unless contamination from those USTs reaches a receptor or the USTs are uncovered during construction or a real estate transaction. States have tried a variety of approaches to identify

these USTs, including substantial outreach and education, but the results of those efforts are probably diminishing substantially. While some states have taken more proactive efforts to identify unregistered USTs, these USTs are most often identified through either a receptor impact (for example, a nearby well is impacted), a real estate transaction, or a redevelopment project.

The Agency has identified three potential approaches to identifying unregistered USTs: enhanced interaction with the real estate industry; delivery prohibitions; and visual surveys by summer hires. EPA has intentionally excluded the option of visual surveys by UST inspectors because it is considerably less cost effective than hiring part-time summer help.

Real Estate Transactions

Environmental liability is a primary concern for potential buyers of commercial properties. Environmental assessments are routinely performed before a property transaction is completed, and any environmental concerns that are identified can lead to further action by the buyer and/or the seller. State UST programs are often made aware of USTs identified through real estate transactions. However, thorough assessments are not performed in every situation, and even when they are, it is unlikely states are notified of every UST that is uncovered. Therefore, enhanced awareness on the part of property buyers and sellers, as well as the real estate professionals involved in the transactions, would lead to some unregistered USTs being reported to states. EPA and some states have had some success partnering with the real estate industry to improve awareness (for example, EPA and the Maryland Department of the Environment worked with Maryland Association of Realtors to develop a publication entitled, “Real Estate Professionals and Underground Storage Tanks”).

EPA has not developed cost estimates for this effort, because it is difficult to estimate the time necessary to work with various real estate organizations in each state. While EPA believes this is a worthwhile long-term endeavor, the Agency acknowledges this will simply increase the sporadic reporting of unregistered tanks and is not sufficient to identify the majority of unregistered USTs. It is also worth noting that property redevelopment, with or without a real estate transaction, can also lead to the discovery of unregistered USTs. It is not unusual to identify a few USTs through a visual search of a property, and additional USTs when excavation is conducted to remove known USTs.

Delivery Prohibitions

In preparation for the spill, overfill, and corrosion protection deadline, many states realized that limited state inspection resources would not be sufficient to ensure compliance at every UST facility in the months immediately following the deadline. A few states used the successful approach of prohibiting delivery of fuel to any UST not in compliance. These programs impose a regulatory responsibility on the fuel delivery companies and, in turn, leverage

compliance by the UST owner. If environmental stewardship and fear of an inspection were not sufficient motivations to bring about compliance, stopping the supply of product – which is the lifeline of many businesses – was a successful alternative. A number of other states recognized the success of this approach and developed their own delivery prohibition programs. As of December 1999, more than 20 states have implemented some form of a delivery prohibition program. These programs vary greatly, from tagging the fill pipe of the UST found to be out of compliance during an inspection – an indicator to the delivery driver to not deliver fuel – to requiring a compliance permit (without which fuel cannot be delivered) at every facility.

While EPA and some states do not have the explicit authority to impose regulatory requirements on anyone other than the tank owner and/or operator, the states using these programs have found them to be quite successful. The primary success of these programs has been ensuring rapid compliance with the requirements without requiring significant enforcement expenditures on the part of the states. While state staff must still either inspect the facilities to determine compliance, or rely on self-certifications from the tank owners, the benefit in securing rapid compliance for USTs determined to be out of compliance has been significant and can be achieved without pursuing formal enforcement.

A beneficial side effect of these programs is identifying previously unregistered USTs. Under a program where delivery to a facility without a valid compliance permit is prohibited, unregistered facilities would obviously not receive permits from the state, even if the USTs met the spill, overfill, and corrosion requirements. Therefore, the owners of those facilities must register their tanks and be evaluated for compliance before they can receive additional fuel. This approach is only successful in identifying active unregistered USTs. Abandoned unregistered USTs would not be identified through this process.

Based on limited information about the cost of establishing delivery prohibition programs in a state, EPA estimates it costs approximately \$100,000 per state to establish a delivery prohibition program, including the cost of tags or stickers and other incidental expenses. Please note that this cost estimate does not include the cost of either performing the initial inspections to determine compliance or to review self-certification paperwork or the ongoing program costs.

Visual Surveys by Summer Hires

During the summer preceding the deadline to meet the spill, overfill, and corrosion requirements, Virginia hired a cadre of students to travel throughout the state to remind tank owners about the deadline and share educational materials with them. A similar approach could be adopted to help locate unregistered USTs. When an UST is abandoned, the above ground vent lines, fill lines, dispenser island, or other visible evidence (including simply the architecture of an abandoned service station) often remain in place. It is sometimes possible to identify the location of abandoned USTs simply by looking for visual clues. It is even easier to identify

active unregistered USTs through visible inspections, since these USTs still have vent lines, fill pipes, and dispensers. States could potentially hire students (or other temporary workers) to travel all existing public roadways looking for evidence of abandoned USTs. Although this approach may be a bit haphazard, it could net some significant benefits. On a smaller scale, North Carolina hired a contractor to do a visual search through three counties. Based on information developed for three counties, the study estimated there are approximately 3,200 to 4,000 abandoned UST sites in North Carolina.

EPA estimates it would cost about \$5 million to locate unregistered USTs nationwide using a visual search method and identify land ownership for those facilities found. (See Appendix A, Calculation 1.3 for EPA’s assumptions and calculations.) Obviously, it is extremely difficult to estimate the number of unknown USTs that exist, and even more difficult to estimate the number of those USTs that could be found through such an effort. The Agency discussed this issue with a number of state program managers and believes it is reasonable to estimate there are approximately 190,000 unregistered USTs. EPA believes this approach could probably identify the majority of active unregistered USTs, but probably no more than half of the abandoned unregistered USTs could be identified. EPA estimates the search effort would not find 76,000 of the abandoned unregistered USTs because in many cases no visible evidence would be found by the summer hires. These remaining tanks will probably not be found unless they leak and someone reports the problem, or they are located through a property transaction or redevelopment. Therefore, EPA assumes this approach will uncover approximately 114,000 USTs. (See Appendix A, Calculation 2.1.2 for details on EPA’s assumptions and calculations.)

After ownership of these UST locations is established, inspections will be required to determine the status of these USTs. In Table 1 below, EPA provides an overview of the estimated additional costs required to conduct initial compliance inspections (including equipment requirements, operation and maintenance requirements, and inspector training) and perform continued inspections for the one, two, and three year cycles. In the narrative below, EPA discusses details regarding the total cost estimates of the number of inspectors required and the associated costs for inspections for the three different cycles.

Table 1
Overview of Estimated Additional Costs for Inspecting All Facilities

Inspection Cycle	1 year	2 year	3 year
Initial Inspection Cost, Including Training	\$93 million	\$63 million over 2 years (\$31.5 million per year)	\$44 million over 3 years (\$14.7 million per year)
Continuing Inspection Cost	\$70 million per year	\$20 million per year	\$9 million per year

One Year Inspection Cycle Costs

There are numerous advantages of a one year inspection cycle. One of the most important advantages is the frequent compliance assistance opportunities to educate and inform UST owners and operators about properly operating their USTs. Another important advantage is the increased presence of inspectors and associated incentives for owners and operators to ensure their USTs remain in compliance.

However, there are a number of practical obstacles that might make a one year inspection cycle infeasible. The first barrier is the high cost of maintaining an annual inspection cycle. A public investment required to maintain annual inspections would require a significantly increased investment in the UST prevention program, and it may not be realistic to assume such an increase is possible. Even if the funding were available, a second impediment is that EPA and some states would have difficulty increasing staff so dramatically. Many states have overall personnel ceilings which limit the possibility of new hires. While most states would make a concerted effort to fully use the additional funding, some would not be able to fully staff their UST programs. In addition, unless there was relative certainty of continued funding for a number of years, some states may not hire new staff who would be subject to layoffs in the event funding did not continue. Finally, while an annual inspection will result in the highest compliance, due to the obstacles discussed above, a two year cycle or a three year cycle with targeted inspections is more feasible. As discussed in the three year cycle below, prioritizing inspections based on indicators of risk such as compliance history and location in sensitive environmental areas would be more cost effective for any given level of resources.

Registered USTs

In order to inspect all registered UST systems in one year, EPA believes states would require approximately 1,435 inspectors, with each inspecting 200 facilities on an annual basis. EPA estimates it would cost a total of at least \$100 million to determine the compliance status for all registered UST systems in one year. Currently, EPA and states have approximately 465 full time equivalent (FTE) employees who routinely perform UST inspections. In order to determine the additional cost (marginal cost) to inspect every registered UST, EPA subtracted the work (and associated costs) that can be performed by the existing corps of inspectors. Existing full time inspectors cost about \$35 million per year. EPA estimates that more than \$65 million in additional prevention resources would be required to conduct inspections of every registered facility in one year. (See Appendix A, Calculation 2.1.1 for EPA's assumptions and calculations.)

Unregistered USTs

EPA estimates it would take an additional 215 inspectors to inspect the unregistered facilities found and cost an additional \$15 million. Therefore, the total cost for searching (via the visual inspection method) for and inspecting unregistered tanks to determine their compliance status in one year is approximately \$20 million (see Appendix A, Calculation 2.1.2 for details on EPA's assumptions and calculations). Please note these cost estimates only account for the unregistered USTs that are identified. As discussed in the "Visual Surveys by Summer Hires" section, EPA estimates only half of the unregistered abandoned USTs will be located. The remaining USTs will probably not be found unless they leak and someone reports the problem, or they're located through a property transaction or redevelopment.

Total Costs

The total additional costs of identifying USTs that are not in compliance with Subtitle I of the Solid Waste Disposal Act would be approximately \$85 million (\$65 million for registered USTs and \$20 million for unregistered USTs) for 1,185 additional inspectors. Please note that inspection costs do not account for new inspector training, which may require at least one additional month at a cost of approximately \$8 million. If inspections were to be continued on an annual basis, the additional cost per year is estimated to be about \$70 million dollars. (See Appendix A, Calculation 2.1 for EPA's assumptions and calculations.)

Two Year Inspection Cycle Costs

While a one year inspection cycle would be most effective in rapidly determining compliance and setting processes in motion to bring tanks back into compliance, EPA believes a two year inspection cycle would still provide significant advantages and be more feasible than the one year inspection cycle. Inspecting every facility within two years would rapidly improve the compliance rates in many states, and continued biennial inspections would ensure continued diligence on the part of UST owners and operators, thus increasing the probability of sustaining high compliance rates. EPA believes the two year cycle provides the best compromise between effectiveness and practicality.

Registered USTs

In order to inspect all registered UST systems in two years, EPA believes states would require approximately 718 inspectors, with each inspecting 200 facilities per year. EPA estimates it would cost at least \$100 million to determine the compliance status for all registered USTs within two years. In order to determine the additional cost (marginal cost) to inspect every registered UST, EPA subtracted the work (and associated costs) that can be performed by the existing corps of inspectors. Therefore, \$45 million in additional resources (spread over two

years) and more than 310 new inspectors would be required to conduct inspections of every registered facility within two years. (See Appendix A, Calculation 2.2 for EPA's assumptions and calculations.)

Unregistered USTs

EPA estimates it would take an additional 91 inspectors to inspect the unregistered facilities found within two years, and cost an additional \$13 million. Therefore, the total cost for searching (via the visual inspection method) for and inspecting unregistered tanks to determine their compliance status in two years is approximately \$18 million (see Appendix A, Calculation 2.2.2 for EPA's assumptions and calculations). Please note these cost estimates only account for the unregistered USTs that are identified. As discussed in the "Visual Surveys by Summer Hires" section, EPA estimates only half of the unregistered abandoned USTs will be located. The remaining USTs will probably not be found unless they leak and someone reports the problem, or they're located through a property transaction or redevelopment.

Total Costs

The total additional cost of identifying USTs that are not in compliance with Subtitle I of the Solid Waste Disposal Act within two years would be approximately \$60 million (or \$30 million each year for two years) for approximately 400 new inspectors. As with the annual inspection approach, these inspection costs do not account for inspector training, which may require at least one additional month at a cost of approximately \$3 million. If inspections were to be continued on a biennial basis, the annual additional cost would be approximately \$20 million. (See Appendix A, Calculation 2.2 for EPA's assumptions and calculations.)

Three Year Inspection Cycle Costs

A three year inspection cycle would still be a significant improvement for many of the states, but approximately 15 states currently inspect every three years or less. As three years is a fairly significant time between inspections, EPA and states would likely need to prioritize inspections more so than with annual or biennial inspection cycles. Many states currently prioritize inspections to maximize their resources, considering such factors as likelihood of non-compliance (e.g., given past compliance history of a facility) and environmental sensitivity (e.g., placing greater priority on facilities located in sensitive environmental areas such as wellhead protection areas). While facilities would be inspected on a three year average, states might decide to inspect individual facilities more or less frequently based on the states' inspection priorities. EPA believes the three year cycle would lead to a significant improvement in many states, and therefore in the national program. The prioritization of inspections could help ensure the highest priority sites receive the necessary attention to ensure continued protection of human health and the environment, despite the relatively longer average inspection cycle.

Relative to the one or two year inspection cycles, however, there are drawbacks to less frequent inspection cycles, including fewer opportunities to detect operation and maintenance errors. Nevertheless, an approach that targets facilities based on indicators of risk such as compliance history and location in sensitive environmental areas would be more cost effective for any given level of resources.

Registered USTs

In order to inspect all active registered UST systems in three years, EPA believes states would require approximately 478 inspectors, with each inspecting 200 facilities per year. EPA estimates it would cost at least \$100 million to determine the compliance status for all registered USTs within three years. In order to determine the additional cost (marginal cost) to inspect every registered UST, EPA subtracted the work (and associated costs) that can be performed by the existing corps of inspectors. Therefore, \$27 million in additional resources (spread over three years) and approximately 130 new inspectors would be required to conduct inspections of every registered facility within three years. (See Appendix A, Calculation 2.3 for EPA's assumptions and calculations.)

Unregistered USTs

EPA estimates it would take an additional 54 inspectors to inspect the unregistered facilities found within three years, and cost an additional \$11 million. Therefore, the total cost for searching (via the visual inspection method) for and inspecting unregistered tanks to determine their compliance status in three years is approximately \$16 million (see Appendix A, Calculation 2.3.2 for details on EPA's assumptions and calculations). Please note these cost estimates only account for the unregistered USTs that are identified. As discussed in the "Visual Surveys by Summer Hires" section, EPA estimates only half of the unregistered abandoned USTs will be located. The remaining USTs will probably not be found unless they leak and someone reports the problem, or they're located through a property transaction or redevelopment.

Total Costs

The total additional cost of identifying USTs that are not in compliance with Subtitle I of the Solid Waste Disposal Act within three years would be approximately \$43 million (or \$14 million each year for three years) for approximately 180 new inspectors. As with the one and two year inspection approaches, these inspection costs do not account for inspector training, which may require at least one additional month at a cost of approximately \$1 million. If inspections were to be continued on a three year cycle, the annual additional cost would be approximately \$9 million. (See Appendix A, Calculation 2.3 for details on EPA's assumptions and calculations.)

Inspecting Facilities Not Known to be Equipped to Meet the 1998 Requirements

There has been a great deal of interest in compliance with the December 22, 1998 deadline for spill, overfill and corrosion protection and EPA is often asked about the number of UST systems that are equipped to comply with these requirements. As a result, the Agency calculated the cost above existing spending levels to inspect only those facilities where implementing agencies are uncertain whether or not the required equipment exists as opposed to inspecting all facilities as described above (these estimates are a subset of the estimates presented above). While at these targeted facilities, however, inspectors would also inspect for other requirements including those related to operation and maintenance. Data from states indicate uncertainty for approximately 32 percent of registered UST systems. No information is available for unregistered USTs. In Table 2, EPA provides an overview of the estimated costs above existing spending levels to conduct initial compliance inspections (including inspecting for equipment and operation and maintenance requirements) for those facilities not known to be equipped to meet the 1998 requirements and train inspectors for the one, two, and three year cycles.

**Table 2
Overview of Estimated Additional Costs for Inspecting Only Facilities Not Known to be Equipped to Meet the 1998 Requirements**

Inspection Cycle	1 year	2 year	3 year
Inspection Cost - Registered and Unregistered Facilities (Includes Initial Training Cost)	\$30 million	\$15 million over 2 years (\$7.5 million per year)	\$10 million over 3 years (\$3.3 million per year)
Inspection Cost - Registered Facilities Only (Includes Initial Training Cost)	\$11 million	\$4 million over 2 years (\$2 million per year)	\$2 million over 3 years (\$0.7 million per year)

The cost above existing spending levels to inspect registered and unregistered UST systems is as follows (see Appendix A, Calculation 2.4 for EPA’s assumptions and calculations):

- The cost of one time inspections conducted in one year would be approximately \$30 million;
- The cost of one time inspections conducted over two years would be approximately \$15 million (\$7.5 million per year);
- The cost of one time inspections conducted over three years would be approximately \$10 million (\$3.3 million per year).

Please note these inspections are targeted only at facilities where implementing agencies are uncertain whether or not the system is equipped to comply with the 1998 requirements for spill, overfill, and corrosion protection. Unless a state currently has the capability to inspect more facilities than those targeted, the state will not have sufficient resources to conduct inspections at other facilities during the targeted inspection cycle. For example, in the two year inspection cycle, approximately 70 percent of states (about 35 states) would have the resources to conduct inspections at facilities other than those not known to be equipped to meet the 1998 requirements. However, those states may only have sufficient resources to inspect a portion of the other UST facilities.

The costs are lower if inspections focus only on registered USTs. The estimated cost, above existing spending levels, to inspect the registered USTs where implementing agencies are uncertain whether or not the required equipment exists is as follows (see Appendix A, Calculation 2.4 for EPA's assumptions and calculations):

- The cost of one time inspections conducted in one year would be approximately \$11 million;
- The cost of one time inspections conducted over two years would be approximately \$4 million (\$2 million per year);
- The cost of one time inspections conducted over three years would be approximately \$2 million (\$0.7 million per year).

Chapter 3

Identifying Underground Storage Tanks in Temporary Closure

Introduction

Temporary closure is an option that allows owners and operators to temporarily stop operating an UST system without permanently closing that system. It was a valid option for complying with the requirement for upgrading with spill, overfill, and corrosion protection; closing; or meeting new tank standards. Some owners and operators chose temporary closure as a temporary means to comply with the requirements. UST systems that did not meet the requirements for upgrading, permanent closure, or new tank standards could be placed in temporary closure for up to 12 months (no later than December 22, 1999) unless an extension was granted by the implementing agency. (The implementing agency may only grant an extension after the owner or operator conducts a site assessment.) If the owner or operator chose to keep product in the UST system, then operation and maintenance of the release detection and corrosion protection must continue during temporary closure. This option may be used indefinitely for UST systems complying with the upgrade or new tank standards; spill and overfill devices are not required while in temporary closure. State and local temporary closure requirements may vary from the federal requirements. For example, some states do not allow extensions beyond the 12 month limit for temporary closure.

As of February 1999, states reported a total of 73,700 UST systems in temporary closure. EPA estimates the number of UST systems in temporary closure today is significantly less than in February 1999 because some owners and operators have since upgraded or permanently closed their systems.

Only registered UST systems are in temporary closure as defined in the regulations. Unregistered USTs, active or abandoned, would not be in compliance with the temporary closure requirements.

Registered USTs

Identifying registered USTs in temporary closure would not be difficult. Many states, regions, and territories have temporarily closed UST systems in their databases and others would identify these UST systems through the compliance inspections of all facilities described in Chapter 2. Identifying UST systems in temporary closure would not require additional resources than those described in Chapter 2.

Chapter 4

Determining the Ownership of USTs Not in Compliance or in Temporary Closure

Introduction

Determining ownership for most registered USTs is relatively straight-forward; but when there is a dispute, the process of determining ownership can become difficult. This problem can be compounded by unregistered USTs that have been abandoned for unknown periods of time. The Solid Waste Disposal Act defines owner as:

“(A) in the case of an underground storage tank in use on November 8, 1984, or brought into use after that date, any person who owns an underground storage tank used for the storage, use, or dispensing of regulated substances, and

(B) in the case of any underground storage tank in use before November 8, 1984, but no longer in use on November 8, 1984, any person who owned such tank immediately before the discontinuation of its use.”

For active USTs, this definition is easy to apply; however, it can become more complicated when there is a lease situation in which the operator of the UST is a different person than the owner of the property. For abandoned USTs, it can be difficult and time consuming to track down the original owner of the UST. Often the original UST owners no longer own the property on which the tanks are located, or the owners are deceased. Relying only on the federal definition of “owner”, there are some cases (for example an UST closed in 1978 by an owner who has since died) where there is simply no owner who can be held responsible.

However, as the UST program is largely implemented by states, more than half of which have received formal state program approval, the state laws and regulations are even more relevant. The variation throughout the country causes some difficulty in making broad assumptions about ownership, but many states have property law provisions that assign ownership to any structures on or in a piece of property to the property owner. In these states, if there is a dispute about the actual UST owner, the property owner can become the UST owner, and can be held accountable for compliance and cleanup. This simplifies the search for the owner and significantly reduces the number of USTs for which no responsible owner can be identified.

One common approach used by states to determine the owner of an abandoned tank is to check the local property tax records to identify the land owner. The land owner is then contacted by phone or mail to discuss the status of the USTs and any follow-up work required.

Due to the variability and uncertainty associated with identifying ownership, it is very difficult to estimate the cost associated with determining ownership. While the property law provisions significantly simplify the process of identifying an owner, the bigger practical problem is that some owners are financially unable to upgrade or properly close their USTs or pay for any necessary remediation. EPA addresses this issue in Chapter 6.

Active Registered USTs

Determining ownership for the majority of active registered USTs is routine. EPA and state notification requirements provide the EPA and states with information (such as number, age, material, status, etc.) about the USTs as well as the UST owner. Many states have procedures in place to regularly update this information, and they should have fairly accurate information about USTs and UST owners. However, the federal regulations require only a one time notification, as do some state regulations, so the information – including ownership information – in some databases could be significantly outdated. Nevertheless, using their databases, coupled with the inspections of all facilities discussed in Chapter 2, states should be able to identify the owners for all non-compliant and temporarily closed USTs that are still active.

Abandoned Registered USTs

States can generally use their databases to determine the owner at the time the UST was abandoned. In some cases, however, the owner of an abandoned registered UST will not be easy to locate. Ensuring compliance from these owners is yet another challenge and may not even be possible due to financial insolvency. EPA discusses this in more detail in Chapter 6.

Active Unregistered USTs

Once an active unregistered UST is located, there will not be any problem in determining ownership. Since the UST is still active, the current facility owner will be the responsible UST owner.

Abandoned Unregistered USTs

The category of abandoned unregistered USTs causes the biggest problem in determining ownership. Because these USTs were never registered in the first place, states do not have a starting point from which to work. Determining the date the UST was last used is another

difficult challenge, but potentially an important factor in determining ownership. Significant research will need to be done, including researching county records and interviewing neighbors. Ultimately, many states will use state property laws to hold the current property owner responsible for the USTs, which in some cases will likely lead to litigation.

Estimating Costs

As noted above, it is relatively easy to determine the ownership of active USTs, both registered and unregistered. It should not be difficult to determine the ownership of an abandoned registered UST, but it may be difficult to locate the owner. The identification of owners of abandoned unregistered USTs is time consuming. As indicated in Calculation 1.2 in Appendix A, the work by summer hires to research land owners for unregistered USTs will cost almost \$170,000. State inspectors will need to spend additional time trying to locate and contact some of these land owners before they conduct an inspection, and working with them to ensure compliance and/or to assess the site for potential contamination.

Chapter 5

Determining the Plans of Owners and Operators to Bring Such Tanks Into Compliance or Out of Temporary Closure

Introduction

When bringing USTs into compliance or out of temporary closure, owners and operators must ensure their UST systems meet all of the regulatory requirements. These requirements include: release detection; spill, overfill, and corrosion protection; and financial responsibility. Release detection and operation and maintenance of release detection is required for nearly all regulated UST systems to ensure that, in the event of a release, owners and operators can minimize the extent of environmental damage through early detection. The spill, overfill, and corrosion protection requirements allow owners and operators of substandard tanks to upgrade, properly close, or meet new tank standards. These requirements help ensure that good UST systems are in the ground and that those systems are operated and maintained properly. Financial responsibility requirements ensure that owners have a financial means to clean up any releases that may occur.

A small number of UST systems may be in temporary closure and in compliance with the regulatory requirements and may not have or need plans for coming out of temporary closure. UST systems that did not meet the requirements for upgrading, permanent closure, or new tank standards could be placed in temporary closure before December 22, 1998 for up to 12 months to comply with the spill, overfill, and corrosion protection deadline. An extension to the 12 month time frame may be granted by the implementing agency if an owner or operator conducts a site assessment. UST systems that meet the upgrade or new tank standards may remain in temporary closure indefinitely. Since temporarily closed USTs that meet these requirements are already in compliance with the regulations, they are not addressed in this chapter. However, the majority of USTs that are still in temporary closure are subject to, and have exceeded, the 12 month limit and, if an extension was not granted, are out of compliance and subject to enforcement. These noncompliant USTs are included in the discussion below on determining the plans of owners and operators to return to compliance.

Some owners may be unknown or financially insolvent and unable to pay for the cost to bring an UST into compliance. Chapter 4 discusses the issue of ownership. Chapter 6 discusses the issue of unknown and financially insolvent owners. The strategy for determining the compliance plans for these USTs would be the same for active, abandoned, registered, and unregistered tanks. Determining these plans would be dependent on ownership and current compliance status of the UST.

Active, Abandoned, Registered, and Unregistered USTs

Implementing agencies can determine the plans of owners and operators whose USTs are not in compliance as a result of the inspections of all facilities described in Chapter 2 through the follow-up activity that would occur after the inspection. Inspectors often work with tank owners through informal means, such as issuing warnings and following up with phone calls, to secure compliance. Many times, however, more formal enforcement is used to secure compliance. The settlement of enforcement actions will include a plan and schedule for returning the tank to compliance. Failure of an owner to comply with a schedule or plan would result in further enforcement. Enforcement activity could be a substantial cost. As discussed in Chapter 2, delivery prohibition programs are an alternative approach to enforcement used by a number of states. While these programs can be quite successful in ensuring compliance for active USTs, they will not be successful in ensuring compliance with abandoned USTs.

Chapter 6

Describing How Tanks For Which No Owner Can Be Identified Will Be Brought Into Compliance Or Permanently Closed

Introduction

States estimate approximately 50 percent of abandoned tanks will be orphaned. The term orphaned is used to refer to abandoned tanks where there is no known or financially viable owner. Due to the property law provisions of most states (see Chapter 4), owners will be identified for the majority of registered and unregistered USTs. However, the most significant problem is owners who are financially unable to pay for compliance or cleanups. As a result, there is a large universe of orphaned tanks.

In nearly all cases, bringing these orphaned USTs into compliance will involve permanent closure and, in many cases, cleanup. Because there are no owners to pay for the closures or cleanups, this expense will often become the responsibility of the implementing agencies. Under RCRA Subtitle I, EPA and states are limited in their authority to use federal funds to pay for tank closures, unless there is reason to believe that a release from an UST may have occurred. Many states are similarly limited in the use of state funds. However, if there is reason to suspect a release of petroleum, Leaking Underground Storage Tank (LUST) Trust Fund resources may be used to conduct a site assessment, and if a release is found, to perform the necessary cleanup. While a state could empty a tank as part of the site assessment, actual closure of the UST is a valid LUST Trust Fund expense only if the closing is incidental to either the site assessment or the corrective action.

In determining whether to perform a site assessment, states make a determination of the likelihood of a release based on a variety of factors, such as the age of the UST, the type of UST, and the location. In cases where a state reasonably suspects a release, a thorough site assessment will be conducted, which includes soil or groundwater samples from those areas where contamination is most likely to be present. EPA has assumed that the states will always be granted access to these properties to perform the assessments and, if necessary, cleanups. In reality, some property owners will resist access, which will affect the manner and time frame to deal with those sites. If no release is detected through the site assessment, the orphaned USTs will not necessarily be brought into compliance, until and unless they leak or are addressed as part of a future property transaction or redevelopment (See Appendix C on USTfields).

A few states have programs specifically designed to address the closure of orphaned tanks. In these cases the USTs will be appropriately closed, bringing them into compliance. In addition, approximately 40 states have state cleanup funds. In general, these funds pay some or all of the cleanup costs of UST releases. However, the eligibility criteria for these funds varies

greatly. Some funds will only pay for releases incurred by USTs that are currently registered and for which the UST owner has paid the annual fee. In some cases, payment from the state funds are allowed only if the USTs are in full compliance with the regulations at the time of the release. Some state cleanup funds will actually pay for releases from orphaned USTs. These funds are a significant resource for cleaning up identified releases at orphaned sites, but they cannot always be used to either assess a site to determine whether a release has occurred or to close an UST where there has been no release.

While this chapter addresses closure and cleanup from orphaned USTs, it is worth noting that when financially able owners are identified, states still need to ensure these owners perform cleanups appropriately and expeditiously. The existence of the state cleanup funds has dramatically limited this concern, since the state funds have been responsible for the majority of the total cleanups performed in the UST program. State cleanup funds collectively raise almost \$1.4 billion annually to clean up releases. However, in those cases where state funds do not exist, or where a release is not eligible to be funded by a state fund, the state needs to ensure the owners comply with the cleanup requirements. While this can be an issue in some cases, most cleanups are progressing adequately. While corrective action enforcement costs can be significant in difficult individual cases, EPA has not factored additional corrective action enforcement costs into this analysis because they are not as significant as the prevention and detection compliance costs or the actual cleanup costs.

Closing Abandoned Unregistered USTs When There is Reason To Believe There Has Been a Release

Because of the uncertainty of the actual number of abandoned unregistered USTs and releases from them, it is extremely difficult to estimate the costs of assessing, closing, and remediating UST sites which are orphaned. Due to the fact that these tanks have never been registered and have been abandoned for an indefinite period of time (often decades), very little is known about the USTs. There has been very little work done in any systematic fashion with abandoned USTs.

However, EPA estimates the cost to assess (\$5,000 per site) and clean up (\$40,000 per site) abandoned unregistered UST sites which are orphaned is approximately \$450 million. Approximately 50 percent of the states can use their state cleanup funds to pay for the remediation costs of orphaned USTs. Therefore, \$225 million in cleanup costs will need to be paid by state funds. The remaining \$225 million for assessment and cleanup costs would need to come from other sources. (See Appendix A, Calculation 3 for EPA's assumptions and calculations.) (Please note EPA estimates that solvent owners will be identified for approximately 50 percent of the abandoned unregistered USTs. These owners will be responsible for closure and, if necessary, associated cleanup costs.)

Closing Abandoned Registered USTs When There is Reason To Believe There Has Been a Release

If efforts to locate and compel an owner to pay for a closure and, if necessary, a cleanup are unsuccessful, states and EPA will address the facilities in much the same way they address unregistered orphaned USTs. The Agency has used similar assumptions and calculations to determine the cost of assessing and, as necessary, remediating registered orphaned UST sites.

EPA believes the total cost to assess (\$5,000 per site) and clean up (\$40,000 per site) abandoned registered UST sites which are orphaned is approximately \$225 million. Assuming one half of the state funds will pay for cleanup costs from these orphaned UST sites, more than \$110 million would remain to be funded from sources other than the state funds. (See Appendix A, Calculation 4 for EPA's assumptions and calculations.) (Please note EPA estimates that solvent owners will be identified for approximately 50 percent of the abandoned registered USTs. These owners will be responsible for closure and, if necessary, associated cleanup costs.)

Total Costs

Bringing abandoned USTs into compliance will generally require closing them and cleaning them up. For those sites with no actual releases, many states will not be able to properly close the USTs; therefore, the USTs will never be brought into compliance. While this may be a compliance problem, these sites should not pose a significant threat to human health and the environment. For those sites with actual releases of petroleum, states can use either LUST Trust Fund or state cleanup fund resources to address those sites. The remediation of contaminated sites will generally require the closure of the USTs; so EPA assumes that most of these sites will be brought into full compliance.

The total cost to conduct site assessments and associated cleanups of orphaned USTs, both registered and unregistered, is approximately \$675 million. EPA assumes that approximately one half of this, or more than \$335 million, can be paid for by state funds and that the remaining costs would need to be funded from other sources. These costs could be covered by the LUST Trust Fund. These cost estimates are based on the assumption of \$40,000 per cleanup, which is a reasonable estimate given the nature of these tanks. These estimates also assume that states will continue cleaning up the constituents that are currently being addressed. Changes in the constituents cleaned up could have a substantial effect on the total cleanup costs.

Please remember EPA has assumed only 50 percent of the abandoned unregistered USTs will be identified. Approximately 76,000 remaining abandoned unregistered USTs will not be located. The compliance status of these tanks will remain unknown. However, a significant proportion will be very old USTs, some of which were never even required to be registered, and pose less of a threat than active USTs.

Closing Orphaned USTs When There is No Release

Currently, neither EPA nor most states have the authority to close registered or unregistered orphaned USTs when there is no release. If that authority was available, however, EPA believes the closure costs for USTs without releases would be approximately \$70 million. (See Appendix A, Calculation 5 for EPA's assumptions and calculations.)

Chapter 7

Conclusion

Over the past 15 years, states and EPA have achieved significant successes in the underground storage tank program. Approximately, 1.3 million federally-regulated substandard USTs have been permanently closed. Of the 400,000 confirmed releases, cleanups have been initiated for approximately 346,000 releases and completed at about 229,000 sites as of September 30, 1999. Approximately 85 percent of the active USTs meet the spill, overfill, and corrosion protection requirements and are, as a result, much less likely to have a release and are more protective of the environment. In sum, an enormous amount of progress has been made in closing the USTs most likely to have releases and improving the quality of the USTs that remain active. Even in light of this record, however, considerable work remains to be accomplished so that improvements can continue to be made.

One of the keys to continued improvement is regular inspection of regulated USTs. There are many ongoing requirements with which owners and operators must comply. UST systems are increasingly complicated. Owners and operators need to pay significant attention to operation and maintenance of their UST systems to maintain the progress that has been made over the past 15 years. Through regular inspections, the implementing agency can verify compliance, provide technical assistance, help owners and operators come into compliance and take enforcement actions when necessary to ensure compliance. Targeting inspections based on indicators of risk such as compliance history and location in sensitive environmental areas would be more cost effective for any given level of resources. Some states have established delivery prohibition programs which induce owners to comply relatively quickly without the state expending a great deal of enforcement resources.

This Report to Congress discusses five topics Congress directed EPA to consider. Approaches to these topics are discussed along with cost estimates. The Agency has broadened the analysis of the last topic dealing with compliance when no owner can be determined. As discussed in Chapter 6, it is relatively easy to identify an owner. A much more difficult issue to deal with is whether that owner has the financial capability to close an UST and pay for remediation if that is necessary. Thus, Chapter 6 discusses approaches and cost estimates for dealing with non-compliant USTs (as well as pre-1974 compliant systems that may have had a release) when the owner is insolvent. After devoting considerable attention to bringing owners into compliance with the spill, overfill, and corrosion protection requirements, some states are giving greater attention to orphaned UST systems. As a result, the attention given in this compliance plan to orphaned USTs corresponds to increasing interest and time in states to deal with these USTs.

As discussed in this compliance plan, considerable and continuous work needs to be done with owners and operators to provide them with technical assistance on operation and maintenance issues and, ultimately, to ensure they continually comply with the regulations. Accomplishing this work will greatly increase the chances that: releases will be prevented; when releases occur, they are found quickly through proper leak detection before significant damage can be done to the environment, especially to groundwater and drinking water; and remediation is undertaken and completed quickly.

Appendix A

Calculations

This appendix provides the assumptions and calculations used to determine the cost estimates in the compliance plan to Congress. EPA used data from a variety of sources to develop the assumptions necessary to perform the calculations. Those sources include: EPA semi-annual reports; a workgroup meeting with state and EPA UST regional managers; conversations with state personnel; an abandoned tank report from the state of North Carolina; the 1999 state fund survey compiled by state fund managers; and the best professional judgment of state and EPA staff. The data received from states, either at the workgroup meeting or through other conversations, are both from their databases and best professional judgment. As specific issues arose during the development of this report, EPA contacted various state experts throughout the country to seek their guidance and solicit time or cost estimates.

EPA imposes very limited reporting requirements on the state UST/LUST programs. States are the primary implementing agencies for the program, and the Agency has decided the program would be best served by limiting the reporting burden on states and allowing them to focus their resources on preventing, detecting, and remediating releases.

Given the relatively limited scope of national data, EPA often had to rely on these other sources of data as well as, in many cases, best professional judgment. When appropriate, the Agency extrapolated from a limited set of data or estimates. Where it was necessary to use best professional judgment rather than real data, EPA made a concerted effort to make realistic estimates.

Calculation 1 - Visual Surveys and Land Ownership

1.1 Cost to conduct visual surveys by summer hires

Assumptions:

Estimated miles of road in the U. S.:	4,000,000
Search time:	6 weeks (40 hours/week, 30 workdays)
Hourly cost per summer hire:	\$10/hour
Government mileage rate:	32.5 ¢/mile
Miles of new road covered each day:	125
Additional percent of road already covered to commute to and from home:	50%

Calculation to determine total miles traveled:

$$(4 \text{ million miles}) + [(4 \text{ million miles}) \times (0.5)] = 6 \text{ million total miles traveled}$$

Calculation to determine mileage costs:

$$(\$0.325/\text{mile}) \times (6 \text{ million miles}) = \$1.95 \text{ million}$$

Calculation of miles per day traveled by all summer hires:

$$(6,000,000 \text{ miles})/(30 \text{ work days}) = 200,000 \text{ miles/day}$$

Calculation of the total miles traveled each day by each summer hire:

$$(125 \text{ miles}) + [(125 \text{ miles}) \times (0.5)] = 188 \text{ miles}$$

Calculation of the number of summer hires needed to conduct visual surveys:

$$(200,000 \text{ miles/day})/(188 \text{ miles/day/summer hire}) = 1,064 \text{ summer hires}$$

Calculation of wages for 1,064 summer hires:

$$(1,064 \text{ summer hires}) \times (\$10/\text{hr}) \times (40 \text{ hrs/wk}) \times (6 \text{ wks}) = \$2.55 \text{ million}$$

Calculation of the total cost to conduct visual surveys:

$$\$1.95 \text{ million} + \$2.55 \text{ million} = \$4.5 \text{ million}$$

1.2 Cost to determine land ownership of discovered facilities

Assumptions:

Number of counties in the U. S.:	approximately 3,100
Number of facilities found:	43,000 (see calculation 2.1.2)
Average miles traveled to and from each county courthouse:	30 miles
Time for each summer hire to get to and from each county courthouse:	1 hour
Time to determine land ownership for each facility:	0.25 hour
Hourly cost per summer hire:	\$10/hour
Government mileage rate:	32.5 ¢/mile

Calculation of the total number of hours spent at the courthouse:

$$(43,000 \text{ facilities}) \times (0.25 \text{ hrs/facility}) = 10,750 \text{ hours spent at courthouse}$$

Calculation of the total number of travel hours:

$$(1 \text{ hour/courthouse}) \times (3,100 \text{ courthouses}) = 3,100 \text{ hours driving time}$$

Calculation of the total hours needed to determine land ownership:

$$(10,750 \text{ hours}) + (3,100 \text{ hours}) = 13,850 \text{ total hours}$$

Calculation of the total wage cost to determine land ownership:

$$(13,850 \text{ hours}) \times (\$10/\text{hour}) = \$138,500 \text{ wage cost}$$

Calculation of total miles traveled to and from courthouses:

$$(3,100 \text{ courthouses}) \times (30 \text{ miles/courthouse}) = 93,000 \text{ miles}$$

Calculation to determine mileage costs:

$$(\$0.325/\text{mile}) \times (93,000 \text{ miles}) = \$30,225 \text{ travel costs}$$

Calculation of total cost to determine land ownership:

$$(\$30,225) + (\$138,500) = \$168,725 \text{ total cost}$$

For purposes of this compliance plan, EPA rounded the estimate of \$168,725 to \$170,000.

1.3 Total cost to conduct visual surveys and determine land ownership

Calculation:

$$(\$168,725) + (\$4,500,000) = \$4.67 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$4.67 million to \$5 million.

Calculation 2 - Compliance Inspections

2.1 Conducting all compliance inspections in one year

2.1.1 Cost to inspect all registered USTs - active and abandoned

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Years to conduct all inspections:	1
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Average number of inspectors per state/territory dedicated to performing compliance inspections:	8
Number of states and territories:	56
Number of EPA inspectors:	17

Calculation to determine the number of registered facilities:

$$(760,500 \text{ UST systems}) / (2.65 \text{ UST systems/facility}) = 287,000 \text{ facilities}$$

Calculation to determine the number of inspectors needed to inspect 287,000 facilities:

$$(287,000 \text{ facilities}) / (200 \text{ facilities/inspector}) = 1,435 \text{ inspectors}$$

Calculation to determine the cost of paying 1,435 inspectors:

$$(1,435 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$100 \text{ million}$$

Calculation to determine the current compliance inspection workforce:

$$(8 \text{ inspectors/state}) \times (56 \text{ states}) + (17 \text{ EPA inspectors}) = 465 \text{ total inspectors}$$

Calculation of the cost of 465 inspectors to conduct compliance inspections:

$$(465 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$32.6 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$32.6 million to \$35 million.

Calculation of the additional cost to conduct a compliance inspection of every facility in one year:

$$(\$100 \text{ million}) - (\$32.6 \text{ million}) = \$67.4 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$67.4 million to \$65 million.

2.1.2 Cost to inspect unregistered USTs - active and abandoned

Assumptions:

Percent of active unregistered USTs: 5% of registered USTs

Percent of active unregistered USTs found: 100%

Percent of abandoned unregistered USTs: 20% of registered USTs

Percent of abandoned unregistered USTs found: 50%

Registered UST systems: 760,500 (as of September 30, 1999)

Number of UST systems/facility: 2.65

Inspections per year per inspector: 200

Years to conduct all inspections: 1

Annual inspector cost: \$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment

Visual surveys and land ownership cost: \$4.67 million (see calculation 1.3)

Calculation of active unregistered tanks:
 $(760,500 \text{ USTs}) \times (0.05) = 38,025 \text{ active unregistered tanks}$

Calculation of abandoned unregistered tanks:
 $(760,500 \text{ USTs}) \times (0.2) = 152,100 \text{ abandoned unregistered tanks}$

Calculation of the total (active and abandoned) unregistered tanks:
 $(38,025 \text{ USTs}) + (152,100 \text{ USTs}) = 190,125 \text{ total unregistered tanks}$

For purposes of this compliance plan, EPA rounded the estimate of 190,125 to 190,000 total unregistered tanks.

Calculation of active unregistered tanks found as a result of the visual surveys:
 $(38,025) \times (1.0) = 38,025 \text{ active unregistered tanks found}$

Calculation of abandoned unregistered tanks found as a result of the visual surveys:
 $(152,100) \times (0.5) = 76,050 \text{ abandoned unregistered tanks found}$

Calculation of total unregistered tanks that were found and need to be inspected:
 $(38,025) + (76,050) = 114,075 \text{ total unregistered tanks found}$

For purposes of this compliance plan, EPA rounded the estimate of 114,075 to 114,000 total unregistered tanks found.

Calculation of number of unregistered facilities found that need to be inspected:
 $(114,075 \text{ UST systems}) / (2.65 \text{ UST systems/facility}) = 43,000 \text{ facilities}$

Calculation of the number of inspectors needed to inspect 43,000 facilities:
 $(43,000 \text{ facilities}) / (200 \text{ facilities/inspector}) = 215 \text{ inspectors}$

Calculation to determine the cost of paying 215 inspectors:
 $(215 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \15 million

Calculation of the total cost to find and inspect all unregistered systems:
 $(\$15 \text{ million}) + (\$4.67 \text{ million}) = \19.7 million

For purposes of this compliance plan, EPA rounded the estimate of \$19.7 million to \$20 million.

2.1.3 Total additional cost to find and inspect all registered and unregistered UST systems

Calculation of the total additional cost for the visual search and inspections:
 $(\$67.4 \text{ million}) + (\$19.7 \text{ million}) = \87.1 million

For purposes of this compliance plan, EPA rounded the estimate of \$87.1 million to \$85 million.

2.1.4 Cost to train new inspectors

Assumptions:

Time needed to train an inspector: 1 month
Annual inspector cost: \$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost: \$1,000

Calculation of the number of new inspectors that would need to be hired:
 $[(1,435 + 215) \text{ needed inspectors}] - (465 \text{ current inspectors}) = 1,185 \text{ new inspectors}$

Calculation of the cost to pay 1,185 new inspectors during training:
 $(1,185 \text{ inspectors}) \times (\$70,000/\text{year}) \times (1/12 \text{ year}) = \6.9 million

Calculation of the training cost for 1,185 new inspectors:
 $(1,185 \text{ inspectors}) \times (\$1,000/\text{inspector}) = \1.2 million

Calculation of the total cost to train 1,185 new inspectors:
 $(\$1.2 \text{ million}) + (\$6.9 \text{ million}) = \$8.1 \text{ million}$

For purposes of this compliance plan, EPA rounded the estimate of \$8.1 million to \$8 million.

2.1.5 Cost to continue annual inspections into the future

Assumptions:

Registered and unregistered abandoned facilities will need no future inspections
Number of abandoned registered USTs: 38,025 (see calculation 4.1)
Number of active unregistered USTs: 38,025 (see calculation 2.1.2)
Number of inspectors needed to conduct annual inspections at active facilities: 1,435 (see calculation 2.1.1)
Current number of inspectors: 465 (see calculation 2.1.1)

Because the number of abandoned registered USTs needs to be excluded and the number of active unregistered USTs needs to be included, they mathematically cancel each other out. In addition, the 215 inspectors used to inspect the unregistered facilities are no longer needed to perform annual inspections because those facilities will be addressed and closed or are already addressed above.

Calculation of the number of additional inspectors needed to conduct annual inspections:
(1,435 inspectors needed) - (465 current inspectors) = 970 additional inspectors

Calculation of the annual cost of 970 additional inspectors:
(970 inspectors) x (\$70,000) = \$67.9 million

For purposes of this compliance plan, EPA rounded the estimate of \$67.9 million to \$70 million.

2.2 Conducting all compliance inspections in two years

2.2.1 Cost to inspect all registered USTs - active and abandoned

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Years to conduct all inspections:	2
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment

Average number of inspectors per state/territory dedicated to performing compliance inspections:	8
Number of states and territories:	56
Number of EPA inspectors:	17
Inspectors not reinspecting already-inspected facilities the second year of the inspection:	75%

Calculation to determine the number of registered facilities:
(760,500 UST systems)/(2.65 UST systems/facility) = 287,000 facilities

Calculation to determine the number of inspectors needed to inspect 287,000 facilities:
(287,000 facilities)/(200 facilities/inspector) = 1,435 inspectors

Calculation to determine how many inspectors are needed to inspect all facilities in two years:

$$(1,435 \text{ inspectors}) / (2 \text{ years}) = 718 \text{ inspectors}$$

Calculation to determine the cost of paying 718 inspectors for two years:

$$(718 \text{ inspectors}) \times (\$70,000/\text{inspector}/\text{year}) \times (2 \text{ years}) = \$100 \text{ million}$$

Calculation to determine the current compliance inspection workforce:

$$(8 \text{ inspectors}/\text{state}) \times (56 \text{ states}) + (17 \text{ EPA inspectors}) = 465 \text{ total inspectors}$$

Calculation of the cost of 465 inspectors to conduct compliance inspections (first year):

$$(465 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$32.6 \text{ million}$$

Calculation of the number of inspectors in states and territories who inspect all facilities over two or more years (those states/territories that can inspect at a frequency of less than two years cannot be counted in the total inspectors for the second year because they are now reinspecting facilities already inspected in the first year):

$$(465 \text{ inspectors}) \times (0.75) = 349 \text{ inspectors}$$

Calculation of the cost of 349 inspectors to conduct compliance inspections (second year):

$$(349 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$24.4 \text{ million}$$

Calculation of the additional cost to conduct a compliance inspection of every facility over a two year period:

$$(\$100 \text{ million}) - [(\$32.6 \text{ million}) + (\$24.4 \text{ million})] = \$43 \text{ million over two years}$$

For purposes of this compliance plan, EPA rounded the estimate of \$43 million to \$45 million.

2.2.2 Cost to inspect unregistered USTs - active and abandoned

Assumptions:

Percent of active unregistered USTs: 5% of registered UST facilities

Percent of active unregistered USTs

found: 100%

Percent of abandoned unregistered

USTs: 20% of registered UST facilities

Percent of abandoned unregistered

USTs found: 50%

Registered UST systems: 760,500 (as of September 30, 1999)

Number of UST systems/facility: 2.65

Inspections per year per inspector: 200
Years to conduct all inspections: 2
Annual inspector cost: \$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment

Percent of states that cannot inspect abandoned unregistered tanks every two years without additional resources: 85%

Visual surveys and land ownership cost: \$4.67 million (see calculation 1.3)

Calculation of active unregistered tanks:
 $(760,500 \text{ USTs}) \times (0.05) = 38,025 \text{ active unregistered tanks}$

Calculation of abandoned unregistered tanks:
 $(760,500 \text{ USTs}) \times (0.2) = 152,100 \text{ abandoned unregistered tanks}$

Calculation of active unregistered tanks found as a result of the visual surveys:
 $(38,025) \times (1.0) = 38,025 \text{ active unregistered tanks found}$

Calculation of abandoned unregistered tanks found as a result of the visual surveys:
 $(152,100) \times (0.5) = 76,050 \text{ abandoned unregistered tanks found}$

Calculation of total unregistered tanks found and which need to be inspected:
 $(38,025) + (76,050) = 114,075 \text{ total unregistered tanks}$

Calculation of number of unregistered facilities found which need to be inspected:
 $(114,075 \text{ UST systems}) / (2.65 \text{ UST systems/facility}) = 43,000 \text{ facilities}$

Calculation of the number of unregistered facilities for which existing state inspectors cannot inspect within two years:
 $(43,000) \times (0.85) = 36,550 \text{ facilities}$

Calculation of the number of inspectors needed to inspect 36,550 facilities over two years:
 $(36,550 \text{ facilities}) / (200 \text{ facilities/inspector/year}) / 2 \text{ years} = 91 \text{ inspectors/year}$

Calculation to determine the cost of paying 91 inspectors for two years:
 $(91 \text{ inspectors}) \times (\$70,000/\text{inspector/year}) \times (2 \text{ years}) = \12.8 million

Calculation of the total cost to find and inspect all unregistered systems over two years:
 $(\$12.8 \text{ million}) + (\$4.67 \text{ million}) = \$17.5 \text{ million over two years}$

For purposes of this compliance plan, EPA rounded the estimate of \$17.5 million to \$18 million.

2.2.3 Total additional cost to find and inspect all registered and unregistered UST systems

Calculation of the total additional cost for the visual search and inspections over a two year period:

$(\$43 \text{ million}) + (\$17.5 \text{ million}) = \$60.5 \text{ million for two years or}$
 $\$30.25 \text{ million each year for two years}$

For purposes of this compliance plan, EPA rounded the estimates of \$60.5 million to \$60 million and \$30.25 million to \$30 million.

2.2.4 Cost to train new inspectors

Assumptions:

Time needed to train an inspector:	1 month
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Number of inspectors needed to conduct biennial inspections:	718 (see calculation 2.2.1)
Current number of inspectors (year 1)	465 (see calculation 2.2.1)
Current number of inspectors (year 2)	349 (see calculation 2.2.1)

Calculation of the number of new inspectors that would need to be hired:
 $\{[(718 - 465) \text{ first year}] + [(718 - 349) \text{ second year}]/2 \text{ years}\} + 91 = 402 \text{ inspectors}$

Calculation of the cost to pay 402 new inspectors during training:
 $(402 \text{ inspectors}) \times (\$70,000/\text{year}) \times (1/2 \text{ year}) = \2.3 million

Calculation of the training cost for 402 new inspectors:
 $(402 \text{ inspectors}) \times (\$1,000/\text{inspector}) = \0.4 million

Calculation of the total cost to train 402 new inspectors:
 $(\$2.3 \text{ million}) + (\$0.4 \text{ million}) = \$2.7 \text{ million}$

For purposes of this compliance plan, EPA rounded the estimate of \$2.7 million to \$3 million.

2.2.5 Cost to continue biennial inspections into the future

Assumptions:

Registered and unregistered abandoned facilities will need no future inspections

Number of abandoned registered USTs: 38,025 (see calculation 4.1)

Number of active unregistered USTs: 38,025 (see calculation 2.2.2)

Number of UST systems/facility: 2.65

Number of inspectors needed to conduct biennial inspections: 718 (see calculation 2.2.1)

Current number of inspectors (year 1): 465 (see calculation 2.2.1)

Current number of inspectors (year 2): 349 (see calculation 2.2.1)

Because the number of abandoned registered USTs needs to be excluded and the number of active unregistered USTs needs to be included, they mathematically cancel each other out. In addition, the 91 inspectors used to inspect the unregistered facilities are no longer needed to perform biennial inspections because those facilities will be addressed and closed or are already addressed above.

Calculation of the number of additional inspectors needed to conduct biennial inspections:
{[(718 - 465) first year] + [(718 - 349) second year]/2 years} = 311 inspectors

Calculation of the annual cost of 311 inspectors:
(311 inspectors) x (\$70,000) = \$21.8 million

For purposes of this compliance plan, EPA rounded the estimate of \$21.8 million to \$20 million.

2.3 Conducting all compliance inspections in three years

2.3.1 Cost to inspect all registered USTs - active and abandoned

Assumptions:

Registered UST systems: 760,500 (as of September 30, 1999)

Number of UST systems/facility: 2.65

Inspections per year per inspector: 200

Years to conduct all inspections: 3

Annual inspector cost: \$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment

Average number of inspectors per state/territory dedicated to performing compliance inspections: 8
Number of states and territories: 56
Number of EPA inspectors: 17
Inspectors not reinspecting already-inspected facilities the second year of the inspection cycle: 75%
Inspectors not reinspecting already-inspected facilities the third year of the inspection cycle: 50%

Calculation to determine the number of registered facilities:
 $(760,500 \text{ UST systems}) / (2.65 \text{ UST systems/facility}) = 287,000 \text{ facilities}$

Calculation to determine the number of inspectors needed to inspect 287,000 facilities:
 $(287,000 \text{ facilities}) / (200 \text{ facilities/inspector}) = 1,435 \text{ inspectors}$

Calculation to determine how many inspectors are needed to inspect all facilities in three years:
 $(1,435 \text{ inspectors}) / (3 \text{ years}) = 478 \text{ inspectors}$

Calculation to determine the cost of paying 478 inspectors for three years:
 $(478 \text{ inspectors}) \times (\$70,000/\text{inspector/year}) \times (3 \text{ years}) = \100 million

Calculation to determine the current compliance inspection workforce:
 $(8 \text{ inspectors/state}) \times (56 \text{ states}) + (17 \text{ EPA inspectors}) = 465 \text{ total inspectors}$

Calculation of the cost of 465 inspectors to conduct compliance inspections (first year):
 $(465 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \32.6 million

Calculation of the number of inspectors in states and territories who inspect all facilities over two or more years (those states/territories that can inspect at a frequency of less than two years cannot be counted in the total inspectors for the second year because they are now reinspecting facilities already inspected in the first year):
 $(465 \text{ inspectors}) \times (0.75) = 349 \text{ inspectors}$

Calculation of the cost of 349 inspectors to conduct compliance inspections (second year):
(349 inspectors) x (\$70,000/inspector) = \$24.4 million

Calculation of the number of inspectors in states and territories who inspect all facilities over three or more years (those states/territories that can inspect at a frequency of less than three years cannot be counted in the total inspectors for the third year because they are now reinspecting facilities already inspected in the first or second years):
(465 inspectors) x (0.5) = 233 inspectors

Calculation of the cost of 233 inspectors to conduct compliance inspections (third year):
(233 inspectors) x (\$70,000/inspector) = \$16.3 million

Calculation of the additional cost to conduct a compliance inspection of every facility over a three year period:
(\$100 million) - [(\$32.6 million) + (\$24.4 million) + (\$16.3 million)]
= \$26.7 million over three years

For purposes of this compliance plan, EPA rounded the estimate of \$26.7 million to \$27 million.

2.3.2 Cost to inspect unregistered USTs - active and abandoned

Assumptions:

Percent of active unregistered USTs: 5% of registered UST facilities

Percent of active unregistered USTs found: 100%

Percent of abandoned unregistered USTs: 20% of registered UST facilities

Percent of abandoned unregistered USTs found: 50%

Registered UST systems: 760,500 (as of September 30, 1999)

Number of UST systems/facility: 2.65

Inspections per year per inspector: 200

Years to conduct all inspections: 3

Annual inspector cost: \$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment

Percent of states that cannot inspect abandoned unregistered tanks every three years without additional resources: 75%

Visual surveys and land ownership cost: \$4.67 million (see calculation 1.3)

Calculation of active unregistered tanks:
 $(760,500 \text{ USTs}) \times (0.05) = 38,025 \text{ active unregistered tanks}$

Calculation of abandoned unregistered tanks:
 $(760,500 \text{ USTs}) \times (0.2) = 152,100 \text{ abandoned unregistered tanks}$

Calculation of active unregistered tanks found as a result of the visual surveys:
 $(38,025) \times (1.0) = 38,025 \text{ active unregistered tanks found}$

Calculation of abandoned unregistered tanks found as a result of the visual surveys:
 $(152,100) \times (0.5) = 76,050 \text{ abandoned unregistered tanks found}$

Calculation of total unregistered tanks found and which need to be inspected:
 $(38,025) + (76,050) = 114,075 \text{ total unregistered tanks}$

Calculation of number of unregistered facilities found which need to be inspected:
 $(114,075 \text{ UST systems}) / (2.65 \text{ UST systems/facility}) = 43,000 \text{ facilities}$

Calculation of the number of unregistered facilities for which existing state inspectors cannot inspect within three years:
 $(43,000) \times (0.75) = 32,250 \text{ facilities}$

Calculation of the number of inspectors needed to inspect 32,250 facilities over three years:
 $(32,250 \text{ facilities}) / (200 \text{ facilities/inspector/year}) / 3 \text{ years} = 54 \text{ inspectors/year}$

Calculation to determine the cost of paying 54 inspectors for three years:
 $(54 \text{ inspectors}) \times (\$70,000/\text{inspector/year}) \times (3 \text{ years}) = \11.3 million

Calculation of the total cost to find and inspect all unregistered systems over three years:
 $(\$11.3 \text{ million}) + (\$4.67 \text{ million}) = \$16 \text{ million over three years}$

2.3.3 Total additional cost to find and inspect all registered and unregistered UST systems

Calculation of the total additional cost for the visual search and inspections over a three year period:
 $(\$26.7 \text{ million}) + (\$16 \text{ million}) = \$42.7 \text{ million for three years or } \$14.2 \text{ million each year for three years}$

For purposes of this compliance plan, EPA rounded the estimates of \$42.7 million to \$43 million and \$14.2 million to \$14 million.

2.3.4 Cost to train new inspectors

Assumptions:

Time needed to train an inspector:	1 month
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Number of inspectors needed to conduct triennial inspections:	478 (see calculation 2.3.1)
Current number of inspectors (year 1)	465 (see calculation 2.3.1)
Current number of inspectors (year 2)	349 (see calculation 2.3.1)
Current number of inspectors (year 3)	233 (see calculation 2.3.1)

Calculation of the number of new inspectors that would need to be hired:
 $\{[(478 - 465) \text{ first year}] + [(478 - 349) \text{ second year}] + [(478 - 233) \text{ third year}]/3 \text{ years}\} + 54 = 183 \text{ inspectors}$

Calculation of the cost to pay 183 new inspectors during training:
 $(183 \text{ inspectors}) \times (\$70,000/\text{year}) \times (1/12 \text{ year}) = \1.07 million

Calculation of the training cost for 183 new inspectors:
 $(183 \text{ inspectors}) \times (\$1,000/\text{inspector}) = \0.183 million

Calculation of the total cost to train 183 new inspectors:
 $(\$1.07 \text{ million}) + (\$0.183 \text{ million}) = \1.25 million

For purposes of this compliance plan, EPA rounded this estimate from \$1.25 million to \$1 million.

2.3.5 Cost to continue triennial inspections into the future

Assumptions:

Registered and unregistered abandoned facilities will need no future inspections	
Number of abandoned registered USTs:	38,025 (see calculation 4.1)
Number of active unregistered USTs:	38,025 (see calculation 2.3.2)
Number of UST systems/facility:	2.65
Number of inspectors needed to conduct triennial inspections:	478 (see calculation 2.3.1)

Current number of inspectors (year 1)	465 (see calculation 2.3.1)
Current number of inspectors (year 2)	349 (see calculation 2.3.1)
Current number of inspectors (year 3)	233 (see calculation 2.3.1)

Because the number of abandoned registered USTs needs to be excluded and the number of active unregistered USTs needs to be included, they mathematically cancel each other out. In addition, the 54 inspectors used to inspect the unregistered facilities are no longer needed to perform triennial inspections because those facilities will be addressed and closed or are already addressed above.

Calculation of the number of additional inspectors needed to conduct triennial inspections:
 $\{[(478 - 465) \text{ first year}] + [(478 - 349) \text{ second year}] + [(478 - 233) \text{ third year}]/3 \text{ years}\} = 129 \text{ inspectors}$

Calculation of the annual cost of 129 inspectors:
 $(129 \text{ inspectors}) \times (\$70,000) = \$9 \text{ million}$

2.4 Conducting inspections on USTs not reported as equipped to comply with the 1998 requirements

2.4.1 Calculating the percent of USTs not reported as equipped to comply with the 1998 requirements

Assumptions:

Number of USTs reported as equipped to comply:	520,666 (as of September 30, 1999)
Registered UST systems:	760,500 (as of September 30, 1999)

Calculation of the percent of USTs reported as equipped to comply with the 1998 requirements:

$$[(520,666 \text{ tanks})/(760,500 \text{ tanks})] \times (100\%) = 68\%$$

Calculation of the percent of USTs not reported as equipped to comply with the 1998 requirements:

$$(100\%) - (68\%) = 32\%$$

Note: All unregistered UST systems would need to be inspected because their status for equipped to comply with the 1998 requirements is not known.

2.4.2 Conducting an annual inspection on USTs not reported as equipped to comply with the 1998 requirements

2.4.2.1 Inspecting registered USTs not reported as equipped to comply with the 1998 requirements - annual

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Current inspectors:	465 (see calculation 2.1.1)
Percent of tanks not in compliance at a non-compliant facility:	85%
Percent of states that cannot inspect 32% of USTs annually:	70%
Percent of total inspectors in the 70% of states that cannot inspect 32% of USTs annually:	50%
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of tanks not reported as equipped to comply with the 1998 requirements in states that cannot inspect 32% of USTs annually:

$$(0.32) \times (0.70) \times (760,500 \text{ tanks}) = 170,352 \text{ tanks}$$

Calculation of the number of facilities not reported as equipped to comply with the 1998 requirements (This calculation includes a correction for those compliant tanks at a non-compliant facility. The result of the correction is that more than 32% of facilities need to be inspected.):

$$[(170,352 \text{ tanks}) / (0.85)] / (2.65 \text{ tanks/facility}) = 75,627 \text{ facilities}$$

Calculation of the number of existing inspectors in states that cannot inspect 32% of UST systems annually:

$$(465 \text{ inspectors}) \times (0.50) = 233 \text{ inspectors}$$

Calculation of the number of inspectors needed:

$$(75,627 \text{ facilities}) / (200 \text{ facilities/inspector}) = 378 \text{ inspectors needed}$$

Calculation of additional inspectors that would be needed:

$$(378) - (233) = 145 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:

$$(145 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$10.2 \text{ million}$$

Calculation of the cost to train inspectors:

$$[(145 \text{ inspectors}) \times (\$1,000/\text{inspector})] + [(145 \text{ inspectors}) \times (\$70,000/\text{inspector})/(12 \text{ months})] = \$0.99 \text{ million}$$

Calculation of the total additional cost to inspect registered USTs in one year that are not equipped to comply with the 1998 requirements:

$$(\$10.2 \text{ million}) + (\$0.99 \text{ million}) = \$11.19 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$11.19 million to \$11 million.

2.4.2.2 Inspecting active unregistered USTs not reported as equipped to comply with the 1998 requirements - annual

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Percent of states that cannot inspect all unregistered facilities with existing inspectors:	80%
Percent of active unregistered USTs:	5% of registered USTs
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of active unregistered USTs:

$$(0.05) \times (760,500) = 38,025 \text{ USTs}$$

Calculation of the number of active unregistered facilities:

$$(38,025 \text{ USTs})/2.65 \text{ USTs/facility} = 14,350 \text{ facilities}$$

Calculation of the number of active unregistered facilities that cannot be inspected by existing inspectors:

$$(14,350 \text{ facilities}) \times (0.8) = 11,480 \text{ facilities}$$

Calculation of the number of additional inspectors needed to inspect active unregistered facilities:

$$(11,480 \text{ facilities}) / (200 \text{ facilities/inspector}) = 57 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:

$$(57 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$3.99 \text{ million}$$

Calculation of the cost to train additional inspectors:

$$[(57 \text{ inspectors}) \times (\$1,000/\text{inspector})] + [(57 \text{ inspectors}) \times (\$70,000/\text{inspector}) / (12 \text{ months})] = \$0.39 \text{ million}$$

Calculation of the total additional cost to inspect active unregistered USTs in one year that are not equipped to comply with the 1998 requirements:

$$(\$3.99 \text{ million}) + (\$0.39 \text{ million}) = \$4.38 \text{ million}$$

2.4.2.3 Inspecting abandoned unregistered USTs not reported as equipped to comply with the 1998 requirements - annual

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Percent of states that cannot inspect all unregistered facilities with existing inspectors:	80%
Percent of abandoned unregistered USTs discovered:	10% of registered USTs
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of abandoned unregistered USTs discovered:

$$(0.1) \times (760,500) = 76,050 \text{ USTs}$$

Calculation of the number of abandoned unregistered facilities:

$$(76,050 \text{ USTs}) / 2.65 \text{ USTs/facility} = 28,700 \text{ facilities}$$

Calculation of the number of abandoned unregistered facilities that cannot be inspected by existing inspectors:

$$(28,700 \text{ facilities}) \times (0.8) = 22,960 \text{ facilities}$$

Calculation of the number of additional inspectors needed to inspect abandoned unregistered facilities:

$$(22,960 \text{ facilities}) / (200 \text{ facilities/inspector}) = 115 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:

$$(115 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$8.05 \text{ million}$$

Calculation of the cost to train additional inspectors:

$$[(115 \text{ inspectors}) \times (\$1,000/\text{inspector})] + [(115 \text{ inspectors}) \times (\$70,000/\text{inspector}) / (12 \text{ months})] = \$0.79 \text{ million}$$

Calculation of the total additional cost to inspect abandoned unregistered USTs in one year that are not equipped to comply with the 1998 requirements:

$$(\$8.05 \text{ million}) + (\$0.79 \text{ million}) = \$8.84 \text{ million}$$

2.4.2.4 Total annual costs (includes the \$5 million cost to do visual surveys and determine land ownership (see calculation 1) and initial inspector training costs)

$$(\$11.19 \text{ million}) + (\$4.38 \text{ million}) + (\$8.84 \text{ million}) + (\$5 \text{ million}) = \$29.4 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$29.4 million to \$30 million.

Note: If only registered USTs not reported as equipped to comply with the 1998 requirements were inspected in one year, the cost would be about \$11 million.

2.4.3 Conducting a two year inspection on USTs not reported as equipped to comply with the 1998 requirements

2.4.3.1 Inspecting registered USTs not reported as equipped to comply with the 1998 requirements - two year

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Current inspectors:	465 (see calculation 2.1.1)
Percent of tanks not in compliance at a non-compliant facility:	85%

Percent of states that cannot inspect 32% of USTs every two years:	30%
Percent of total inspectors in the 30% of states that cannot inspect 32% of USTs every two years:	12%
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of tanks not reported as equipped to comply with the 1998 requirements in states that cannot inspect 32% of USTs every two years:

$$(0.32) \times (0.30) \times (760,500 \text{ tanks}) = 73,008 \text{ tanks}$$

Calculation of the number of facilities not reported as equipped to comply with the 1998 requirements (This calculation includes a correction for those compliant tanks at a non-compliant facility. The result of the correction is that more than 32% of facilities need to be inspected.):

$$[(73,008 \text{ tanks}) / (0.85)] / (2.65 \text{ tanks/facility}) = 32,412 \text{ facilities}$$

Calculation of the number of existing inspectors in states that cannot inspect 32% of UST systems every two years:

$$(465 \text{ inspectors}) \times (0.12) = 56 \text{ inspectors}$$

Calculation of the number of inspectors needed over two years:

$$(32,412 \text{ facilities}) / (200 \text{ facilities/inspector}) = 162 \text{ inspectors needed}$$

Calculation of additional inspectors that would be needed:

$$[(162 \text{ inspectors}) / (2 \text{ years})] - (56 \text{ existing inspectors}) = 25 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:

$$(25 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$1.75 \text{ million}$$

Calculation of the cost to train inspectors:

$$[(25 \text{ inspectors}) \times (\$1,000/\text{inspector})] + [(25 \text{ inspectors}) \times (\$70,000/\text{inspector}) / (12 \text{ months})] = \$0.17 \text{ million}$$

Calculation of the total additional cost to inspect registered USTs in two years that are not equipped to comply with the 1998 requirements:

First year: (\$1.75 million) + (\$0.17 million) = \$1.92 million

Second year: \$1.75 million

Total cost over two years: (\$1.92 million) + (\$1.75 million) = \$3.67 million

For purposes of this compliance plan, EPA rounded the estimate of \$3.67 million to \$4 million.

2.4.3.2 Inspecting active unregistered USTs not reported as equipped to comply with the 1998 requirements - two years

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Percent of states that cannot inspect all unregistered facilities with existing inspectors:	43%
Percent of active unregistered USTs:	5% of registered USTs
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of active unregistered USTs:

$$(0.05) \times (760,500) = 38,025 \text{ USTs}$$

Calculation of the number of active unregistered facilities:

$$(38,025 \text{ USTs}) / 2.65 \text{ USTs/facility} = 14,350 \text{ facilities}$$

Calculation of the number of active unregistered facilities that cannot be inspected by existing inspectors:

$$(14,350 \text{ facilities}) \times (0.43) = 6,170 \text{ facilities}$$

Calculation of the number of additional inspectors needed to inspect active unregistered facilities:

$$[(6,170 \text{ facilities}) / (200 \text{ facilities/inspector})] / (2 \text{ years}) = 15 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:

$$(15 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$1.05 \text{ million}$$

Calculation of the cost to train additional inspectors:

$$[(15 \text{ inspectors}) \times (\$1,000/\text{inspector})] + [(15 \text{ inspectors}) \times (\$70,000/\text{inspector})/(12 \text{ months})] = \$0.1 \text{ million}$$

Calculation of the total additional cost to inspect active unregistered USTs in two years that are not equipped to comply with the 1998 requirements:

$$\text{First year: } (\$1.05 \text{ million}) + (\$0.1 \text{ million}) = \$1.15 \text{ million}$$

$$\text{Second year: } \$1.05 \text{ million}$$

$$\text{Total cost over two years: } (\$1.15 \text{ million}) + (\$1.05 \text{ million}) = \$2.2 \text{ million}$$

2.4.3.3 Inspecting abandoned unregistered USTs not reported as equipped to comply with the 1998 requirements - two years

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Percent of states that cannot inspect all unregistered facilities with existing inspectors:	43%
Percent of abandoned unregistered USTs discovered:	10% of registered USTs
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of abandoned unregistered USTs discovered:

$$(0.1) \times (760,500) = 76,050 \text{ USTs}$$

Calculation of the number of abandoned unregistered facilities:

$$(76,050 \text{ USTs})/2.65 \text{ USTs/facility} = 28,700 \text{ facilities}$$

Calculation of the number of abandoned unregistered facilities that cannot be inspected by existing inspectors:

$$(28,700 \text{ facilities}) \times (0.43) = 12,341 \text{ facilities}$$

Calculation of the number of additional inspectors needed to inspect abandoned unregistered facilities:

$$[(12,341 \text{ facilities})/(200 \text{ facilities/inspector})]/(2 \text{ years}) = 31 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:
 $(31 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \2.2 million

Calculation of the cost to train additional inspectors:
 $[(31 \text{ inspectors}) \times (\$1,000/\text{inspector})] +$
 $[(31 \text{ inspectors}) \times (\$70,000/\text{inspector})/(12 \text{ months})] = \0.21 million

Calculation of the total additional cost to inspect abandoned unregistered USTs in two years that are not equipped to comply with the 1998 requirements:

First year: $(\$2.2 \text{ million}) + (\$0.21 \text{ million}) = \2.41 million

Second year: $\$2.2 \text{ million}$

Total cost over two years: $(\$2.41 \text{ million}) + (\$2.2 \text{ million}) = \$4.61 \text{ million}$

2.4.3.4 Total two year costs

Calculation for year 1 (includes the \$5 million cost to do visual surveys and determine land ownership (see calculation 1) and initial inspector training costs):

$(\$1.92 \text{ million}) + (\$1.15 \text{ million}) + (\$2.41 \text{ million}) + (\$5 \text{ million}) = \$10.5 \text{ million}$

Calculation for year 2:

$(\$1.75 \text{ million}) + (\$1.05 \text{ million}) + (\$2.2 \text{ million}) = \$5 \text{ million for the second year}$

Calculation of the total 2 year cost:

$(\$10.5 \text{ million}) + (\$5 \text{ million}) = \$15.5 \text{ million over two years}$

For purposes of this compliance plan, EPA rounded the estimate of \$15.5 million to \$15 million.

Note: If only registered USTs not reported as equipped to comply with the 1998 requirements were inspected in two years, the cost would be about \$4 million over two years.

2.4.4 Conducting a three year inspection on USTs not reported as equipped to comply with the 1998 requirements

2.4.4.1 Inspecting registered USTs not reported as equipped to comply with the 1998 requirements - three years

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200

Current inspectors:	465 (see calculation 2.1.1)
Percent of tanks not in compliance at a non-compliant facility:	85%
Percent of states that cannot inspect 32% of USTs every three years:	10%
Percent of total inspectors in the 10% of states that cannot inspect 32% of USTs every three years:	2%
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of tanks not reported as equipped to comply with the 1998 requirements in states that cannot inspect 32% of USTs every three years:

$$(0.32) \times (0.10) \times (760,500 \text{ tanks}) = 24,336 \text{ tanks}$$

Calculation of the number of facilities not reported as equipped to comply with the 1998 requirements (This calculation includes a correction for those compliant tanks at a non-compliant facility. The result of the correction is that more than 32% of facilities need to be inspected.):

$$[(24,336 \text{ tanks}) / (0.85)] / (2.65 \text{ tanks/facility}) = 10,803 \text{ facilities}$$

Calculation of the number of existing inspectors in states that cannot inspect 32% of UST systems every three years:

$$(465 \text{ inspectors}) \times (0.02) = 9 \text{ inspectors}$$

Calculation of the number of inspectors needed over three years:

$$(10,803 \text{ facilities}) / (200 \text{ facilities/inspector}) = 54 \text{ inspectors needed}$$

Calculation of additional inspectors that would be needed:

$$[(54 \text{ inspectors}) / (3 \text{ years})] - (9 \text{ existing inspectors}) = 9 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:

$$(9 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$0.63 \text{ million}$$

Calculation of the cost to train inspectors:

$$[(9 \text{ inspectors}) \times (\$1,000/\text{inspector})] + [(9 \text{ inspectors}) \times (\$70,000/\text{inspector}) / (12 \text{ months})] = \$0.062 \text{ million}$$

Calculation of the total additional cost to inspect registered USTs in three years that are not equipped to comply with the 1998 requirements:

First year: (\$0.63 million) + (\$0.062 million) = \$0.692 million

Second and third years: \$0.63 million

Total cost over three years: (\$0.692 million) + (2 x \$0.63 million) = \$1.95 million

For purposes of this compliance plan, EPA rounded the estimate of \$1.95 million to \$2 million.

2.4.4.2 Inspecting active unregistered USTs not reported as equipped to comply with the 1998 requirements - three years

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Percent of states that cannot inspect all unregistered facilities with existing inspectors:	16%
Percent of active unregistered USTs:	5% of registered USTs
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of active unregistered USTs:

$$(0.05) \times (760,500) = 38,025 \text{ USTs}$$

Calculation of the number of active unregistered facilities:

$$(38,025 \text{ USTs}) / 2.65 \text{ USTs/facility} = 14,350 \text{ facilities}$$

Calculation of the number of active unregistered facilities that cannot be inspected by existing inspectors:

$$(14,350 \text{ facilities}) \times (0.16) = 2,296 \text{ facilities}$$

Calculation of the number of additional inspectors needed to inspect active unregistered facilities:

$$[(2,296 \text{ facilities}) / (200 \text{ facilities/inspector})] / (3 \text{ years}) = 4 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:
 $(4 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \0.28 million

Calculation of the cost to train additional inspectors:
 $[(4 \text{ inspectors}) \times (\$1,000/\text{inspector})] +$
 $[(4 \text{ inspectors}) \times (\$70,000/\text{inspector})/(12 \text{ months})] = \0.027 million

Calculation of the total additional cost to inspect active unregistered USTs in three years that are not equipped to comply with the 1998 requirements:

First year: $(\$0.28 \text{ million}) + (\$0.027 \text{ million}) = \0.307 million

Second and third years: $\$0.28 \text{ million}$

Total cost over three years: $(\$0.307 \text{ million}) + (2 \times \$0.28 \text{ million}) = \0.867
million

2.4.4.3 Inspecting abandoned unregistered USTs not reported as equipped to comply with the 1998 requirements - three years

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Inspections per year per inspector:	200
Percent of states that cannot inspect all unregistered facilities with existing inspectors:	16%
Percent of abandoned unregistered USTs discovered:	10% of registered USTs
Annual inspector cost:	\$70,000/year - includes salary, travel costs, benefits, managerial and secretarial support, and inspector equipment
Training cost:	\$1,000
Time needed to train an inspector:	1 month

Calculation of the number of abandoned unregistered USTs discovered:
 $(0.1) \times (760,500) = 76,050 \text{ USTs}$

Calculation of the number of abandoned unregistered facilities:
 $(76,050 \text{ USTs})/2.65 \text{ USTs/facility} = 28,700 \text{ facilities}$

Calculation of the number of abandoned unregistered facilities that cannot be inspected by existing inspectors:
 $(28,700 \text{ facilities}) \times (0.16) = 4,592 \text{ facilities}$

Calculation of the number of additional inspectors needed to inspect abandoned unregistered facilities:

$$[(4,592 \text{ facilities}) / (200 \text{ facilities/inspector})] / (3 \text{ years}) = 8 \text{ additional inspectors}$$

Calculation of the annual cost to pay additional inspectors:

$$(8 \text{ inspectors}) \times (\$70,000/\text{inspector}) = \$0.56 \text{ million}$$

Calculation of the cost to train additional inspectors:

$$[(8 \text{ inspectors}) \times (\$1,000/\text{inspector})] + [(8 \text{ inspectors}) \times (\$70,000/\text{inspector}) / (12 \text{ months})] = \$0.055 \text{ million}$$

Calculation of the total additional cost to inspect abandoned unregistered USTs in three years that are not equipped to comply with the 1998 requirements:

$$\text{First year: } (\$0.56 \text{ million}) + (\$0.055 \text{ million}) = \$0.615 \text{ million}$$

$$\text{Second and third years: } \$0.56 \text{ million}$$

$$\text{Total cost over three years: } (\$0.615 \text{ million}) + (2) \times (\$0.56 \text{ million}) = \$1.735 \text{ million}$$

2.4.4.4 Total three year costs

Calculation for year 1 (includes the \$5 million cost to do visual surveys and determine land ownership (see calculation 1) and initial inspector training costs):

$$(\$0.692 \text{ million}) + (\$0.307 \text{ million}) + (\$0.615 \text{ million}) + (\$5 \text{ million}) = \$6.6 \text{ million}$$

Calculation for years 2 and 3:

$$(\$0.63 \text{ million}) + (\$0.28 \text{ million}) + (\$0.56 \text{ million}) = \$1.47 \text{ million each year}$$

Calculation of the total 3 year cost:

$$(\$6.6 \text{ million}) + (\$1.47 \text{ million}) + (\$1.47 \text{ million}) = \$9.54 \text{ million over three years}$$

For purposes of this compliance plan, EPA rounded the estimate of \$9.54 million to \$10 million.

Note: If only registered USTs not reported as equipped to comply with the 1998 requirements were inspected in three years, the cost would be about \$2 million over three years.

Calculation 3 - Costs to Conduct a Site Assessment and Clean Up Contaminated Sites for Abandoned Unregistered USTs

3.1 Cost to conduct a site assessment of unregistered orphaned USTs with a suspected release

Assumptions:

Number of found abandoned unregistered USTs:	76,050 (see calculation 2.1.2)
Number of UST systems/facility:	2.65
Percent of abandoned unregistered USTs which are orphaned:	50%
Percent of UST sites where a release is suspected:	90%
Cost to perform an expedited site assessment:	\$5,000

Calculation of the number of found abandoned unregistered USTs which are orphaned:
 $(76,050 \text{ USTs}) \times (0.5) = 38,025 \text{ unregistered orphaned USTs}$

Calculation of the number of unregistered orphaned UST sites:
 $(38,025 \text{ orphaned USTs}) / (2.65 \text{ orphaned USTs/site}) = 14,349 \text{ unregistered orphaned sites}$

Calculation of the number of unregistered orphaned sites with a suspected release:
 $(14,349 \text{ orphaned sites}) \times (0.9) = 12,914 \text{ unregistered orphaned sites with a suspected release}$

Calculation of the expedited site assessment costs associated with 12,914 unregistered orphaned sites with a suspected release:
 $(12,914 \text{ sites}) \times (\$5,000/\text{site}) = \$64.6 \text{ million}$

For purposes of this compliance plan, EPA rounded the estimate of \$64.6 million to \$65 million.

3.2 Cost to conduct cleanups of unregistered orphaned USTs with a release

Assumptions:

Number of unregistered orphaned UST sites with a suspected release:	12,914 (see calculation 3.1)
Percent of unregistered orphaned UST sites where a site assessment shows a release	

occurred and a cleanup is needed: 75%
Cost of corrective action: \$40,000

Calculation of the number of unregistered orphaned sites with releases where corrective action is needed:

$$(12,914 \text{ sites}) \times (0.75) = 9,686 \text{ sites where cleanup is needed}$$

Calculation of the cost of conducting cleanup at 9,686 unregistered orphaned sites:

$$(9,686 \text{ orphaned sites}) \times (\$40,000/\text{site}) = \$387.4 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$387.4 million to \$385 million.

3.3 Total cost of site assessments and cleanups of unregistered orphaned USTs

Calculation of total cost as a result of site assessment and cleanup:

$$(\$64.6 \text{ million}) + (\$387.4 \text{ million}) = \$452 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$452 million to \$450 million.

Calculation 4 - Costs to Conduct a Site Assessment and Clean Up Contaminated Sites for Abandoned Registered USTs

4.1 Cost to conduct a site assessment of registered orphaned USTs with a suspected release

Assumptions:

Registered UST systems:	760,500 (as of September 30, 1999)
Number of UST systems/facility:	2.65
Percent of abandoned registered USTs:	5%
Percent of abandoned registered USTs that are orphaned:	50%
Percent of registered orphaned USTs suspected to have a release:	90%
Cost to perform a site assessment:	\$5,000

Calculation of the number of abandoned registered USTs:

$$(760,500 \text{ USTs}) \times (0.05) = 38,025 \text{ abandoned registered USTs}$$

Calculation of the number of abandoned registered USTs which are orphaned:

$$(38,025 \text{ USTs}) \times (0.5) = 19,013 \text{ registered orphaned USTs}$$

Calculation of the number of registered orphaned UST sites:

$$(19,013 \text{ orphaned USTs}) / (2.65 \text{ orphaned USTs/site}) = 7,174 \text{ registered orphaned sites}$$

Calculation of the number of registered orphaned sites with a suspected release:

$$(7,174 \text{ orphaned sites}) \times (0.9) = 6,457 \text{ registered orphaned sites with a suspected release}$$

Calculation of the site assessment costs associated with 6,457 registered orphaned sites with a suspected release:

$$(6,457 \text{ sites}) \times (\$5,000/\text{site}) = \$32.3 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$32.3 million to \$30 million.

4.2 Cost to conduct cleanups of registered orphaned USTs with a release

Assumptions:

Number of registered orphaned UST sites with a suspected release:	6,457 (see calculation 4.1)
Percent of registered orphaned UST sites where a site assessment shows a release occurred and a cleanup is needed:	75%
Cost of corrective action:	\$40,000

Calculation of the number of registered orphaned sites with releases where corrective action is needed:

$$(6,457 \text{ sites}) \times (0.75) = 4,843 \text{ registered orphaned sites where cleanup is needed}$$

Calculation of the cost of conducting cleanup at 4,843 registered orphaned sites:

$$(4,843 \text{ registered orphaned sites}) \times (\$40,000/\text{site}) = \$193.7 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$193.7 million to \$195 million.

4.3 Total cost of site assessments and cleanups of registered orphaned USTs

Calculation of total cost as a result of site assessment and cleanup:

$$(\$32.3 \text{ million}) + (\$193.7 \text{ million}) = \$226 \text{ million}$$

For purposes of this compliance plan, EPA rounded the estimate of \$226 million to \$225 million.

Calculation 5 - Costs to Close All (Registered and Unregistered) Orphaned USTs When There is No Release

Assumptions:

Cost to permanently close an UST:	\$5,000	
Number of registered orphaned USTs:	19,013	(see calculation 4.1)
Number of unregistered orphaned USTs:	38,025	(see calculation 3.1)
Percent of orphaned sites that do not have releases:	25%	

Calculation of the total number of registered and unregistered orphaned USTs:
 $(19,013 \text{ registered}) + (38,025 \text{ unregistered}) = 57,038 \text{ total orphaned USTs}$

Calculation of the total number of orphaned USTs without a release:
 $(57,038 \text{ orphaned USTs}) \times (0.25) = 14,260 \text{ total orphaned USTs without a release}$

Calculation of the cost to close all orphaned USTs without a release:
 $(14,260 \text{ USTs}) \times (\$5,000/\text{UST}) = \$71.3 \text{ million}$

For purposes of this compliance plan, EPA rounded the estimate of \$71.3 million to \$70 million.

Appendix B

Third-Party Inspection Programs in the Underground Storage Tank (UST) Program

The concept of allowing private sector entities (“third-party service providers”) to perform some government functions is being implemented in a few state UST programs and considered by others. The Pennsylvania Department of Environmental Protection (PADEP), the Alaska Department of Environmental Conservation (ADEC), and the Montana Department of Environmental Quality (MDEQ) all require owners or operators of USTs whose facilities are due for inspection to hire private, state-certified UST inspectors to perform the required inspections at their facilities. Pennsylvania initiated its program in 1994; Alaska and Montana are implementing their programs, which are scheduled to begin in June 2000.

Certified UST inspectors in these states must meet minimum qualifications that include education and/or experience and, in Pennsylvania’s case, also passing a written test. Certified inspectors must adhere to standards of performance once certified. All three state programs have the authority to suspend or revoke inspector certification. PADEP currently has 154 certified facility inspectors; ADEC, which has just begun its certification process, has five inspectors certified and is training more. MDEQ is just beginning to train potential inspectors.

In both Pennsylvania and Alaska, facilities identified for inspection are notified that an inspection is due and provided a list of certified inspectors. In both states, it is the owner’s responsibility to set up and pay for the inspection. The inspector has 60 days in Pennsylvania and 120 days in Alaska to complete the inspection report. During that period, the inspector may provide technical assistance to the facility owner/operator and often provides needed services or tank handling work at the facility to help it come into compliance. In Pennsylvania, the cost of inspections can be \$100 per tank, and PADEP has heard that an average facility inspection costs about \$250. (Market forces set the price. PADEP does not ask inspectors what they charge or publish rates, but it encourages tank owners to shop for the best price.)

After the inspection, the PADEP and ADEC programs operate in different manners. In Pennsylvania, the inspection process is completed when the private inspector returns the completed inspection form to PADEP and PADEP determines that the facility is in compliance. In Alaska, each tank that passes inspection will be issued a metal tag by the state; the tag is to be displayed in a prominent place near the tank and it permits fuel to be delivered to that tank. USTs that fail an inspection cannot get a tag or receive fuel. MDEQ is mandated by its legislature to inspect every regulated facility by January, 2002; after that, inspections will be conducted on a three year cycle. In Montana, only tanks that pass inspection, as determined by MDEQ, will receive operating permits.

Appendix C

USTfields: Cleaning Up and Reusing Leaking UST Sites

The term and concept of “USTfields” are both offshoots of the Brownfields effort begun and developed during the 1990s. “Brownfields” are abandoned or underused properties where redevelopment is complicated by real or perceived contamination. Reclaiming these properties makes the land productive again and helps to spur private and public sector investment in housing, job-producing businesses, and open space that can help communities improve their neighborhoods. Local leaders use this redevelopment as a way to improve and sustain their economies by recycling land instead of developing pristine land. The obstacles in cleaning up these sites, such as regulatory barriers, lack of private investment, and contamination and remediation issues, can and are being addressed through a wide range of programs, ideas, and methods. “USTfields” is a subset within the Brownfields definition and applies particularly to abandoned or underused industrial and commercial properties where redevelopment is complicated by real or perceived environmental contamination from federally-regulated USTs. (Please note that petroleum sites are excluded from coverage under the Comprehensive Environmental Response, Compensation, and Liability Act and are not, therefore, covered under the Brownfields program.)

There are many lessons from the Brownfields work that could and should be applied to the numerous (and often smaller and more rural) USTfields sites. For instance, the successful cleanup and redevelopment of Brownfields sites involves, by necessity, a wide range of interests, resources, and stakeholders. Concerned state and local governments and citizens get involved. The private sector gets involved for a variety of reasons: the need to cleanup and transfer a property, the otherwise desirable location of a blighted property, tax advantages, or economic opportunity. For all parties to work effectively together, public-private partnerships are forged and exploited to foster progress toward the common goal of revitalizing unused properties.

Brownfields has also taken a very broad and inclusive approach to dealing with the problems of reinvigorating contaminated sites. For instance, barriers (i.e., *any* barrier) to the cleanup and redevelopment of abandoned properties are identified and ways to overcome the barriers are developed. An example of this type of effort is what OUST did in 1994 when it promulgated the lender liability rule in an effort to encourage lenders to provide loans to UST owners for upgrading, replacing, or closing USTs. EPA promulgated this rule to facilitate lending to UST owners and operators by clarifying when a lender may be exempt from UST liability, a big concern of several potential but reluctant lenders. And beyond overcoming barriers, Brownfields also focuses on incentives to promote cleanup and redevelopment, such as local tax incentives. By simultaneously smoothing the path to cleanup and redevelopment and adding “sweeteners” on top of that, officials, businesses, and communities try to bring abandoned and contaminated properties back to productive life. These same approaches – public and private

sector involvement, partnerships, defining and overcoming barriers – are very applicable to USTfields sites. A few states are already venturing into the USTfields arena and are using these approaches to successfully deal with abandoned sites.