

May 2001

# ENVIRONMENTAL PROTECTION

## Improved Inspections and Enforcement Would Better Ensure the Safety of Underground Storage Tanks



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United States General Accounting Office  
Washington, DC 20548

May 4, 2001

The Honorable Robert C. Smith  
Chairman, Committee on Environment  
and Public Works  
United States Senate

The Honorable Lincoln Chafee  
Chairman, Subcommittee on Superfund,  
Waste Control, and Risk Assessment  
Committee on Environment and Public Works  
United States Senate

Underground storage tanks that leak petroleum or other hazardous substances contaminate nearby soil and groundwater. These substances can contain known carcinogens, and individuals coming into contact with this contamination may experience health problems ranging from nausea to kidney or liver damage. Furthermore, one contaminant—methyl tertiary butyl ether (MTBE), a fuel additive being used with increasing frequency in recent years—is particularly troublesome in that it migrates quickly through the soil into the groundwater and even small amounts can render the groundwater undrinkable. In 1984, because of concerns about risks posed from leaking tanks, the Congress established the Underground Storage Tank (UST) program to monitor the more than 2 million tanks active at the time, most of which were located at gas stations across the country. Administered by the Environmental Protection Agency (EPA), the UST program was designed to prevent releases of petroleum and hazardous substances into the environment, detect releases when they occurred, and clean up any contamination from a release. To prevent further leaks from active tanks and additional cleanups, EPA issued regulations requiring tank owners to either install new leak detection equipment (by the end of 1993) and new spill-, overfill- and corrosion-prevention equipment (by the end of 1998), or permanently close down or remove their tanks in accordance with federal procedures. As a result, by September 2000, approximately 1.5 million tanks had been permanently closed, leaving an estimated 693,107 tanks subject to federal UST program requirements. Newly installed tanks must also meet strict equipment requirements.

To monitor this large number of tanks, EPA has enlisted states' assistance in implementing and enforcing the UST program. At the time of our review, EPA had approved 27 states and the District of Columbia to

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implement the program with agency oversight and monitoring. Twenty-one additional states operate and enforce their own tank programs under state laws with EPA maintaining limited oversight. These states have implemented requirements similar to the federal requirements. The agency also maintains responsibility for implementing the program for approximately 2,650 tanks located on lands owned by Indian tribes and 3,480 tanks in Idaho because that state does not have the necessary laws in place.<sup>1</sup>

Concerned that the tank program is not effectively preventing leaks and that tanks continue to pose risks, you asked us to determine (1) whether the tanks regulated by EPA and the states have the required equipment and are being properly operated and maintained, (2) the breadth of EPA's and the states' tank inspections and the types of enforcement actions taken, and (3) whether upgraded tanks were still leaking. To address your questions, we obtained information via survey from tank program managers in all 50 states and the District of Columbia, because nationwide data on implementation of the program did not exist (see appendix I for a copy of the survey). We followed up with respondents to clarify and ensure the consistency of the information provided; however, we did not independently verify the information. In addition, we spoke with officials in all nine EPA regions that are responsible for monitoring tanks on tribal lands, and visited the three regions with the largest number of tanks to regulate.

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## Results in Brief

Based on state and EPA responses to our survey, we estimate that about 89 percent of the total number of regulated tanks, or 616,865 tanks, received federally required equipment upgrades by the end of fiscal year 2000. However, we also estimated that about 29 percent of the regulated tanks, or 201,001 tanks, were not being operated or maintained properly, increasing the risk of soil and groundwater contamination. Survey respondents, as well as expert and industry groups, attribute operations and maintenance problems to poor training among tank owners, installers, operators, and removers. The reliability of the state- and EPA-provided compliance data cannot be verified, however, because almost half the states and several EPA regions do not physically inspect all tanks for

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<sup>1</sup> New York is responsible under state law for inspecting its tanks, but EPA maintains responsibility for taking enforcement actions at non-compliant tanks because the state lacks the necessary laws in the areas of spill, overfill, and corrosion protection.

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compliance with federal requirements. Instead, these states and regions estimate compliance rates based on inspections of selected tanks or on tank owners' self-certification that their tanks are in compliance. In addition, we found that even though state and EPA officials believe that most of the estimated 76,000 non-upgraded tanks are either empty or inactive, they should still be assessed for contamination risks and closed or removed accordingly. This is important because states have found that empty or inactive tanks may still pose a contamination risk. Because of continuing reports of tank problems, EPA announced in October 2000 that it would undertake a set of four program initiatives, including one intended to improve tank compliance with federal requirements and address training, although the agency had not fully defined its implementation plans. We are recommending that EPA include in its plans ways to better address the remaining empty or inactive tanks and work with the states to identify and fill their individual training shortfalls.

Most states and EPA do not physically inspect all underground storage tanks frequently enough or have access to the most effective enforcement tools to ensure compliance with federal requirements. Only 19 states and two of the three EPA regions we visited physically inspect all of their tanks at least once every three years—the minimum EPA considers necessary for effective tank monitoring. Ten additional states inspect all of their tanks but less frequently than every 3 years. The remaining 22 states and EPA region do not inspect all of their tanks, but instead generally target inspections to potentially problematic tanks, such as those close to drinking water sources. As a result, these states and EPA lack the data they need to evaluate the overall effectiveness of the tank program and to take appropriate enforcement actions. States and EPA regions attribute their limited inspection programs to the lack of staff. In addition, 27 states and EPA noted that they lack the authority to use the most effective enforcement tool—prohibiting fuel deliveries to non-compliant tanks. Instead, 45 states and EPA typically fine violators, and 19 states and EPA can issue field citations to violators—a cost-effective method, similar to issuing traffic tickets, that is used for less serious violations. Nevertheless, 27 states responded that they needed additional enforcement authority and 46 said they needed additional resources. EPA plans to address inspection and enforcement issues as part of its program initiatives. We are making more specific recommendations to EPA and suggestions for the Congress to consider that would encourage periodic inspections of all tanks and help address the need for additional enforcement authorities and resources.

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Upgraded tanks continue to leak despite the installation of leak prevention and detection equipment, although the extent of the problem is unknown. Fourteen states reported that some of their upgraded tanks still leaked, 17 states said their tanks seldom or never leaked, and 20 states did not know whether their tanks leaked. EPA and some localities have studies underway to obtain better data on the extent of leaks. One California locality study concluded that tanks with upgraded equipment do not provide complete protection against leaks, and that tank monitoring systems, even when properly operated and maintained, cannot guarantee the detection of leaks. One of EPA's initiatives to determine whether current equipment and operation and maintenance requirements are adequate to prevent leaks or if the agency needs to set new requirements should eventually help address concerns about continuing leaks. States and key stakeholders agree with the need to reconsider these requirements.

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## Background

An underground storage tank is defined as a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. When the UST program was established, Congress and EPA excluded about 2 million tanks meeting this definition from coverage based upon their size, content, location, or regulation under other programs or laws. For example, certain tanks used to store heating fuel or small tanks used on farms and residences were excluded. Under EPA's UST program, a tank owner must notify a designated state or local agency of any tank storing petroleum or hazardous substances. EPA and the states track and regulate these underground tanks, updating its databank as new tanks become active. Most regulated tanks store fuel for vehicles and are located at gas stations.

Although tank owners and operators are ultimately responsible for cleaning up contamination from leaks, the Congress created a trust fund in 1986 to help EPA and the states cover cleanup costs which tank owners and operators could not afford or were reluctant to pay. In instances where owners and operators would not pay, EPA or the relevant state could proceed with the cleanup and later seek reimbursement from the owners and operators. EPA derives about \$70 million annually from the trust fund, most of which it distributes to states to implement its cleanup program. The trust fund is replenished primarily by revenue generated from a \$0.001 per gallon tax on gasoline, diesel, and aviation fuel. At the end of fiscal year 2000, the balance in the fund was about \$1.5 billion. States receiving support from the trust fund must spend it on cleanup and related activities, and cannot use the money for inspections or

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enforcement of leak detection and prevention requirements. States can keep any reimbursements from owners and operators for states' cleanup costs and use these extra funds on future cleanups. EPA also awards states annual grants of about \$187,000 each to help states cover some of the program's inspection and enforcement costs, and spends about \$6 million annually on its own headquarters and regional program implementation, management, and oversight activities.

In addition to setting equipment requirements for active tanks, EPA has established operational and maintenance requirements to help ensure that these tanks remain safe. These requirements specify actions that tank owners and operators are to take to prevent the spills, overfilling, and corrosion that typically cause leaks, such as periodic system testing. EPA has taken further steps to improve the UST program. For example, in recent years, MTBE—a gasoline additive designed to reduce emissions and raise octane—has been detected with increasing frequency in groundwater used for drinking water supplies. MTBE is a potential carcinogen and the effects of exposure include headaches, eye, nose and throat irritation, cough, nausea, dizziness, and disorientation. In recent years, water suppliers have incurred increasing costs to clean up MTBE contamination. In November 1998, EPA convened a panel of experts to help investigate reported releases of this fuel additive into some groundwater, including releases from tanks. In 1999, the agency also convened a focus group of nine industry representatives who provided comments on the current status of the tank program and leak prevention methods. Using information from these two groups and a variety of other sources, in October 2000, EPA announced a set of four program initiatives intended to:

- Improve compliance
- Achieve faster cleanups
- Evaluate the performance of tank systems
- Promote tank cleanups at abandoned and idled properties that are contaminated.

At the time of our review, EPA had just begun to assemble working groups to define the initiatives' time frames and implementation details.

The Congress has introduced several legislative proposals to help states increase their capacity to inspect tanks and to enforce federal requirements intended to prevent problems with leaking tanks. For example, S. 2962, which was introduced in July 2000, would have allowed states, among other things, to spend a portion of the funds they receive

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from the tank cleanup trust fund on inspections and enforcement of leak detection and prevention requirements.

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**Most Tanks Have Been Upgraded With Leak- and Spill-Prevention Equipment, but Many Are Not Being Operated and Maintained Properly**

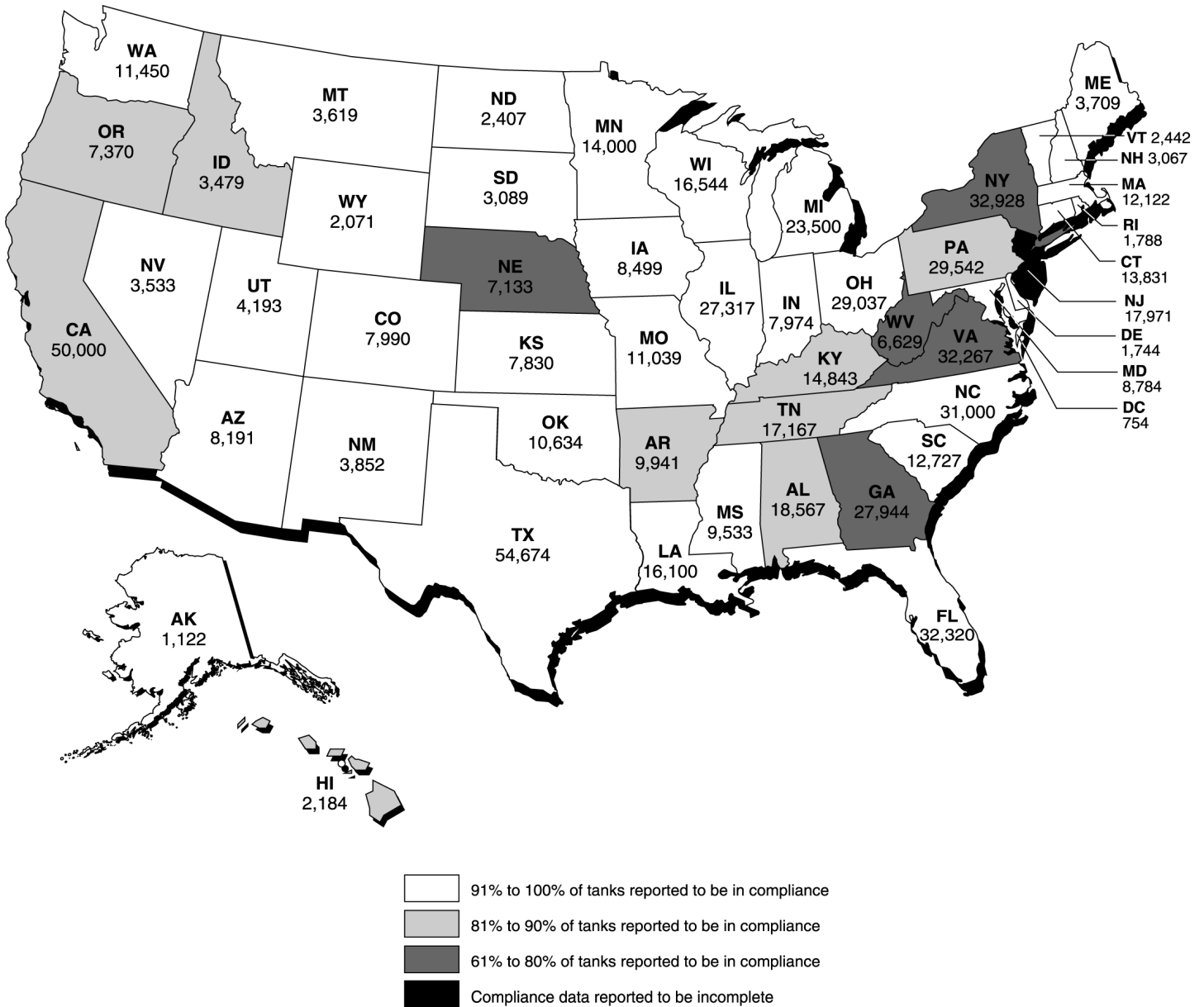
Although most tanks have been upgraded with the federally required equipment to help prevent leaks, spills, and corrosion, the states and EPA regions report operations and maintenance problems that could lead to spills, leaks, and health risks. Consequently, some upgraded tanks still pose potential health risks. State and EPA officials believe that the tanks without the equipment are generally empty and inactive, but further investigation is needed to determine whether these tanks should be removed to guard against contamination or undergo cleanup. States also noted that owners, operators, installers, and inspectors need more training to help solve the operations and maintenance problems. As a result, EPA has included improved training and tank compliance in its program initiatives.

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**State Compliance With Federal Equipment Requirements Is High but Still Varies Considerably**

Based on state responses to our survey, we estimate that about 89 percent of the 693,107 regulated tanks, or 616,865 tanks, had been upgraded with the federally required equipment by the end of fiscal year 2000. Compliance rates among the states varied, as the following figure illustrates.

**Figure 1: Most Tanks Comply With Federal Equipment Requirements, but Compliance Rates Vary (total active tanks per state)**



Source: GAO estimates based on responses to a survey of tank program managers in all 50 states and the District of Columbia

Note: EPA implements the federal tank program in Idaho and enforces certain requirements in New York because these states lack some or all of the necessary laws.



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In comparison, EPA data indicated that about 70 percent of the tanks that its regions regulate on tribal lands had also been upgraded, but this varied among the regions as well. For example, four regions reported upgrades in more than 90 percent of their tanks, while a fifth region reported that only 36 percent out of its 736 tanks complied with federal requirements.

The accuracy of the states' tank compliance estimates varies, however, because some are based on more reliable data than others are. For example, 29 states base their estimates on periodic physical inspections of all of their tanks. Other states base their overall compliance rate estimate on inspections of only a subset of their tanks or on information provided by owners and operators that certifies that their tanks had been upgraded. The accuracy of EPA compliance data for tanks on tribal lands also varies. For example, one region reported it lacked data to know the actual location of some of the 300 tanks it was supposed to regulate on tribal lands and therefore could not verify whether these tanks had been upgraded.

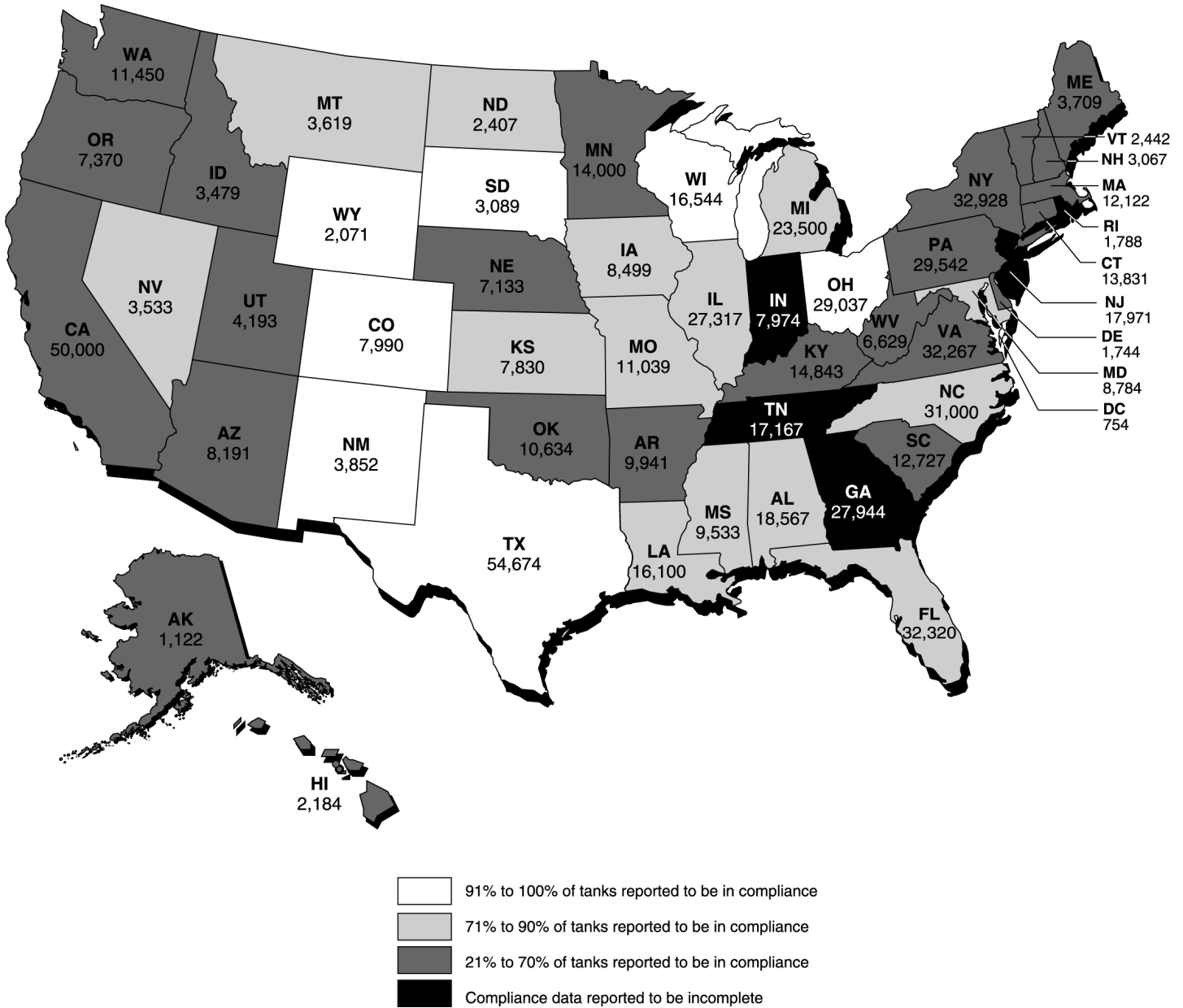
We estimate that the remaining 11 percent, or about 76,000, of the regulated tanks may not be upgraded. Seventeen states and the three EPA regions we visited reported that they believe that most of these tanks were either empty or inactive, while five states reported that at least half of their non-upgraded tanks were still in use. EPA program managers surmised that many states most likely assume that the empty or inactive tanks pose less risk and therefore allocate fewer resources to their care. However, states also reported that they generally do not discover tank leaks or contamination around tanks until the empty tanks are removed from the ground during replacement or closure. Therefore, unless EPA and the states address the issue of empty or inactive tanks in a timely manner, this potential source of contamination may be overlooked.

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## Tank Operations and Maintenance Problems Increase the Risk of Contamination

We estimate that 29 percent of regulated tanks, or 201,001 tanks, are not being operated and maintained properly. Operations and maintenance problems varied across the states, as the following map illustrates.

**Figure 2: Compliance With Federal Operations and Maintenance Requirements Varies Among States (total active tanks per state)**



Source: GAO estimates based on responses to a survey of tank program managers in all 50 states and the District of Columbia

Note: EPA implements the federal tank program in Idaho and enforces certain requirements in New York because these states lack some or all of the necessary laws.

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States reported a variety of operations and maintenance problems that surfaced during routine inspections of underground storage tanks:

- 19 states reported frequent problems with the equipment intended to prevent corrosion,
- 15 states reported that leak detection equipment was frequently turned off or improperly maintained, and
- 7 states reported frequent problems with the equipment to prevent spills and overfilling.

States also reported that the majority of operational compliance problems occurred at tanks owned by small, independent businesses; non-retail and commercial companies, such as cab companies; and local governments. EPA and the states attribute operations and maintenance problems to insufficient training for all staff implementing tank requirements, including owners, operators, installers, removers, and inspectors. Owners and operators are responsible for making sure that they and their staffs acquire adequate training. However, the owners and operators from these smaller businesses and local government operations may find it more difficult to afford adequate training for themselves and their staff, especially given the high employee turnover, or give training a lower priority. States and EPA must also ensure that their own inspectors receive proper training. However, 47 states reported the need for additional training for their staff, and 41 requested additional technical assistance from the federal government to provide such training.

EPA's expert and industry panels also called on the agency to take additional measures to address the problems surrounding tank operations, maintenance, and staff training. The expert panel concluded that releases were more likely to occur in smaller, independently owned tanks because owners and employees may have less training in performing operational and maintenance activities. The panel recommended the creation of expanded programs to train and to license tank staff. The industry group also identified the need to better address operations and maintenance problems and to provide better training. The group discussed various training methods that EPA could pursue, such as developing instructional videos for operators and inspectors, and suggested the establishment of a national program to certify tank staff and inspectors.

To date, EPA has provided states with a number of training sessions and helpful tools designed to address these issues, including operations and maintenance checklists and manuals, and other publications and guidance. EPA has also publicized its training initiatives and operations and

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maintenance guides, which companies and the states have found to be successful. For example, the American Petroleum Institute now offers recommended practices on underground storage tank management and is in the process of developing operations and maintenance training for members. The state of California now requires training courses for all tank owners, operators, installers, and inspectors. EPA has entered a cooperative agreement with a university in another state to provide similar training.

One of EPA's tank program initiatives is intended to improve training and tank compliance with federal equipment, operational, and maintenance requirements. With this initiative, EPA wants to

- encourage EPA regions and the states to improve the quality of their tank compliance data so that the agency can compile an accurate and consistent compliance measure,
- get states to commit to annual targets so that substantially more tanks will be in compliance with federal requirements by the end of 2005, and
- provide owners, operators, and inspectors with the technical assistance, improved guidance, and training needed to achieve compliance.

EPA program managers said the agency is currently working out the details of how it will implement and achieve this initiative. At the time of our review, the agency had set up a working group of state and EPA representatives whose initial tasks, among other things, will be the establishment of compliance targets.

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## Most States Do Not Inspect All Tanks Frequently Enough or Have All the Enforcement Tools Needed to Correct Problems

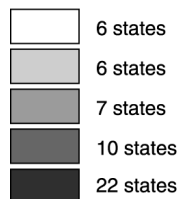
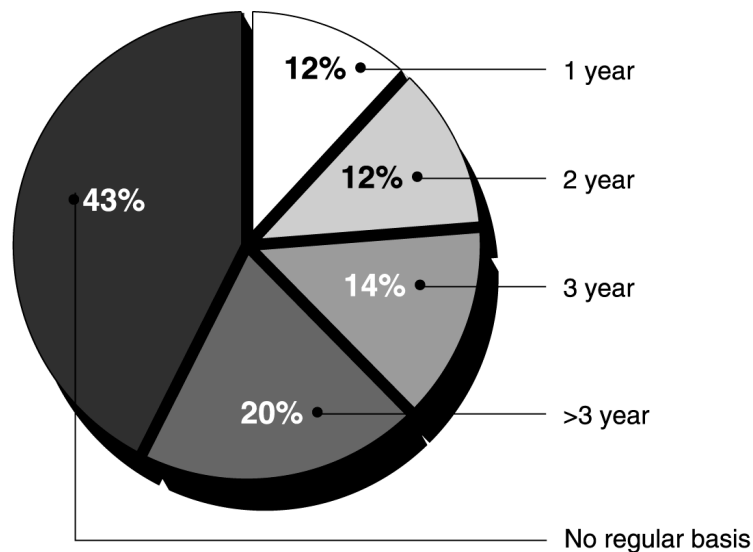
Twenty-two states and one of the three EPA regions we visited do not know the extent to which their tanks comply with federal requirements, because limited staff and resources inhibit the physical inspection of all affected tanks. Most states and industry stakeholders support establishing a federal requirement for periodic inspections, but the states would need more inspectors to ensure compliance. Likewise, only 24 states have the authority to prohibit fuel delivery to a non-compliant tank—the most effective enforcement tool. The law governing the tank program does not give EPA clear authority to regulate fuel delivery. Most states reported that they need either additional enforcement authority or resources. EPA plans to address inspection and enforcement issues under its initiatives, and the Congress could consider actions to allocate additional funds to help states with their tank inspection and enforcement activities.

## Most States' Tank Inspections Are Too Infrequent to Ensure Compliance

According to EPA's program managers, only physical inspections can confirm whether tanks have been upgraded and are being properly operated and maintained. The managers stated that tanks should ideally be inspected on an annual basis to ensure that problems are being identified and resolved quickly. However, if a state or region lacks the resources to inspect tanks annually, all tanks should be inspected at a minimum of at least once every 3 years. Twenty-nine states reported that they inspected all of their tanks on a regular basis, but only 19 states—and two of the three EPA regions we visited—inspected all tanks at least once every 3 years.

**Figure 3: Most States Do not Inspect all Tanks at Least Once Every 3 Years**

Frequency of inspections



Source: Responses to a GAO survey of tank program managers in all 50 states and the District of Columbia

Note: EPA implements the federal tank program in Idaho because this state lacks the necessary laws.

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Twenty-two states do not inspect all of their tanks on a regular basis, and therefore, some tanks may never be inspected. These states typically target tanks for inspection based on factors such as a tank's proximity to groundwater or the number of complaints lodged against it. Overall, we estimated that states and EPA inspected about 185,000 tanks in fiscal year 2000. However, 17 states inspected only 10 percent of their tanks or less that year.

The possibility of a tank inspection provides tank owners and operators incentive to comply with federal requirements. If tank owners and operators did not think that their tanks would be subject to inspection, some might be less concerned about ensuring compliance, although others might comply for fear of being held liable for any damage from spills and contamination. Nevertheless, broader and more frequent inspection coverage would provide EPA and the states with more complete compliance data, which could then be used to better target their enforcement actions and improve tank compliance. However, states and EPA would need to hire additional staff to conduct more frequent inspections—every tank at least once every 3 years. For example, based on current staffing levels, inspectors in 11 states would have to visit more than 300 facilities a year to inspect all of their tanks within this time frame. However, this number exceeds EPA's estimate of 200 facility visits that a qualified inspector can make in one year.

Most states use their own employees to conduct inspections. Therefore, an increase in the number of inspectors may be dependent on whether their state legislatures consent to granting them additional hiring authority and funding. A few states supplement their programs by delegating inspection responsibilities to local government employees, such as local fire department personnel. Three states allow tank owners and operators to hire licensed or state-certified private inspectors who report the results of their inspections back to the state. EPA has issued a guidebook to states on the use of such third party inspectors. However, program managers caution that this approach raises the potential for a conflict of interest on the part of the inspectors. For example, the managers said that inspectors may not readily identify tank violations for fear that tank owners or operators may not rehire them for future inspections.

Officials in 40 states said that they would support a federal mandate requiring states to periodically inspect all underground storage tanks. Some states expect that such a mandate would provide them the leverage they need to obtain additional staff and funding from their state legislatures. EPA's industry panel likewise supported a requirement for

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periodic—annual if possible—inspections and a set of inspection standards to promote consistency across the states.

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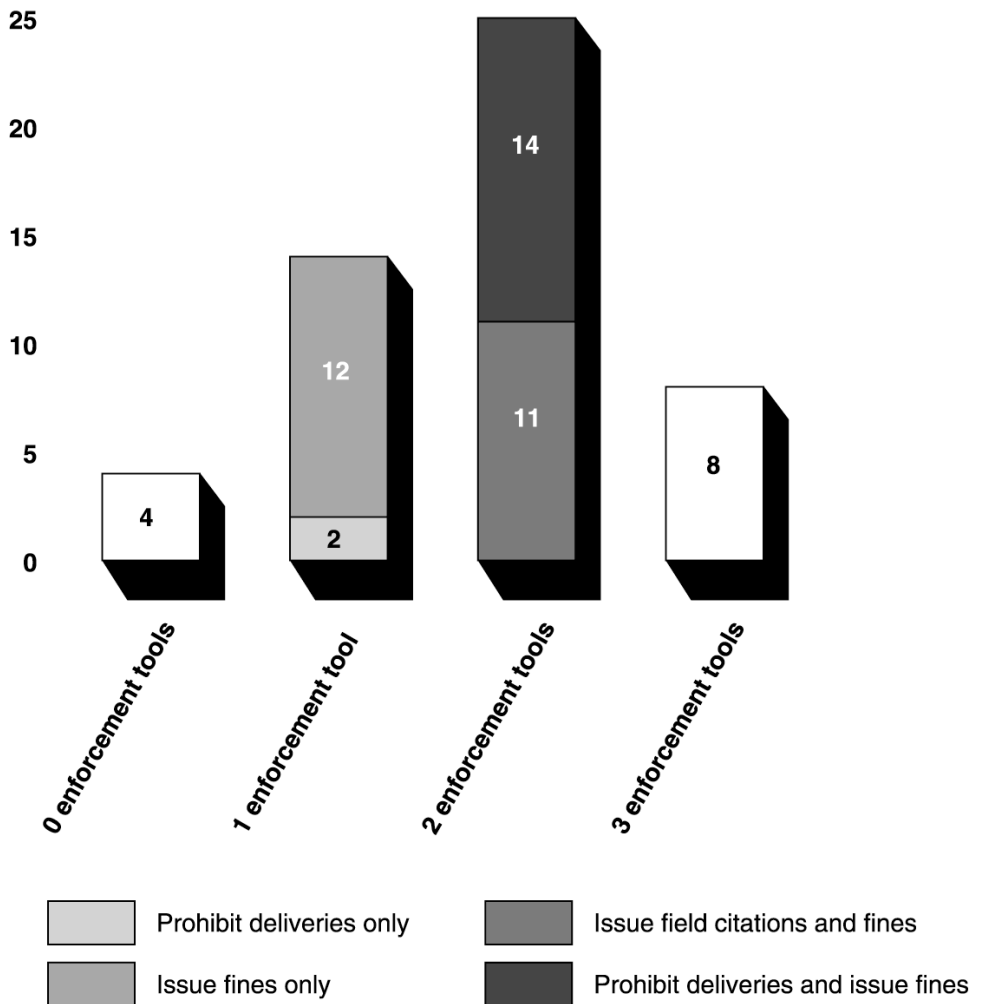
### Most States and EPA Lack the Most Effective Enforcement Authority

EPA’s program managers stated that the most effective enforcement programs employ a variety of authorities or tools, including the ability to (1) levy a fine against a violator; (2) issue field citations to owners or operators at the time of the inspection for less serious violations; and (3) prohibit fuel deliveries to non-compliant tanks. Some states have also filed civil and criminal actions for more egregious violations, although these tend to be more time-consuming and costly.

Only 8 of the 49 states that are responsible for enforcement activities reported having all three tools—levying fines, issuing citations, and prohibiting deliveries—at their disposal. As the following figure illustrates, 30 states reported that they did not have the authority to issue field citations and 27 reported that they did not have the authority to prohibit fuel deliveries. These variances indicate that a tank owner or operator in one state could be fined for a violation, while an owner or operator in another state could be forced to cease operations for a similar violation. In total, 27 states said they needed additional enforcement authorities, while 46 said they could use additional enforcement resources.

**Figure 4: State Enforcement Authorities Vary Widely**

30 Number of states



Source: Responses to a GAO survey of tank program managers in all 50 states and the District of Columbia

Note: EPA implements the federal tank program in Idaho and enforces certain requirements in New York because these states lack some or all of the necessary laws.

EPA regions can levy fines or issue citations but cannot prohibit fuel delivery to non-compliant tanks. According to the program managers, EPA believes, and we agree, that the law governing the tank program does not give it clear authority to regulate fuel distributors. They also noted



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that the regional enforcement of tanks located on tribal land was more difficult because of the agency's focus on respecting tribal sovereignty. For example, program managers in two regions stated that they could not impose any sanctions against tribal owners; they could only issue notices of compliance problems. Managers at EPA headquarters confirmed that regional program managers needed to obtain headquarters approval before any enforcement action could be taken against a tribal owner.

The expert panel and industry group raised similar concerns about the effectiveness of program enforcement. The expert panel recommended that the states be granted the authority to prohibit fuel deliveries to non-compliant tanks and obtain additional resources. The industry group, which maintained that the fear of being shut down provided an incentive for owners and operators to comply with federal requirements, saw a need for more uniform and consistent enforcement across the regions and states.

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### EPA and Congressional Initiatives Could Improve Inspection and Enforcement Effectiveness and Increase Available Resources

EPA is developing several initiatives to encourage states to improve their tank programs. A state must first demonstrate that it has the capabilities and enforcement procedures in place to ensure effective program compliance before EPA will approve a state program. EPA regions oversee the states and conduct annual reviews of their activities, focusing their efforts on more problematic states, such as those that inspect fewer tanks. The regions also have the opportunity, to some extent, to use the state grants as a means to influence state program implementation. According to EPA program managers, regions can also conduct inspections in states and, if necessary, take enforcement action.

Program managers acknowledged that UST-specific resources are limited, problems with inspections and program enforcement continue, and more work is necessary. In EPA's initiative to improve tank compliance with federal requirements, the agency has said that it will attempt to obtain state commitments to increase their inspection and enforcement activities if they do not meet their compliance targets through 2005. However, EPA does not plan to address the variation in enforcement authorities among states. EPA has announced that it may elect to supplement enforcement in those states that fall significantly below their targets, although the agency may be constrained by available resources.

The Congress may wish to consider whether it can help address EPA and state resource limitations to develop better inspection and enforcement programs. The Congress could provide states more funds from the general treasury. The Congress could also increase the trust fund allotments it

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grants to states and give the states the flexibility to use some of these funds on inspections and enforcement rather than cleanup—an action the Congress has considered taking in the past. Officials in 40 states said that they would welcome such funding flexibility. The Congress may have to include some safeguards, however, to ensure that this reallocation of funds does not interfere with tank cleanup progress.

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## Upgraded Tanks Continue to Leak, Although the Extent of the Problem Is Unknown

Despite the equipment requirements, a number of states reported that some of the upgraded tanks leaked last year, while other states did not know whether this was happening with their tanks. EPA has launched studies to determine the extent of the leaks, the effectiveness of the current equipment, and whether the existing equipment standards should be strengthened. States and other stakeholders believe that further equipment requirements are needed and support EPA's efforts.

In fiscal year 2000, EPA and the states confirmed a total of more than 14,500 leaks or releases from tanks subject to federal regulation, although they were uncertain whether the releases occurred before or after the tanks had been upgraded. According to our survey, 14 states said they had traced newly discovered leaks or releases to upgraded tanks that year, while another 17 states said that they seldom or never detected such leaks. Twenty states, however, could not confirm whether or not their upgraded tanks leaked.

States that reported leaks attributed them to poor operations and maintenance, although 33 states suggested that improper equipment installation may have caused some leaks. The remaining states were uncertain about the possible causes of continuing leaks.

EPA is concerned that upgraded tanks may still be leaking and recognizes the need to collect better data to determine the extent and cause of this problem, including whether the current equipment requirements are sufficient to prevent leaks. Several states and three EPA regions have studies underway to try to determine the extent and source of leaks. Researchers studying tanks in California's Santa Clara County suspected that 13 of the 16 tanks they reviewed had undetected leaks after the tanks had been upgraded, although they could not conclusively determine whether the leaks and releases came from tanks before or after they had been upgraded. To resolve this problem, California launched a new statewide study to trace leaks coming from newly installed upgraded tanks, which the state expects to be completed by the end of June 2002.

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Researchers with the Santa Clara study concluded that tanks with upgraded equipment do not provide complete protection against leaks, and tank monitoring systems, even when properly operated and maintained, cannot guarantee the detection of leaks. Other stakeholders expressed similar concerns about leaking tanks. The expert panel recommended that the agency evaluate the performance of current tank system design and equipment requirements and revise them where necessary to better prevent leaks. The industry group also called on EPA to strengthen the requirements, such as require additional leak containment systems and double-walled tanks. In response, EPA, as one of its four tank program initiatives, plans to undertake a nationwide effort to assess the adequacy of existing equipment requirements to prevent leaks and releases.

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## Conclusions

The states and EPA cannot ensure that all active tanks have the required leak-, spill-, and overfill-protection equipment installed, nor can they guarantee that the installed equipment is being properly operated and maintained. While the states and EPA regions focus most of their limited resources on monitoring active tanks, empty or inactive tanks require attention to ensure that no soil and groundwater contamination has occurred. Half of the states have not physically inspected all of their tanks and several others have not conducted frequent enough inspections to ensure the tanks' compliance with program requirements. Moreover, most states and EPA lack authority to use the most effective enforcement tools and many state officials acknowledged that additional enforcement tools and resources were needed to ensure tank compliance. EPA has the opportunity to correct these limitations within its own regions and to help states correct them through its new tank program initiatives. However, the agency has yet to define many of the implementation details, so it is difficult to determine whether the proposed actions will be sufficient to ensure more inspection coverage and more effective enforcement, especially within the states. The Congress has an opportunity to help alleviate the states' resource shortages by providing additional funding for inspections and enforcement or more flexibility to use existing funds to improve these activities.

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## Recommendations for Executive Action

To better ensure that underground storage tanks meet federal equipment, operations, and maintenance requirements to prevent leaks and contamination that pose threats to public health, we are making four recommendations to the Administrator, EPA. First, we recommend that EPA address the remaining non-upgraded tanks by working with the states to (1) review available information and determine those empty or inactive

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tanks that pose the greatest potential health and environmental risks, 2) set up time tables for the owners, states, or EPA to remove or close these tanks in accordance with federal procedures, and (3) take enforcement actions against owners and operators who continue to operate tanks without the required equipment.

Second, we recommend that EPA supplement the agency's more general training support, such as providing manuals and materials, by having each region work with each of the states in its jurisdiction to determine specific training needs and tailored ways to meet them.

Third, we recommend that EPA negotiate with each state to reach a minimum frequency for physical inspections of all its tanks. Periodic physical inspections of all tanks will provide states better data on non-compliant tanks, and that, in turn, will help states better enforce federal requirements.

Fourth, we recommend that EPA present to the Congress an estimate of the total additional resources the agency and states need to conduct the training, inspection, and enforcement actions necessary to ensure tank compliance with federal requirements. EPA can base the estimate on the information regions obtain from their annual state reviews and grant negotiations.

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## Matters for Congressional Consideration

The Congress may consider taking the following actions to strengthen EPA's and the states' ability to inspect tanks and enforce federal requirements. First, the Congress may want to increase the resources available to the UST program and base the amount of the increase on a consideration of the Administrator's estimate of additional resources needed. One way to do this would be to increase the amount of funds the Congress provides from the trust fund and to authorize states to spend a limited portion of these monies on training, inspection, and enforcement activities to detect and prevent leaks, as long as this does not interfere with tank cleanup progress.

Second, the Congress may want to (1) authorize EPA to establish a federal requirement for the physical inspections of all tanks on a periodic basis, (2) authorize EPA to prohibit the delivery of fuel to tanks that do not comply with federal requirements, and (3) establish a federal requirement that states have authority to similarly prohibit fuel deliveries.

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## Agency Comments

We provided a draft of this report to EPA for review and comment. We subsequently met with the Deputy Director and staff of the Office of Underground Storage Tanks who generally agreed with our conclusions and that our recommendations had merit. The agency noted that implementation of the recommendations would depend on a variety of factors, including the willingness of state legislatures to grant the state tank programs the necessary authorities and support. In terms of obtaining additional enforcement tools, EPA agrees that prohibiting the delivery of fuel to non-compliant tanks can be a valuable and effective enforcement tool. The agency does not believe that it currently has the authority to require those state programs that operate under their own laws to incorporate this tool. The agency was also reluctant to make the process of awarding state grants too dependent on the states meeting additional federal requirements, such as minimum frequencies of inspections, because this could seriously jeopardize some states' ability to qualify for grants, thus taking critical resources from these programs. EPA noted that it has recently begun an initiative to try to obtain more complete data from all of the states on, among other things, tank compliance with federal requirements. The agency is establishing compliance performance measures and asking states to provide data on their performance against these measures in their mid-year program reports to EPA, the first of which are due by the end of May 2001. The agency also suggested a number of technical changes that we incorporated.

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In addition to the state survey and work in the EPA regions, we (1) reviewed key tank studies and reports published by EPA, local governments, industry, and private organizations, (2) reviewed available EPA and state data on compliance rates, inspections, and enforcement actions, and (3) obtained the views of EPA's tank program managers and key environmental association and industry officials. We conducted our work between June 2000 and April 2001 in accordance with generally accepted government auditing standards.

Unless you announce its contents earlier, we plan no further distribution of this report until 3 days after the date of this letter. At that time, we will send copies of the report to appropriate congressional committees and interested Members of Congress. We will also send copies of this report to the Honorable Christine Todd Whitman, Administrator, EPA, and the Honorable Mitchell E. Daniels, Jr., Director, Office of Management and Budget. In addition, we will make copies available to others on request.

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If you or your staff have any questions about this report, please contact me at (202) 512-3841. Key contributors to this report were Jim Donaghy, Eileen Larence, Gerald Laudermilk, Ingrid Jaeger, and Fran Featherston.

A handwritten signature in black ink, reading "John B. Stephenson". The signature is written in a cursive style with a long horizontal flourish extending to the right.

John B. Stephenson  
Director, Natural Resources  
and Environment

# Appendix I: Survey of State Tank Program Managers

United States General Accounting Office

## GAO Survey of the 50 States: Federal UST Requirements

### Introduction

The U.S. General Accounting Office (GAO) is an agency of the legislative branch that reviews federal programs for the U.S. Congress. We are currently surveying the 50 states as part of a study on the federal requirements for underground storage tanks (UST). When we refer to "federal requirements" in this survey, we mean the UST requirements that states have adopted for leak detection capability, spill and overfill prevention, and corrosion protection. These USTs contain petroleum products, such as gasoline, diesel, and kerosene, or they may contain certain hazardous substances. We are asking the states for information on the extent to which owners of USTs have complied with various aspects of the federal requirements.

Without your state's response, we will not be able to accurately report to the Congress on how the requirements for USTs are working nationwide. Your participation is vital so that we can report to the Congress on what works well and what could be improved.

It should take about 45 minutes to complete this questionnaire, depending on the availability of the information. We have made every effort to minimize the amount of information requested. Your prompt participation will help us avoid costly follow-ups. If you have any questions about our study or this survey, please contact:

Gerald Lauder milk  
Phone: 617-565-7511 (Boston, MA)  
E-mail: laudermilk.g.bos@gao.gov

If the envelope is misplaced, please return this questionnaire to:

Mr. Gerald Lauder milk  
U.S. General Accounting Office  
Room 575, 10 Causeway Street  
Boston, MA 02222-1030

Thank you very much for taking time to contribute to this study.

Please provide the following information:

Name of state: \_\_\_\_\_

Your name: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

1. Current federal requirements require that underground storage tanks (USTs) be equipped with a leak detection capability, spill and overfill prevention, and corrosion protection. Please rate your state's confidence in these requirements to prevent leaks or other releases of USTs' contents into your state's environment. (*Check one.*)

1.  Very high

2.  High

3.  Moderate

4.  Low

5.  Very low

6.  Too early to tell

7.  Uncertain

8.  Other (*Please describe.*)

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2. As of September 30, 2000, how many *active* USTs subject to *federal requirements* (see box below) are registered in your state? By *active* tanks, we mean USTs that have not been permanently closed in accordance with federal requirements. (Please enter number below.)

\_\_\_\_\_ active USTs

**USTs subject to federal requirements** (including those adopted by state regulations) include the following with some exceptions:

- Hold more than 110 gallons,
- Have at least 10 percent of their volume underground,
- Contain petroleum products or certain hazardous substances,
- Do *not* contain any hazardous wastes already regulated under federal solid waste laws, and/or
- Do *not* operate as part of a wastewater treatment facility, as regulated by the Clean Water Act.

**Compliance with federal requirements**

3. As of September 30, 2000, approximately what percentage of *active* USTs in your state (a) have installed the *required equipment* that complies with current federal requirements and (b) have properly operated and maintained this *required equipment*. (Check one for each column.)

By “**required equipment**,” we include both spill, overfill, and corrosion protection equipment as well as leak detection equipment (or another approved leak detection method, such as inventory reconciliation).

Please note: The next page has questions that ask about your sources for estimates for Columns A and B.

Percentage of all active USTs (as reported in Question 2)	Required equipment is...	
	(A) Installed (Check one.)	(B) Properly operated and maintained (Check one.)
1. 20% or less		
2. 21% to 30%		
3. 31% to 40%		
4. 41% to 50%		
5. 51% to 60%		
6. 61% to 70%		
7. 71% to 80%		
8. 81% to 90%		
9. 91% to 95%		
10. 96% to 100%		
11. <i>Uncertain</i>		
12. <i>Other (Please specify.)</i>		



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4. In answering Question 3, Column A (on the percentage of USTs that have the proper equipment installed), how much did you rely on the following sources of information? (*Check one for each row.*)

	Very high (1)	High (2)	Moderate (3)	Low (4)	Very little/None (5)	Uncertain (6)
a. Records of physical inspections of <i>all of</i> your state's USTs						
b. Estimates based on physical inspections of <i>some of</i> your state's USTs						
c. Information from self-certifications by UST owners or operators						
d. Installation/Upgrade plans submitted for your state's approval by owners or operators						

e. Please list any other sources below.

5. In answering Question 3, Column B (the percentage of USTs that have the required equipment *and* are properly operated and maintained), how much did you rely on the following sources of information? (*Check one for each row.*)

	Very high (1)	High (2)	Moderate (3)	Low (4)	Very little/None (5)	Uncertain (6)
a. Records of physical inspections of <i>all of</i> your state's USTs						
b. Estimates based on physical inspections of <i>some of</i> your state's USTs						
c. Information from self-certifications by UST owners or operators						

d. Please list any other sources below.

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6. Of the active USTs in your state that have not been upgraded with the required equipment (as reported in Question 3, Column A), about how many of them are in the following categories? *(Check one for each row.)*

	All/ Almost all (1)	More than half (2)	About half (3)	Less than half (4)	Very few/ None (5)	Uncertain (6)
a. USTs with contents that are out of compliance with federal requirements but are currently operating under a compliance/enforcement schedule						
b. Other USTs with contents that are operating out of compliance with federal requirements						
c. USTs with contents, but contents are not moved in and out of tank						
d. USTs with no contents						

e. Please list any other categories of such USTs below.

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7. In your opinion, what is the relative level of *operational compliance* with federal requirements over the last 12 months (October 1, 1999 through September 30, 2000) for the types of UST owners/operators listed below. (Check one for each row.)

	Very high (1)	High (2)	Moderate (3)	Low (4)	Very little/None (5)	Uncertain (6)
a. Retail establishments that are owned by major oil companies						
b. Independent (not owned by major oil company) retail chains selling a major oil company's brand of gasoline (including gas stations and convenience stores)						
c. Large independent retail chains selling gasoline under the chain's name (10 or more locations)						
d. Small independent retail chains selling gasoline under the chain's name (2 to 9 locations)						
e. Independent retail establishments with only one location (often called "Mom and Pop" store)						
f. Nonretail, commercial establishments (e.g., truck fleet, cab company, car rental company, and auto dealer)						
g. Local governments (e.g., counties, municipalities, school districts) with populations 50,000 and above						
h. Local governments with populations below 50,000						
i. State government						
j. Federal government						

k. You may list others below.

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**Licensing and inspections**

8. Does your state currently license or otherwise certify UST installers? *(Check one.)*

- 1.  Yes
- 2.  No
- 3.  Other *(Please specify.)*

9. Does your state currently (1) license UST private inspectors, (2) delegate UST inspection authority to local government inspectors, or (3) otherwise formally delegate inspection authority? *(Check all that apply.)*

- 1.  Yes, license private inspectors
- 2.  Yes, delegate inspection authority to local government inspectors
- 3.  Yes, otherwise formally delegate inspection authority *(Please describe.)*
- 4.  No
- 5.  Other *(Please specify.)*

10. Does your state currently require UST owners to self-certify for any of the following? *(Check all that apply.)*

- 1.  *Does not apply: No self-certification program*
- 2.  Yes, self-certify that required equipment is installed
- 3.  Yes, self-certify that required equipment has been inspected by a private inspector
- 4.  Yes, self-certify that required equipment operates properly
- 5.  Yes, self-certify that required equipment is maintained properly
- 6.  Other *(Please describe.)*

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11. Over the last 12 months (October 1, 1999 through September 30, 2000), about how many of the compliance inspections of your state's USTs were performed by the following types of inspectors? Please consider only field inspections at the UST location that included operational compliance with federal UST requirements. (Check one for each row.)

Who conducted the inspections?	How many of the inspections did they conduct?					
	All or almost all (1)	More than half (2)	About half (3)	Less than half (4)	Few/None (5)	Uncertain (6)
a. U.S. EPA inspectors						
b. State inspectors						
c. State-delegated, local government inspectors						
d. State-delegated, private inspectors						
e. Other (Please specify.)						

12. Over the last 12 months (October 1, 1999 through September 30, 2000), how many compliance inspections of your state's USTs were performed by the following types of inspectors? Please consider only field inspections at the UST location that included operational compliance with federal UST requirements. (Enter number. If none, enter "0." If the number is unknown, please check the box in Column B.)

	(A) Number of compliance inspections (Enter number.)	(B) If number is unknown, check this column.
a. State inspectors	_____	
b. State-delegated, local government inspectors	_____	
c. State-delegated, private inspectors	_____	

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13. How many employee full-time equivalents (FTEs) were used over the last 12 months (October 1, 1999 through September 30, 2000) to conduct field UST inspections? By "field inspection," we mean a visit to the location of the UST. (Enter number. If none, enter "0.")

	Number of FTEs
a. Inspector FTEs employed by your state government	
b. State-delegated, local government inspector FTEs	
c. State-delegated, private inspector FTEs	
d. Other (Please specify.)	

14. Which of the following elements are included in your state's field inspections for compliance with federal UST requirements? Include inspections by state employees and those delegated with such responsibility by your state. (Check all that apply.)

1.  Does not apply: This type of inspection is not conducted
2.  Required equipment is installed
3.  Required equipment is maintained properly
4.  Leak detection equipment or other method operates properly
5.  Equipment for spill and overflow prevention operates properly
6.  Corrosion protection operates properly
7.  Other (Please specify.)

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15. When USTs in your state have equipment changes through installation, upgrade, or removal, how often are such changes inspected *in person* by your state's inspectors or other inspectors authorized by your state? (Check one.)

- 1.  Always/Almost always
- 2.  More than half the time
- 3.  About half the time
- 4.  Less than half the time
- 5.  Rarely/Never
- 6.  Other (Please describe.)

16. Which one of the following *best describes* the coverage of inspections performed by your state's inspectors or other inspectors authorized by your state? (Check one.)

- 1.  Attempt to inspect *all of* the state's USTs on a regular basis
- 2.  Randomly select *some of* the state's USTs for inspection
- 3.  Target inspections to certain USTs (such as those deemed most likely to be out of compliance or those deemed most at risk to the environment)
- 4.  Only *perform* inspections in response to complaints and equipment changes
- 5.  Other (Please describe.)

17. If your state attempts to inspect all USTs on a regular basis, how frequently is each UST inspected? (Check one.)

- 1.  **Does not apply:** Our state does not try to inspect all USTs on a regular basis
- 2.  Every year
- 3.  Every 2 years
- 4.  Every 3 years
- 5.  Every 4 to 5 years
- 6.  Other (Please describe.)

18. Over the last 12 months (October 1, 1999 through September 30, 2000), approximately what percentage of your state's USTs were inspected for *operational compliance* with federal requirements? (Check one.)

- 1.  10% or less
- 2.  11% to 20%
- 3.  21% to 30%
- 4.  31% to 40%
- 5.  41% to 50%
- 6.  51% to 60%
- 7.  61% to 70%
- 8.  71% to 80%
- 9.  81% to 90%
- 10.  91% to 95%
- 11.  96% to 100%
- 12.  Uncertain
- 13.  Other (Please specify.)

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19. During the past 12 months (October 1, 1999 through September 30, 2000), how often were the following problems detected during inspections in your state? *(Check one for each row.)*

	Very often (1)	Often (2)	Sometimes (3)	Seldom (4)	Rarely/ Never (5)	Does not apply (6)
a. Required equipment has not been installed.						
b. Leak detection equipment has been disabled or otherwise improperly operated or maintained.						
c. Equipment for spill and overflow prevention is not properly maintained and operated.						
d. Equipment for corrosion protection is not properly maintained and operated.						
e. Record keeping is inadequate (such as records for leak detection, corrosion protection).						
f. Employees/Owners are not properly trained to operate equipment.						

g. Please list any other frequent problems below.



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**Leaks and other product releases**

20. During the past 12 months (October 1, 1999 through September 30, 2000), how often were new leaks or releases of product traced to USTs that had the federally-required equipment properly installed? *(Check one.)*

- 1.  Very often
- 2.  Often
- 3.  Sometimes
- 4.  Seldom
- 5.  Rarely/Never
- 6.  *Uncertain*
- 7.  *Other (Please describe.)*

21. In your state's opinion, which of the following best explain the causes of leaks in USTs that have the proper equipment installed as required by federal requirements? *(Check one for each row.)*

	Major cause (1)	Moderate Cause (2)	Minor cause (3)	Not a cause (4)	<i>No basis to judge/ Uncertain</i> (5)
a. Required equipment was not installed properly.					
b. Required equipment was faulty.					
c. Operators did not operate and maintain the required equipment properly.					
d. Required equipment was not faulty and was properly installed and operated but still failed.					

e. Please list any other causes below.

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22. How many confirmed leaks or other releases of UST products were discovered in your state during the past 12 months (October 1, 1999 through September 30, 2000)? (Check one.)

- 1.  10 or less
- 2.  11 to 50
- 3.  51 to 100
- 4.  101 to 250
- 5.  251 to 500
- 6.  More than 500
- 7.  No basis to judge
- 8.  Other (Please describe.)

23. In your opinion, how has each of the categories of USTs below contributed to the leaks discovered in your state over the past year (October 1, 1999 through September 30, 2000)? (Check one for each row.)

	Major problem (1)	Moderate problem (2)	Minor problem (3)	Not a known problem (4)	No basis to judge/ Uncertain (5)
a. USTs with contents that are operating out of compliance with federal requirements					
b. USTs with contents, but contents are not moved in and out of tank					
c. USTs removed from ground during closure or replacement					

d. You may list other categories below.

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24. Considering the leaks and other releases of product from federally regulated USTs that were discovered in your state in the past 12 months (October 1, 1999 through September 30, 2000), please rate the total impact on the following aspects of human health and the environment in your state. *(Check one for each row.)*

	Impact on human health and the environment					
	Very great problem (1)	Great problem (2)	Moderate problem (3)	Some problem (4)	Little or no problem (5)	Too early to tell/ Uncertain (6)
a. Groundwater and surface water sources for drinking water						
b. Groundwater and surface water <i>not</i> currently used as a drinking water source						

c. Please list any others below.

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**Enforcement**

25. If your state has the authority to issue field citations or a similar type of ticket for UST owners who are out of compliance with federal requirements, how many citations/tickets did your state issue in the last 12 months (October 1, 1999 through September 30, 2000)? *(Check one.)*

- 1.  *Does not apply: State lacks authority for this enforcement tool*
- 2.  None
- 3.  50 or less
- 4.  51 to 100
- 5.  101 to 500
- 6.  501 to 1,000
- 7.  1,001 to 5,000
- 8.  5,001 to 10,000
- 9.  Over 10,000
- 10.  *Uncertain*
- 11.  *Other (Please describe.)*

26. If your state has the authority to prevent USTs from receiving fuel deliveries when they are out of compliance with federal requirements (often called "red tag" authority), for how many USTs did your state stop deliveries in the last 12 months (October 1, 1999 through September 30, 2000)? *(Check one.)*

- 1.  *Does not apply: State lacks authority for this enforcement tool*
- 2.  None
- 3.  15 or less
- 4.  16 to 50
- 5.  51 to 100
- 6.  101 to 500
- 7.  Over 500
- 8.  *Uncertain*
- 9.  *Other (Please describe.)*

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27. If your state has the authority to fine UST systems that are out of compliance with federal requirements, how many USTs were fined over the last 12 months (October 1, 1999 through September 30, 2000)? *(Check one.)*

- 1.  *Does not apply: State lacks authority for this enforcement tool*
- 2.  None
- 3.  50 or less
- 4.  51 to 100
- 5.  101 to 250
- 6.  251 to 500
- 7.  Over 500
- 8.  *Uncertain*
- 9.  *Other (Please describe.)*

28. How many (a) criminal court cases and (b) civil court cases did your state file over the last 12 months (October 1, 1999 through September 30, 2000) against UST owners for lack of compliance with federal requirements? *(Check one for each column.)*

	(A) Civil cases <i>(Check one.)</i>	(B) Criminal cases <i>(Check one.)</i>
1. None		
2. 10 or less		
3. 11 to 50		
4. 51 to 100		
5. More than 100		
6. <i>Uncertain</i>		
7. <i>Other (Please specify.)</i>		

29. Inspections or other information may indicate that UST owners/operators are out of compliance with federal requirements. How successful has your state been in compelling such owners/operators to either close the tanks or bring them into compliance? *(Check one.)*

- 1.  Very successful
- 2.  Moderately successful
- 3.  Somewhat successful
- 4.  Not very successful
- 5.  *Uncertain*
- 6.  *Other (Please describe.)*

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30. How much, if at all, does your state presently need the following to ensure that USTs comply with federal requirements? (Check one for each row.)

	Very great need (1)	Great need (2)	Moderate need (3)	Some need (4)	Little or no need (5)	Too early to tell/ Uncertain (6)
a. Obtain more enforcement authority (such as the ability to immediately close USTs that are out of compliance).						
b. Obtain more resources to pursue enforcement cases (such as legal staff).						
c. Increase the number of inspectors available for operational compliance inspections.						
d. Increase/Obtain authority to issue monetary penalties for noncompliance.						
e. Provide more training for UST operators.						
f. Upgrade state's UST databases.						

g. You may list other needs below.

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31. Do you support or oppose the following proposals for improving the federal UST program? (*Check one for each row.*)

	Strongly support (1)	Generally support (2)	Neutral (3)	Generally oppose (4)	Strongly oppose (5)	<i>Too early to tell/ Uncertain</i> (6)
a. Strengthen equipment requirements (such as requirements for double-walled USTs).						
b. Strengthen requirements for Statistical Inventory Reconciliation (SIR) as method to detect leaks.						
c. Combine federal funding for enforcement (UST program) and cleanup (LUST program) in order to give the states more flexibility in using these funds for prevention.						
d. Require periodic inspections of all USTs in the state.						
e. Improve the coordination of federal inspections with the state.						
f. Provide more technical assistance and training <i>to state employees</i> on UST systems and equipment.						
g. Expand federal requirements to cover all parts of the dispensing system.						

h. Please list any other suggestions below.

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32. Please add any comments you wish on the issues in this survey or other matters related to underground storage tanks.

**Thank you very much for participating in our survey.**





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