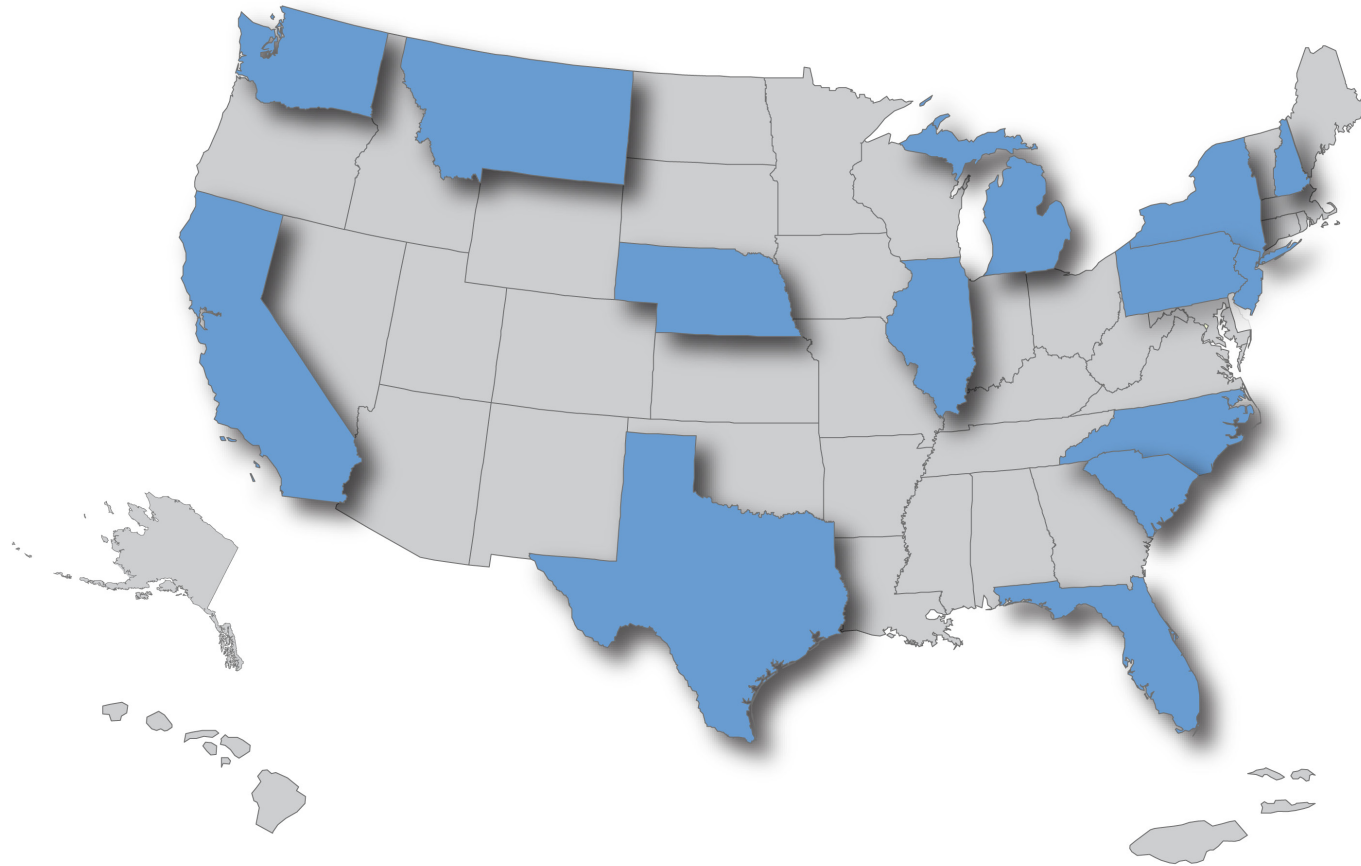


The National LUST Cleanup Backlog: A Study of Opportunities





THE NATIONAL LUST CLEANUP BACKLOG: A STUDY OF OPPORTUNITIES

STATE SUMMARY CHAPTER: SOUTH CAROLINA

LIST OF ACRONYMS

DHEC	South Carolina Department of Health and Environmental Control
EPA	United States Environmental Protection Agency
ESA	Expedited Site Assessment
FY	Fiscal Year
LUST	Leaking Underground Storage Tank
MNA	Monitored Natural Attenuation
NA	Not Applicable
RBCA	Risk-Based Corrective Action
RP	Responsible Party
SUPERB	State Underground Petroleum Environmental Response Bank
UST	Underground Storage Tank

EXECUTIVE SUMMARY

Leaks from underground storage tanks (USTs) threaten America's groundwater and land resources. Even a small amount of petroleum released from a leaking underground storage tank (LUST) can contaminate groundwater, the drinking water source for nearly half of all Americans. In surveys of state water programs, 39 states and territories identified USTs as a major source of groundwater contamination.¹ As the reliance on our resources increases due to the rise in population and use, there is a correspondingly greater need to protect our finite natural resources.

From the beginning of the UST program to September 2009, more than 488,000 releases were confirmed from federally-regulated USTs nationwide. Of these confirmed releases needing cleanup, over 100,000 remained in the national LUST backlog. These releases are in every state, and many are old and affect groundwater. To help address this backlog of releases, the United States Environmental Protection Agency (EPA) invited 14 states to participate in a national backlog characterization study.

ANALYSIS OF SOUTH CAROLINA DATA

South Carolina's Department of Health and Environmental Control (DHEC) has made significant progress toward reducing its LUST cleanup backlog. As of May 2009, DHEC had completed 6,322 LUST cleanups, which is 68 percent of all known releases in the state. At the time of data collection, there were 2,942 open releases remaining in its backlog.³ To most effectively reduce the national cleanup backlog, EPA believes that states and EPA must develop backlog reduction strategies that can be effective in states with the largest backlogs. EPA invited South Carolina to participate in its national backlog study because South Carolina has one of the ten largest backlogs in the United States.

DHEC actively employs many of the opportunities outlined in this report. In addition, EPA had previously determined that the primary issue in South Carolina was the undercapitalization of its state assurance fund, the State Underground Petroleum Environmental Response Bank (SUPERB) fund. The South Carolina legislature, with encouragement from the petroleum industry and EPA, provided additional funding for LUST cleanups in 2010, which will result in an additional \$36 million over the next few years. EPA believes that this additional funding, along with continued, targeted backlog strategies, will allow DHEC to greatly reduce its number of open releases.

In this chapter, EPA characterized South Carolina's releases that have not been cleaned up, analyzed these releases based on categories of interest, and developed potential opportunities for DHEC and EPA to explore that might improve the state's cleanup progress and reduce its backlog. As with all the states in this study, EPA's analysis addresses targeted subsets of South Carolina's backlog so not every release is covered in the findings and opportunities discussed below. Building on the potential

South Carolina LUST Data By the Numbers²

National Backlog Contribution	3%
Cumulative Historical Releases	9,264
Closed Releases	6,322/68%
Open Releases	2,942/32%
Stage of Cleanup	
Confirmed Release	637/22%
Site Assessment	1,686/57%
Remediation	619/21%
Media Contaminated	
Groundwater	2,797/95%
Soil	129/4%
Unknown ⁴	16/1%
Median Age of Open Releases	14.8

1 EPA, *National Water Quality Inventory: 2000 Report*, pp. 50-52. www.epa.gov/305b/2000report/chp6.pdf.

2 Data were provided in May 2009 by DHEC staff and are not identical to the UST performance measures reported on EPA's website, available at: www.epa.gov/oust/cat/camarchv.htm.

3 EPA tracks individual releases rather than sites in its performance measures. Therefore, the analyses in this report account for numbers of releases, not sites.

4 Unknown media releases include those releases where the media is unknown as well as those releases where, based on available data, it was not possible to identify the media contaminated.

cleanup opportunities identified in the study, EPA will continue to work with DHEC to develop backlog reduction strategies.

In South Carolina, as in every state, many factors affect the pace of cleaning up releases, such as the availability and mechanisms of funding, statutory requirements, and program structure. South Carolina has a statutory requirement to address the highest risk releases first that affects its ability to address all the releases in its backlog. This constraint is tied to the amount of funding DHEC receives each year.

EPA included potential cleanup opportunities in this report even though current circumstances in South Carolina might make pursuing certain opportunities challenging or unlikely. Also, as stated above, DHEC is already using many of these strategies as part of its ongoing program. The findings from the analysis of DHEC’s data and the potential cleanup opportunities are summarized in the study areas below: stage of cleanup, media contaminated, cleanup financing, release priority, presence of free product, number of releases per affiliated party, geographic clusters, and use of monitored natural attenuation (MNA).

Stage of Cleanup *(see page SC-10 for more details)*

South Carolina Finding	Potential Opportunity	Releases
60 percent of releases are either: <ul style="list-style-type: none"> • 5 years old or older and site assessment has not started; or • 10 years old or older and in site assessment. 	<ul style="list-style-type: none"> • Explore options for funding additional site assessments at old releases to identify releases that can be closed with minimal effort or moved toward remediation. (South Carolina has recently passed legislation to generate additional funding for this purpose.) • Continue to expedite site assessments where appropriate. • Implement enforcement actions at releases not eligible for SUPERB funding and at inactive releases above the funding threshold. 	1,779

South Carolina finances cleanups based on risk rather than on the age of the release. As such, some older releases have not received funding due to their lower priority. South Carolina legislation created a nearly 6-year-long amnesty period from 1988 through June 1993. The amnesty program gave DHEC a great deal of information about older tanks in the state but it also resulted in a high volume of older open releases that DHEC is still addressing to this day. The additional funds provided through the South Carolina legislature will allow DHEC to address many of these releases. EPA recognizes DHEC’s statutory requirement to address high priority

releases first. Where practical, DHEC identifies lower priority releases needing minimum resources to close and closes them. DHEC already employs expedited site assessment and also has an enforcement initiative to contact responsible parties (RP) of inactive releases. EPA believes it is important for DHEC to continue these practices and explore opportunities to accelerate cleanups at releases.

Media Contaminated *(see page SC-12 for more details)*

South Carolina Finding	Potential Opportunity	Releases
17 percent of releases: <ul style="list-style-type: none"> • contaminate groundwater; • are in remediation; and • are 10 years old or older. 	Continue regular evaluation of technology performance and consider alternative cleanup technologies or other strategies to bring releases to closure.	507
4 percent of releases: <ul style="list-style-type: none"> • contaminate soil only; and • are awaiting funding to begin assessment or are in assessment. 	Use expedited site assessment to identify additional releases with soil contamination that can be: <ul style="list-style-type: none"> • targeted for closure with minimal effort; or • moved more quickly into remediation. 	129

Releases contaminating groundwater have always been the largest part of the national backlog and 95 percent of releases in South Carolina are documented as contaminating groundwater. In general, groundwater contamination is considered more technically complex to remediate and also takes longer to clean up than soil contamination. For old, complex cleanups where long-term remediation is underway, EPA believes it is important to have a system in place for periodic reevaluation of cleanup progress and to reconsider whether the cleanup technology being used is still the most appropriate. Periodic reevaluation of treatment technology is a core function of DHEC project managers who oversee cleanup progress. Contractors are also incentivized to evaluate and optimize treatment technology by the terms of the pay-for-performance cleanup contracting that DHEC uses.

Soil contamination is typically easier to remediate than groundwater contamination. South Carolina has releases impacting soil only that are ranked as a lower priority and are not funded or are in assessment. As noted above, some of the releases remain unaddressed because of lower priority and because the state fund does not have enough money to finance the cleanup of all releases simultaneously. According to the data, there are also several releases that do not have a priority ranking that do not have an assessment or are awaiting funds for cleanup. New releases are given a priority ranking as soon as enough data are available to make an educated risk

ranking. As resources become available, EPA believes DHEC should continue to make progress toward closure for all of its LUST releases.

Cleanup Financing *(see page SC-13 for more details)*

South Carolina Finding	Potential Opportunity	Releases
67 percent of state fund eligible releases are either: <ul style="list-style-type: none"> • 5 years old or older and site assessment has not started; or • 10 years old or older and in site assessment. 	<ul style="list-style-type: none"> • Secure additional funding. South Carolina has recently passed legislation providing \$36 million of additional financing to move more state-funded cleanups toward remediation and closure. • In addition to the successful funding effort, continue to encourage the use of other sources of public and private funding such as petroleum brownfields grants at appropriate releases. 	1,673
The median amount of public spending to date at releases impacting groundwater is nearly nine times higher than the median amount spent at closed releases.	This finding is not surprising given that groundwater cleanups are typically more complex. Continue to look for opportunities to achieve cost savings.	Variable number of releases ⁵

EPA and state programs are interested in exploring successful financing strategies for completing cleanups quickly. EPA believes the availability of funding for cleanup is essential to reducing the backlog. EPA is highly encouraged to report that, as noted earlier, the South Carolina legislature, at the urging of the state petroleum industry, has recently provided the necessary additional funding to address many of the releases in South Carolina's backlog. EPA applauds this effort. Because EPA is concerned with the availability of funding across the nation, EPA is increasing its focus on oversight of state funds as well as conducting a study of private insurance.

In South Carolina, early amnesty programs provided strong incentives to report releases, but DHEC's budget did not allow funding of all releases expeditiously. For funded cleanups, DHEC uses economic incentives to reduce cleanup prices and reward prompt cleanup completion. DHEC's use of pay-for-performance cleanup contracting leverages competitive bidding to minimize cleanup prices and provides strong intermediate performance incentives for contractors to complete cleanups

5 Opportunities marked as "variable number of releases" relate to programmatic opportunities and affect an unknown number of releases, potentially including all open releases.

quickly. The state fund pays a bonus of 10 percent to contractors for completing a cleanup ahead of schedule. By leveraging open competitive bidding to drive down cleanup prices, DHEC frees up financial resources to address more releases. However, the resulting cost savings did not yield enough for South Carolina to finance all of its LUST releases. EPA had determined that additional financing to extend these practices to unfinanced releases would further reduce the South Carolina backlog and acknowledges South Carolina's recent accomplishment in this area. Where appropriate, DHEC might also continue to investigate the use of public/private partnerships such as petroleum brownfields grants for low priority releases without a viable RP. DHEC has addressed clusters of releases in the cities of Anderson and Greenville using petroleum brownfields grants.

Release Priority *(see page SC-16 for more details)*

South Carolina Finding	Potential Opportunity	Releases
28 percent of releases: <ul style="list-style-type: none"> • are high priority (Categories 1 and 2); and • are in site assessment. 	<ul style="list-style-type: none"> • Continue to complete assessments and move releases into remediation and toward closure as resources permit. • Continue enforcement initiative to move inactive releases through assessment into remediation. 	821

South Carolina has a statutory requirement to address the highest priority releases first.⁶ Risk determines the priority of each release and the priority ranking determines whether state funds are available to clean up a release. DHEC stated that it currently funds all high priority releases. When the data were collected in 2009, a number of releases considered high priority by the state were still in the early stages of cleanup or were listed in the database as inactive. These inactive high priority releases had work initiated but were delayed temporarily due to pending directed work orders or were delayed by enforcement actions or property redevelopment/access issues. DHEC's enforcement effort to reestablish contact with RPs successfully moved inactive high priority releases back into active work status.

6 According to DHEC, at the time of data collection, funding capacity allowed DHEC to address all high priority releases and allowed the assessment and assignment of releases with inconclusive risk assessments.

Presence of Free Product *(see page SC-17 for more details)*

South Carolina Finding	Potential Opportunity	Releases
18 percent of releases have free product present.	Continue to address the presence of free product at releases, as resources permit	535

Federal regulations require the removal of free product to the extent practicable. There are 535 releases with free product in the South Carolina backlog.⁷ DHEC considers the presence and depth of free product as part of its risk ranking procedures. South Carolina is currently addressing all high priority releases with free product present. DHEC can consider whether the use of enforcement actions at old releases with persistent free product could help ensure the recovery of free product contamination and move cleanups toward closure.

Geographic Clusters *(see page SC-18 for more details)*

South Carolina Finding	Potential Opportunity	Releases
41 percent of releases are clustered within a one-mile radius of five or more releases.	Continue to identify releases within close proximity for resource consolidation opportunities.	Targeted number of releases ⁸

DHEC targets cleanup actions at geographically-clustered releases where feasible. The geographic cluster approach can join and benefit new community-based reuse efforts, use economies of scale, and address commingled contamination. DHEC already pursues consolidation of resources in bidding out contracts when the owner/operator asks the state to choose a contractor on their behalf. EPA believes that highlighting geographic clusters of releases and working with state and local governments in area-wide initiatives can yield more cleanup closures. DHEC has also conducted corridor work using petroleum brownfields grants in Anderson and Greenville. EPA intends to work with the states to conduct further geospatial analyses on clusters of open releases in relation to RPs, highway corridors, local geologic and hydrogeologic settings, groundwater resources, and/or communities with environmental justice concerns. These analyses might reveal additional opportunities for backlog reduction.

⁷ Free product removal is addressed under Title 40 § 280.64, available online at: www.epa.gov/oust/fedlaws/techrule.htm#280.64.

⁸ Opportunities marked as “targeted numbers of releases” relate to geographic opportunities that will address a limited number of releases within select designated geographic areas.

Use of MNA *(see page SC-19 for more details)*

South Carolina Finding	Potential Opportunity	Releases
MNA is used at 33 percent of releases in remediation.	Continue to consider MNA as a remedial technology where appropriate.	Variable number of releases
10 percent of closed releases used MNA.	Continue to consider MNA as a remedial technology where appropriate.	Variable number of releases

EPA supports the appropriate use of MNA and encourages DHEC’s 18-month evaluation of cleanup progress where MNA is used to address contamination. MNA without the use of active cleanup efforts has led to the closure of 631 releases in South Carolina. In addition, a large percentage of releases have also been closed using active remediation followed by MNA. EPA supports South Carolina’s policy that encourages the use of other strategies when MNA does not reduce contamination within a reasonable timeframe. On the other hand, if an expensive, active remedial technology is being used for cleanup and it has little or no effect on reducing contamination, a reevaluation of the cleanup remedy might reveal MNA to be a more cost-effective technology, as long as cleanup is accomplished within a reasonable timeframe.

CONCLUSION

This chapter contains EPA’s data analysis of South Carolina’s LUST cleanup backlog and identifies potential opportunities to reduce the backlog in South Carolina. EPA discusses the findings and opportunities for South Carolina, along with those of 13 additional states, in the national chapter of this report. EPA will continue to encourage South Carolina’s approaches to reducing its backlog and to explore opportunities to further the state’s efforts. Development of strategies could involve targeted data collection, reviewing particular case files, analyzing problem areas, and sharing best practices. Final strategies could involve EPA actions such as using additional program metrics to show cleanup progress, targeting resources for specific cleanup actions, clarifying and developing guidance, and revising policies. EPA, in partnership with states, is committed to reducing the backlog of confirmed UST releases and to protecting the nation’s groundwater, land, and communities affected by these releases.

PROGRAM SUMMARY

State LUST Program Organization and Administration

The South Carolina Department of Health and Environmental Control (DHEC) Division of Underground Storage Tank (UST) Management includes two sections responsible for the oversight of UST releases: the Assessment Section and the Corrective Action Section. The Assessment Section provides technical oversight of the assessment of releases from federally-regulated USTs and identifies the level of risk at releases in accordance with the state's Risk-Based Corrective Action (RBCA) procedures. The Corrective Action Section provides technical oversight of post-assessment cleanup activities related to UST releases. All state-funded cleanups are contracted on a pay-for-performance basis in which the price is set in open competitive bidding, the contractor determines treatment technology, and payments are based on site progress. A core function of DHEC project managers is to routinely evaluate treatment system effectiveness. Both sections pre-approve proposed costs and review claims submitted to the state fund. Corrective action work must be performed by DHEC-certified site rehabilitation contractors.

Cleanup Financing

All releases in South Carolina are eligible for state funding, provided that the site is in significant operational compliance at the time of release or when the release is reported. Since available state funding is insufficient to address all releases simultaneously, the state funds cleanups based on the risk posed by each release. The State Underground Petroleum Environmental Response Bank (SUPERB) funds Leaking Underground Storage Tank (LUST) cleanups, while the State Financial Responsibility Fund pays for third-party claims for actual costs for bodily injury and property damage caused by accidental releases. The SUPERB fund has a \$25,000 deductible. To encourage the reporting of releases, South Carolina offered an amnesty period from 1988 to 1993 during which the deductible required to be paid by the tank owner for coverage by the fund was waived. This created a substantial inventory of releases that remain part of the current backlog. State funds are allocated to cleanups with the highest risk to receptors. According to EPA and DHEC, annual fund revenue at the time of data collection was sufficient to address new releases that occur; however, the SUPERB fund was undercapitalized and could not pay for the cleanup of the large number of amnesty releases and low priority releases. In 2010, the petroleum industry secured an additional \$36 million in long-term funding through the South Carolina legislature to address the open releases.

Cleanup Standards

DHEC uses a risk-based approach that integrates risk assessment, risk management, site assessment, monitoring, and corrective action selection.¹⁰ Risk is assessed using site-specific data, including receptors, exposure potential, hydrogeology, and contaminants of concern. According to DHEC, all groundwater in South Carolina is considered drinking water. However, DHEC regulations allow conditional risk-based no further action decisions based on site-specific conditions and use of the site.¹¹ DHEC keeps a registry of these conditional no-further-action sites.

South Carolina LUST Program At a Glance

Cleanup Rate

In fiscal year (FY) 2009, DHEC confirmed 151 releases and completed 262 cleanups.⁹

Cleanup Financing

According to DHEC, all LUST releases are eligible for state funds except for releases at a site owned or operated by the federal government. A \$25,000 deductible is required.

Cleanup Standards

RBCA standards based on site-specific conditions are used.

Priority System

Release priority is based on current and projected risk and updated based on new information and changes in release conditions.

Average Public Spending on Open Cleanups

\$87,420

Releases per Project Manager

On average, each project manager is responsible for 197 open releases.

Administrative Funding (2008)

\$3.4 million

⁹ Based on FY 2009 *UST Performance Measures End of Year Activity Report*.

¹⁰ DHEC's guidance document, *Risk-Based Corrective Action for Petroleum Releases*, is available online at: www.scdhec.gov/environment/lwm/forms/RBCA_01.pdf.

¹¹ South Carolina Regulation R 61.98.

Release Prioritization

South Carolina has a statutory requirement to address high risk releases first. Priority categories are assigned based on the current and projected degree of risk to human health and the environment. LUST cleanups are allocated state resources based on their priority level. Releases are prioritized based on initial information, and the priority is then updated on completion of each RBCA tier evaluation. Release priority might change subsequent to contamination abatement, additional assessment information, or remedial activities. According to DHEC, at the time of data collection, funding capacity allowed DHEC to address all high priority (Class 1 and 2) releases and the assessment and assignment of releases with inconclusive risk assessments (Class 5B). Class 3 and 4 releases are addressed as funding is available. It is important to note that new high priority cases contribute to the continuation of low priority cases in the backlog.

State Backlog Reduction Efforts

Beginning in November 2008, DHEC began increasing efforts to re-establish contact with responsible parties (RPs) where correspondence had lapsed but where the release was eligible for state funding. In these cases, RPs are contacted by DHEC and, if no response is received, the case is placed under enforcement actions. Through this effort, approximately 25 to 30 RPs are contacted each month. On average, 10 of these RPs are placed under enforcement actions. DHEC plans to use its database to track the influence of these efforts on the time to closure for releases.

ANALYSIS AND OPPORTUNITIES

In this study, EPA analyzed South Carolina's federally-regulated releases that have not been cleaned up (open releases). EPA conducted a multivariate analysis on DHEC's data. However, this technique did not identify strong underlying patterns in the data.¹² Next, EPA divided the open releases into groups that might warrant further attention. EPA used descriptive statistics to examine the distribution of releases by age of release and stage of cleanup and highlighted findings based on DHEC's data.¹⁴ EPA then identified potential opportunities for addressing particular groups of releases in the backlog. Many releases are included in more than one opportunity. These opportunities describe actions that EPA and DHEC might use as a starting point for their discussion on backlog reduction. Although EPA's analysis covered most releases in South Carolina, there are 339 releases that are not included in any of the subsets identified in the findings or opportunities due to the way EPA structured the analysis. These releases might also benefit from some of the suggested opportunities and strategies.

EPA's analyses revealed seven areas of South Carolina's backlog with potential opportunities for its further reduction and EPA acknowledges that, where practical, DHEC utilizes many of the opportunities discussed in these study areas as part of its ongoing program:

- Stage of cleanup
- Media contaminated
- Cleanup financing
- Release priority
- Number of releases per affiliated party
- Geographic clusters
- Use of monitored natural attenuation (MNA)

LUST Data Source

Electronic data for LUST releases occurring between April 1980 and May 2009 were compiled with DHEC staff in 2008 and 2009.¹³ Data were obtained from DHEC's Environmental Facility Information System and selected based on quality and the ability to address areas of interest in this analysis.

¹² The analytic tree method, a multivariate technique used to identify underlying patterns among large data sets, did not reveal strong patterns within the data. For more information on analytic trees, see Appendix A.

¹³ For a detailed description of the South Carolina data used in this analysis, see the Chapter Notes section.

¹⁴ For a detailed description of release stages, see the Chapter Notes section (Stage of Cleanup Reference Table).

South Carolina Finding

- 60 percent of releases are either:
- 5 years old or older and site assessment has not started; or
 - 10 years old or older and in site assessment.

Potential Opportunity Releases

- Explore options for funding additional site assessments at old releases to identify releases that can be closed with minimal effort or moved toward remediation. (South Carolina has recently passed legislation to generate additional funding for this purpose.)
- Continue to expedite site assessments where appropriate.
- Implement enforcement actions at releases not eligible for SUPERB funding and at inactive releases above the funding threshold.

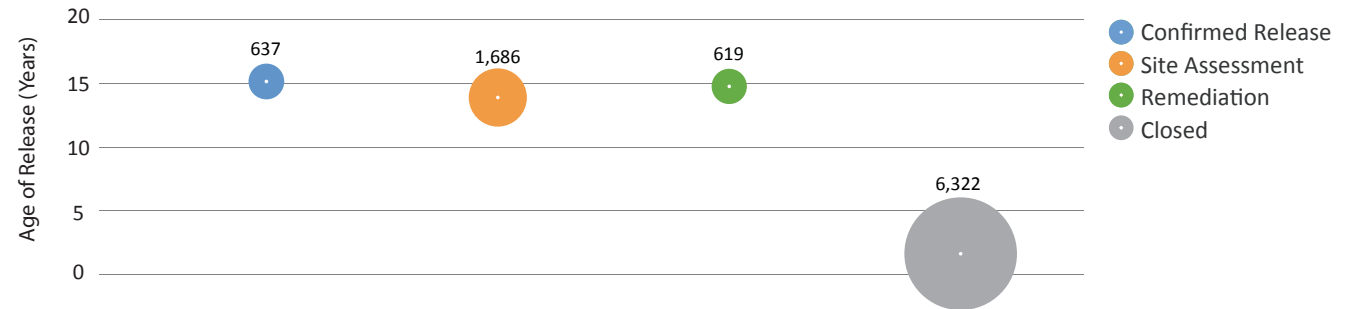
Releases 5 years old and older in the Confirmed Release stage	589
High Priority ¹⁶	149
Medium Priority	382
Low Priority	38
No Priority	20
Releases 10 years old and older in the Site Assessment stage	1,190
High Priority	473
Medium Priority	680
Low Priority	21
No Priority	16

STAGE OF CLEANUP

As of May 4, 2009, the South Carolina backlog consisted of 2,942 open releases. EPA analyzed the age of these LUST releases and their distribution among the stages of cleanup. In general, LUST releases in the backlog are significantly older than releases that have been closed. The high median age of open releases is likely due to the large influx of old, lower priority releases to the backlog during the SUPERB account amnesty period. To facilitate analysis, EPA classified South Carolina’s open releases into three stages of cleanup: the Confirmed Release stage (releases where assessments have not begun), the Site Assessment stage (releases where assessments have begun), and the Remediation stage (releases where remedial activities have begun).¹⁵

Since South Carolina’s LUST program began, DHEC has closed 6,322 releases, half of which were closed in fewer than 1.6 years (Figure 1 below). The young median age of closed LUST releases might be attributable to the rapid closure of relatively easy-to-remediate releases. Also, national program policy allows states to report confirmed releases that require no further action at time of confirmation as “cleanup completed.” Therefore, some releases are reported as confirmed and cleaned up simultaneously.

Figure 1. Age of Releases among Stages of Cleanup

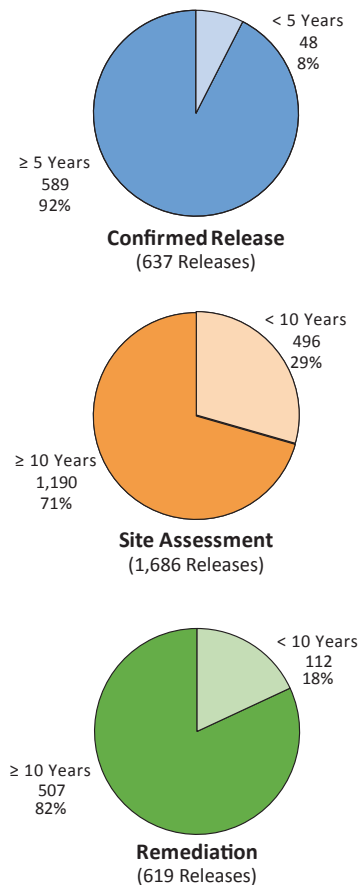


The white dot at the center of each circle represents the median age of releases. Each circle is labeled with, and scaled to, the number of releases within each stage. Included in the release counts and size of circles are eight closed releases for which release age is unknown. These releases are not part of the median age calculation.

To reduce South Carolina’s backlog, DHEC has an initiative to contact RPs and initiate enforcement actions when necessary.¹⁷ Although state law does not preclude DHEC from taking enforcement action to start cleanup, its policy is not to do so if the state cannot fund the needed work. RPs who want to proceed with work can seek possible state reimbursement at a later date with pre-approval and a delayed reimbursement contract. These monies are pre-approved, as required by regulation, but payment might be years later. Agencies in other states have also been able to initiate targeted backlog reduction efforts

15 Releases were classified into stages based on available data and discussion with DHEC staff. For more information, see the Chapter Notes section.
 16 Priority assignments were as follows: High Priority: Class 1 and 2; Medium Priority: Class 3 and 4; Low Priority: Class 5A; Unknown Priority: Class 5B. For details on priority classifications, see the Chapter Notes section (Priority Reference Table). Note the high priority releases in the Confirmed Release category have started work but were labeled as inactive at the time of data collection. Also, as of April 2011, 41 percent of open releases are in the Site Assessment stage.
 17 See State Backlog Reduction Efforts in the Program Summary.

Figure 2. Release Age Distribution among Stages of Cleanup



to look for easy closures and discovered old releases that can be closed with minimal effort.¹⁸ Opportunities for closure with minimal effort are most likely found at lower priority releases where little or no remedial work is required to reach closure standards or at releases that have met closure standards but have not finished closure review.

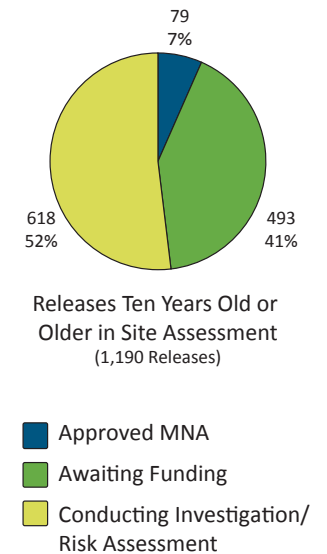
South Carolina legislation created a nearly 6-year-long amnesty period from 1988 through June 1993. The amnesty program alerted DHEC to a great number of older tanks in the state. It also resulted in a high volume of open releases that DHEC is still addressing to this day. Due to this amnesty period, South Carolina has many old LUST releases awaiting funds to proceed with remediation. At the time of data collection, most of South Carolina’s open releases were in the Site Assessment stage (1,686 releases or 57 percent of the total backlog) (Figure 1). Figure 2 to the left shows the backlog of all open releases, including 589 releases five years old or older in the Confirmed Release stage (20 percent of the backlog) that are awaiting funding to start assessment. It also shows 1,190 releases 10 years old or older in the Site Assessment stage (40 percent of the backlog). This subset of older releases awaiting funding or in site assessment accounts for 60 percent of South Carolina’s backlog. Of the 1,190 releases in site assessment that are 10 years old or older, investigations or risk assessments are being conducted at 52 percent of the releases (618 releases) and 7 percent of the releases (79 releases) have been approved for MNA (Figure 3 to the right). The remaining 41 percent (493 releases) are inactive due to a lack of funding. The recent procurement of additional funding should allow many of these releases to move forward with remediation and closure. A small number of releases (4 percent of the backlog) are not eligible for SUPERB funding due to compliance issues. If these releases are stalled, DHEC might want to consider enforcement actions to move them forward with cleanup. In addition, since 2008, DHEC has had a successful enforcement initiative to contact RPs at inactive releases eligible for the state fund.

EPA has encouraged states to streamline the corrective action process, improve data collection, reduce the overall cost of remediation, and move releases more rapidly toward remediation and closure. EPA recognizes South Carolina’s efforts in these areas. EPA has acknowledged that a lack of financing for assessment that could expedite release closure or raise priority for remedial action funding has been the primary issue for the South

Carolina program. EPA recognizes the efforts by the petroleum industry in South Carolina to secure additional funding for the program to address this concern. DHEC uses expedited site assessment to obtain additional cost savings for the state when possible, allowing additional releases to be addressed. EPA developed the *Expedited Site Assessment (ESA)* guide as a tool for states and regulators.¹⁹

Due to the amnesty period, South Carolina also has many old releases in the Remediation stage. Of the releases currently in the Remediation stage, 82 percent (507 releases) are 10 years old or older (Figure 2). DHEC routinely evaluates system

Figure 3. Type of Activity at Releases 10 Years or Older in the Site Assessment Stage



18 See State Backlog Reduction Efforts in the Program Summary.

19 EPA’s 1997 guidance document, *Expedited Site Assessment Tools for Underground Storage Tank Sites: A Guide for Regulators* (EPA 510 B-97-001), is available online at: www.epa.gov/OUST/pubs/sam.htm.

effectiveness, as this is a core function of its project managers. Under DHEC's pay-for-performance structure, payment is triggered as the contractor reaches intermediate and final contamination reduction levels, which rewards progress. EPA encourages DHEC's periodic review of releases in remediation and, in fact, suggests that other states consider a similar approach.

MEDIA CONTAMINATED

South Carolina Finding

17 percent of releases:

- contaminate groundwater;
- are in remediation; and
- are 10 years old or older.

Potential Opportunity Releases

Continue regular evaluation of technology performance and consider alternative cleanup technologies or other strategies to bring releases to closure.

High Priority 372

Medium Priority 134

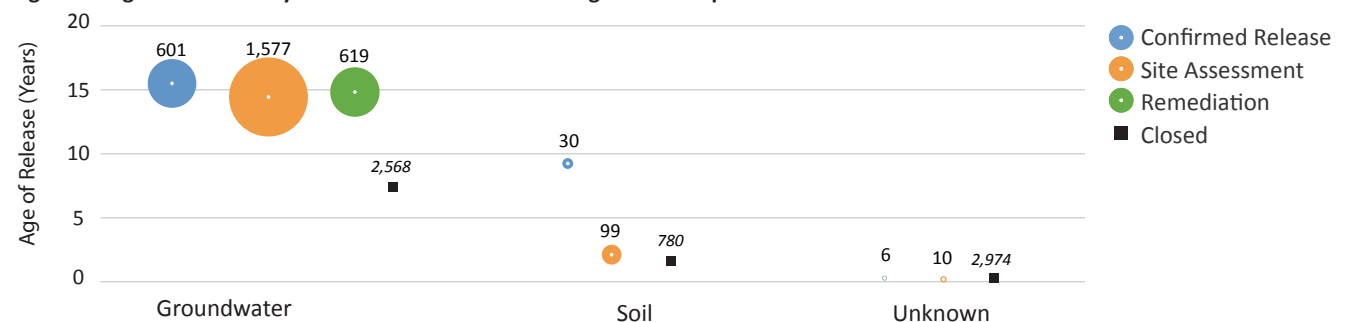
Low Priority 1

Groundwater is an important natural resource that is at risk from petroleum contamination. Releases impacting groundwater make up the majority of South Carolina's backlog. Groundwater contamination generally takes longer and is typically more expensive to clean up than soil contamination. In this study, EPA examined media contaminated as a factor contributing to the backlog. The following analysis classified South Carolina media contamination into three categories: groundwater (2,797 open releases), soil (129 open releases), and "unknown" media, which includes releases with no media specified (16 open releases).²⁰

In South Carolina, 95 percent of open releases (2,797 releases) involve groundwater contamination and, due to the amnesty period, have a median age of 15.1 years (Figure 4 below). In contrast, 77 percent of closed releases (2,568 releases) for which the media contamination is known involved groundwater contamination and these closed releases have a significantly younger median age of 7.5 years compared to the median age of open releases (Figure 4).²¹ Of the 619 Remediation stage releases that impact groundwater, 82 percent (507 releases) are 10 years old or older (Figure 5, page 13). This subset of older releases in remediation that contaminate groundwater makes up 17 percent of South Carolina's total backlog.

Releases that contaminate groundwater can be complex and difficult to remediate. DHEC's regular evaluation of the cleanup progress, current contaminant levels, and treatment technologies identifies releases where revised remediation methods or other strategies to accelerate closure can be implemented. DHEC regulations allow risk-based conditional no further action decisions where risk is minimized for the expected future use. It maintains a registry of conditional no-further-action sites. DHEC also systematically identifies sites where MNA can reach closure levels within 18 months. MNA sites that do not reach closure levels within 18 months might be moved into active remediation as funding becomes available.

Figure 4. Age of Releases by Media Contaminated and Stage of Cleanup



Squares indicating closed releases are not scaled to the number of releases in that stage.

²⁰ For a detailed description of media classifications, see the Chapter Notes section.

²¹ The type of media contaminated is unknown for 47 percent (2,974 releases) of closed releases.

Releases that contaminate soil only are of concern because they represent a potential threat to groundwater resources and contaminate properties in neighborhoods and communities. South Carolina releases impacting soil tend to be significantly younger than releases with groundwater impacts. South Carolina has 129 releases (4 percent of the backlog) that contaminate soil only and are either awaiting funding to begin assessment or are in assessment. Of South Carolina’s releases that contaminate soil only, 15 are in the Confirmed Release stage and are 9.4 years or older (Figure 4). In addition, 99 releases that contaminate soil only are being assessed. These releases have a younger median age than releases in the Confirmed Release stage, which might have a lower priority score and are, therefore, awaiting funding (Figure 4). To the extent that releases contaminate soil only and have lower priority scores, cleanup awaits the availability of state fund financing unless the RP has a reason to proceed with the cleanup, such as property sale or development and has private financing to perform the work and can wait for reimbursement from the state fund.

CLEANUP FINANCING

EPA and state programs are interested in exploring successful financing strategies for completing cleanups quickly. EPA believes the availability of funding for cleanup is essential to reducing the backlog. EPA is highly encouraged to report that, as noted earlier, the South Carolina legislature, at the urging of the state petroleum industry, has recently provided the necessary additional funding to address many of the releases in South Carolina’s backlog. EPA applauds this effort. Because EPA is concerned with the availability of funding across the nation, EPA is increasing its focus on oversight of state funds as well as conducting a study of private insurance.

South Carolina’s state fund fulfills the federal financial responsibility requirement for all USTs in the state. South Carolina has many old releases that are state fund eligible (2,588 releases, 88 percent of the backlog) and in the early stages of the cleanup process due to limited state resources and the amnesty program (Figure 6 below). Because of South Carolina’s amnesty program, it is not surprising that these 2,588 state fund eligible releases are significantly older than the 107 state fund ineligible releases (4 percent of the backlog) and the 247 releases with unknown eligibility (8 percent of the backlog) (Figure 6). According to DHEC staff, all releases with unlisted eligibility should be considered state fund eligible. However, for the purposes of this analysis, they are treated separately and labeled “unknown” since the state’s database did not contain information indicating their eligibility.

Figure 6. Age of Releases by State Fund Eligibility and Stage of Cleanup

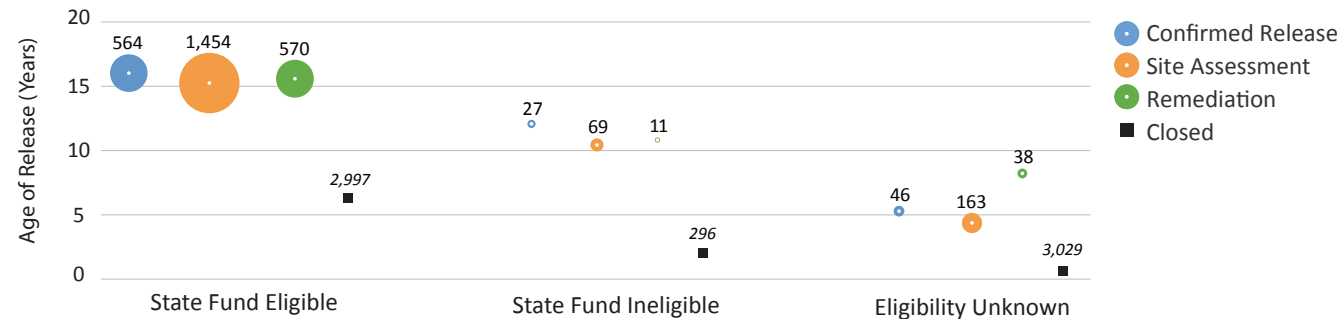
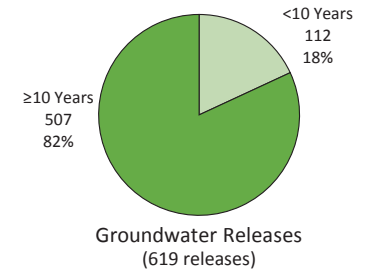


Figure 5. Age Distribution of Remediation Stage Releases with Groundwater Impacts



South Carolina Finding

- 4 percent of releases:
- contaminate soil only; and
 - are awaiting funding to begin assessment or are in assessment.

Potential Opportunity	Releases
-----------------------	----------

- | | |
|--|-----|
| Use expedited site assessment to identify additional releases with soil contamination that can be: | 129 |
| • targeted for closure with minimal effort; or | |
| • moved more quickly into remediation. | |

High Priority	24
Medium Priority	12
Low Priority	12
No Priority	81

South Carolina Finding

67 percent of state fund eligible releases are either:

- 5 years old or older and site assessment has not started; or
- 10 years old or older and in site assessment.

Potential Opportunity Releases

- Secure additional funding. South Carolina has recently passed legislation providing \$36 million of additional financing to move more state-funded cleanups toward remediation and closure.
- In addition to the successful funding effort, continue to encourage the use of other sources of public and private funding such as petroleum brownfields grants at appropriate releases.

High Priority	580
Medium Priority	1,020
Low Priority	52
No Priority	21

At the time of data collection, DHEC reported that funding capacity allowed it to address all high priority (Class 1 and 2) releases and the assessment and assignment of releases with inconclusive risk assessments (Class 5B). According to the data, 21 percent of state fund eligible releases (539 releases) are five years old or older and awaiting funding to start assessment. Of the releases in the Site Assessment stage, 78 percent (1,134 releases) are 10 years old or older (Figure 7 to the right). Together, this subset of older releases makes up 67 percent of the state fund eligible releases. The recent efforts by the South Carolina legislature to address the funding needs should move many of these releases forward. DHEC might also continue to encourage the use of additional funding sources such as petroleum brownfields grants for low priority releases without a viable RP. The 4 percent of releases (107 releases) that cannot be funded by the SUPERB fund are not qualified because the UST system was not in significant operational compliance at the time of the release. The prospect of future action at these sites will rely on alternative financing and perhaps further state enforcement action.

DHEC is responsible for funding cleanups regardless of whether the state or RP is the lead for the cleanup work. DHEC is the direct lead for 19 percent of releases (545 releases), while an RP is the lead for 59 percent of releases (1,723 releases) (Figure 8 below). A higher relative percentage of RP-lead releases have not begun remediation (Figure 8). These RP-lead sites are awaiting state funding due to a lower priority ranking. South Carolina has a statutory requirement to allow a RP to choose the cleanup contractor and DHEC provides a list of state-certified cleanup contractors from which to choose. The maximum amount the state will reimburse, whoever the contractor, is set in competitive bidding for pay-for-performance cleanups. DHEC allows RPs to proceed with remediation voluntarily when state financing is not yet available for a site. There is no significant difference in the age of state-lead and RP-lead cleanups in remediation. Incentives for voluntary work at RP-lead releases might be found to encourage them to move forward with cleanup. Enforcement actions at inactive releases, where appropriate, could also cause RPs to move forward with cleanup.

Figure 7. Age Distribution of State Fund Eligible Releases among Stages of Cleanup

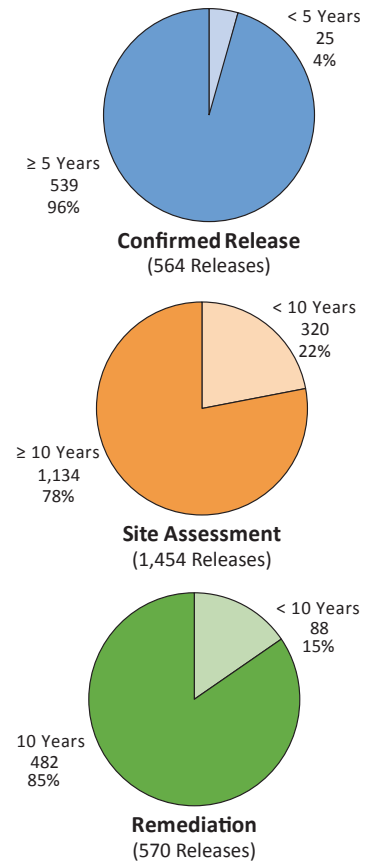
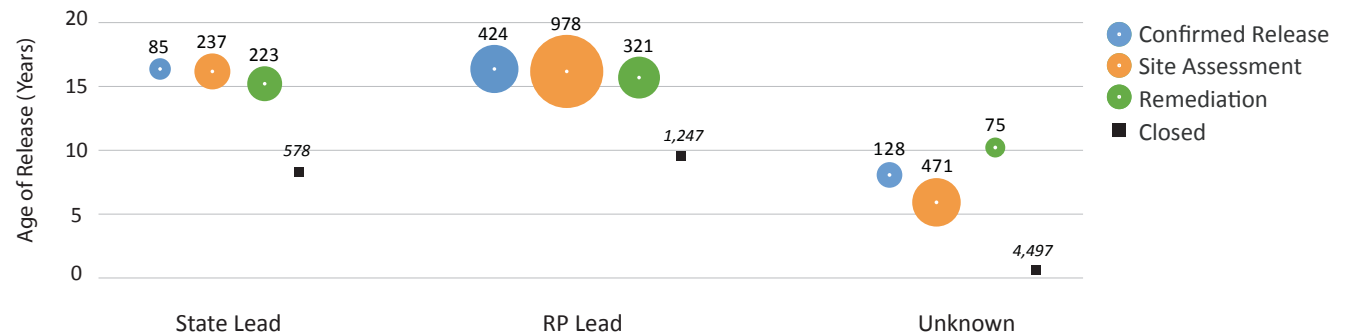


Figure 8. Age of Releases by Lead and Stage of Cleanup



Most open state fund eligible releases involve groundwater and cost more to clean up than closed releases that impacted groundwater. Data available for 2,313 open and 1,783 closed releases with groundwater impacts indicate the median amount (\$117,416) spent to date for cleanup at state-funded Remediation stage releases contaminating groundwater is nearly nine times higher than the median amount (\$19,711) spent at closed releases contaminating groundwater, suggesting that cleaning up a release has become more expensive over time (Figure 9 below).²² This spending differential is most likely due to the easiest releases to remediate having been closed quickly and with low costs, leaving more complex and expensive cleanups in the backlog. Closed releases impacting soil had significantly lower public spending than closed releases impacting groundwater (Figure 9), suggesting that releases with soil contamination are easier to remediate than releases where groundwater is contaminated.

DHEC already has procedures and policies in place to encourage cost savings. Although engineering the treatment technology is the responsibility of the contractor and pay-for-performance contractors have freedom and economic incentive to fine-tune or change treatment technology, DHEC project managers routinely evaluate treatment system effectiveness. Contractors are paid as intermediate cleanup goals are met and DHEC pays a 10 percent bonus to contractors who close a site ahead of schedule. EPA encourages the use of this practice and others that result in savings to South Carolina and allow DHEC to address more releases. Continuing to expedite site assessments to identify releases that could be closed with minimal effort or moved toward remediation might help to further reduce the backlog when additional state resources became available to assess these sites.

South Carolina Finding

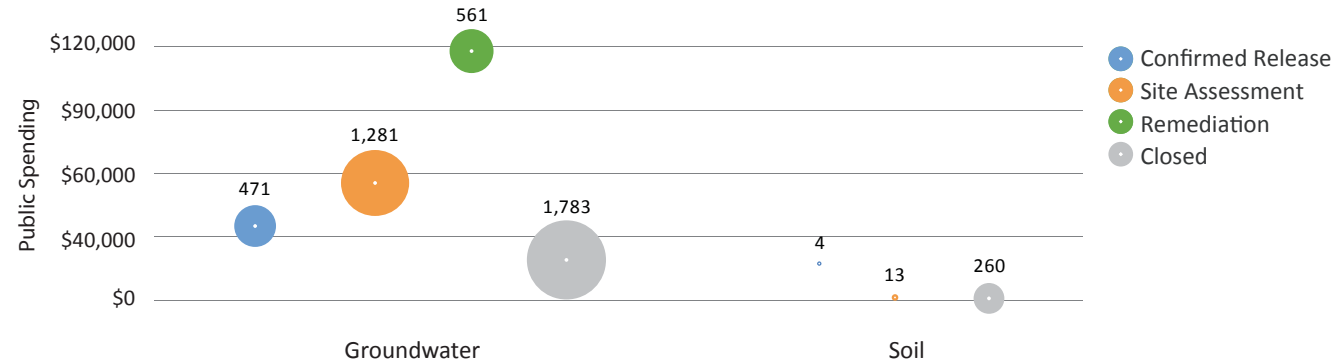
The median amount of public spending to date at releases impacting groundwater is nearly nine times higher than the median amount spent at closed releases.

Potential Opportunity Releases

This finding is not surprising given that groundwater cleanups are typically more complex. Continue to look for opportunities to achieve cost savings.

Variable number of releases²³

Figure 9. Public Spending at State-Funded Cleanups with Groundwater and Soil Impacts, by Stage of Cleanup²⁴



²² Spending data have been adjusted for inflation.

²³ Opportunities marked as “variable number of releases” relate to programmatic opportunities and affect an unknown number of releases, potentially including all open releases.

²⁴ Public spending data were only available for 2,330 open releases (79 percent) and 2,043 closed releases (32 percent).

South Carolina Finding

28 percent of releases:

- are high priority (Categories 1 and 2); and
- are in site assessment.

Potential Opportunity**Releases**

- Continue to complete assessments and move releases into remediation and toward closure as resources permit.
- Continue enforcement initiative to move inactive releases through assessment into remediation.

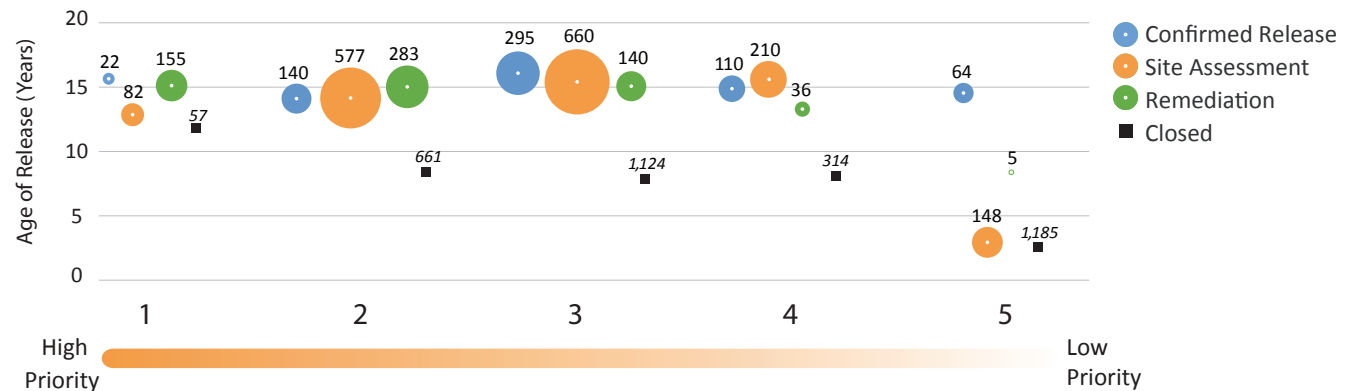
821

RELEASE PRIORITY

Many state programs employ prioritization systems to decide how to best allocate state resources for assessments and cleanups. DHEC is required by statute to focus resources on the highest risk releases and unconfirmed risk releases. DHEC is prohibited from dedicating resources to low priority releases unless resources have already been made available to address all higher priority releases.

In South Carolina, high priority releases are those determined to pose an emergency or significant near-term threat (Class 1 and 2). All high priority releases are funded by DHEC and have begun work. According to the data from 2009, South Carolina has 162 high priority releases classified by DHEC as inactive (6 percent of the backlog) and 659 releases in the Site Assessment stage (22 percent of the backlog) (Figure 10 below).²⁵ This subset of high priority releases is 28 percent of the backlog. DHEC maintains a current database; therefore, many of the high priority releases classified as inactive are in short-term inactive periods between directed scopes of work or, in some cases, work is delayed due the resolution of enforcement action or property redevelopment/access issues. In 2008, DHEC began an enforcement initiative to encourage work at inactive high priority releases. This initiative plus additional funding moved the number of releases in inactive status from 214 in 2008 to 130 at the end of 2010. The remaining 438 high priority releases (15 percent of the backlog) are in remediation. Continuing to use expedited site assessments for pre-remediation releases and enforcement at inactive releases will help to further reduce South Carolina's backlog.

Figure 10. Age of Releases by Release Priority and Stage of Cleanup²⁶



The backlog also has pockets of low priority releases. There are 40 Priority 5 releases in the Confirmed Release stage. These releases have a median age of 15.9 years, likely due to the amnesty period and their low priority (Figure 10). An additional 45 Priority 5 releases are in the Site Assessment stage (Figure 10). The 127 releases without a priority score either do not have

²⁵ Priority 1 includes categories 1A, 1B, 1C, 1D, and 1E. Priority 2 includes categories 2AA, 2AB, 2BA, and 2BB. For details on priority classifications, see the Chapter Notes section (Priority Reference Table).

²⁶ There are 15 open releases and 2,975 closed releases for which priority is unknown that are not included in Figure 10. Also, note that for Class 1 and 2, the releases shown as Confirmed Release stage are actually in inactive status. All high priority Class 1 and 2 releases have started work.

conclusive data to determine prioritization or pose no pending threat. Expediting site assessments of releases that have not been prioritized and identifying releases that could be easily closed can help reduce the current backlog. DHEC estimates that the additional recent financing provided by the legislature will provide enough resources to address the lower priority sites as well as higher priority sites.

PRESENCE OF FREE PRODUCT

Federal law requires that an owner/operator must submit a report on free product within 45 days of release discovery. Although federal regulations require the removal of free product, South Carolina has a large number of relatively old releases with free product present. DHEC tracks the presence of free product using its priority (RBCA Class) codes. Of the 2,942 releases in the South Carolina backlog, the DHEC priority codes indicate that, at the time the data were provided to EPA, free product was present at 18 percent of releases (535 releases; Figure 11 below, left). According to the data, 45 percent of the releases with free product are in Class 1E and 2BA (248 releases), with the majority in Class 2BA (240 releases). The definition of a Class 2BA release is that free product is thicker than one foot. High priority releases are those determined to pose an emergency or significant near-term threat (RBCA Class 1 and 2). South Carolina addresses releases based on priority and had started site assessment or remediation at all Class 1 and almost every Class 2 release. Of the remaining releases with free product, most are in Class 3BA, defined as free product between 0.01 and one foot (277 releases).

Of the 535 releases with free product present, 82 percent (438 releases) are ten years old or older (Figure 12 below, right). Although there are no federal or state mandated time restrictions on the length of time to remove the free product, the owner/operator is required to remove as much free product as practicable. DHEC should continue to encourage the removal of free product to the extent practicable. DHEC might also consider whether enforcement actions at old releases with persistent free product might be appropriate to help ensure the recovery of free product contamination and move cleanups toward closure.

South Carolina Finding

18 percent of releases have free product present.

Potential Opportunity

Releases

Continue to address the presence of free product at releases, as resources permit	535
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Figure 11. Presence of Free Product at Open Releases, by Stage of Cleanup

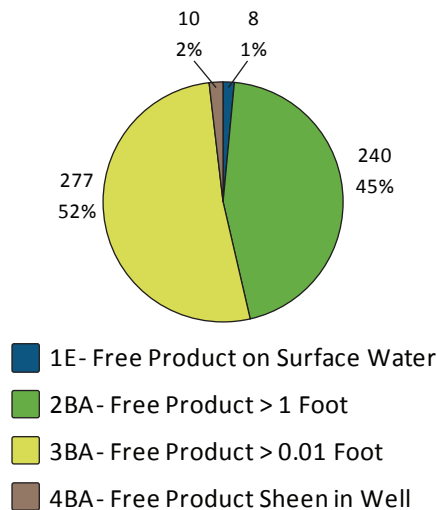
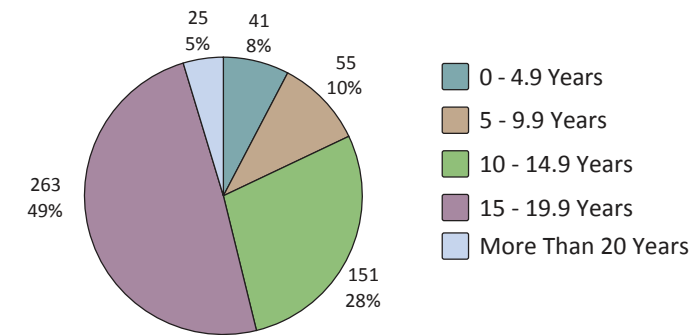


Figure 12. Age of Open Releases with Free Product Present



NUMBER OF RELEASES PER AFFILIATED PARTY

EPA analyzed the number of releases per affiliated party to identify the largest potential contributors to the state's cleanup backlog.²⁷ A total of 32 entities are each associated with 10 or more releases and account for 23 percent of the South Carolina backlog (689 releases) (Table 1 to the right).²⁸ Of these, 25 gasoline retail, distribution, or refining businesses are associated with 420 releases (17 percent of the backlog), and two state government entities are associated with 76 releases (3 percent of the backlog). DHEC has combined activities for RPs where possible, but, according to state statute, releases must be addressed based on release priority and available funding. Releases in close proximity or different releases associated with the same site can have different priority rankings for state funding, and the lower priority releases must await state funding. Where such releases are prospects for sale or redevelopment, there might be private economic incentive for the RP to address all sites under one contract. However, DHEC reports that it has not found significant improvements or advantages in multi-site agreements based on common ownership or proximity of releases.

Table 1. Parties Affiliated with 10 or More Open Releases

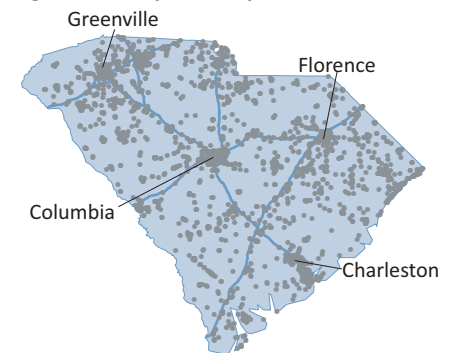
Type of Affiliated Party	Number of Releases	Number of Parties
Gasoline Retail/Distribution/Refining	420	25
Government - State	76	2
Convenience Store Chain	193	5
Total	689	32

GEOGRAPHIC CLUSTERS

EPA performed a geospatial analysis to look for alternative ways to address the backlog. While releases in geographic clusters might not have the same RP, they tend to be located in densely populated areas and present potential opportunities to consolidate resources and coordinate efforts. Geographic proximity can call attention to releases in areas of interest such as redevelopment, environmental justice, and ecological sensitivity. South Carolina local and state agencies have worked with EPA's Brownfields program to develop such opportunities.

State and local governments can utilize geographic clusters for area-wide planning efforts. EPA's analysis identified 1,205 releases (41 percent of releases) located within a one-mile radius of five or more releases (Figure 13). Of these releases, 408 (14 percent of releases) are located within a one-mile radius of 10 or more releases. These releases are clustered primarily in metropolitan areas and are likely to be lower priority due to municipal water use in cities. However, these clusters of releases might still present opportunities to consolidate resources and coordinate efforts. EPA encourages states to look for opportunities for resource consolidation or area-wide planning but also recognizes that this approach is best geared to address targeted groups of releases as opposed to a state-wide opportunity for every cluster of releases. With the

Figure 13. Map of All Open Releases



South Carolina Finding

41 percent of releases are clustered within a one-mile radius of five or more releases.

Potential Opportunity

Continue to identify releases within close proximity for resource consolidation opportunities.

Releases

Targeted number of releases²⁹

²⁷ According to DHEC, the "RP" data field is the current owner/operator and is not necessarily the RP for the release.

²⁸ No federal government entities were identified as having 10 or more releases.

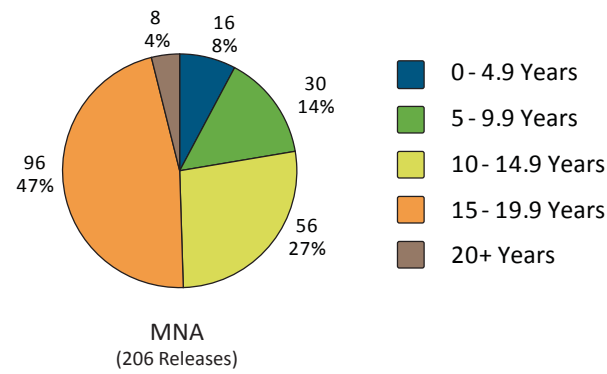
²⁹ Opportunities marked as "targeted numbers of releases" relate to geographic opportunities that will address a limited number of releases within select designated geographic areas.

support of petroleum brownfields grants, DHEC has addressed clusters of releases in the cities of Anderson and Greenville.³⁰ The coordination of resources and the state's efficiency in securing and working with assessment contractors enabled DHEC to keep costs low. EPA intends to conduct further geospatial analyses on clusters of open releases in relation to RPs, highway corridors, local geologic and/or hydrogeologic settings, groundwater resources, and/or communities with environmental justice concerns. These analyses might reveal additional opportunities for backlog reduction.

USE OF MNA

According to the data provided by DHEC, MNA is in use as the remedial treatment technology at 33 percent of releases (206 releases) in the Remediation stage (Figure 14). In addition, DHEC has closed 631 releases (10 percent of closed releases) through the use of MNA only (i.e., no active remedial remedy used prior to MNA). DHEC has closed a greater number of releases using active remediation followed by MNA. EPA guidance states that MNA is an appropriate remediation method where its use will be protective of human health and the environment and it will be capable of achieving site-specific remediation objectives within a timeframe that is reasonable compared to other alternatives.³¹ EPA supports DHEC's use of MNA and its ongoing evaluation of cleanup progress where MNA is used. Releases in DHEC's MNA process are under evaluation for an 18-month period after which the release either continues in MNA or might be placed into active remediation. Use of MNA is appropriate in cases where an expensive, active remediation technology is being used and is having little or no effect on contamination. DHEC's periodic reevaluation of cleanup progress might reveal that MNA would be a more cost-effective technology to use at some releases.

Figure 14. Age of Cleanups in the Remediation Stage Using MNA



South Carolina Finding

MNA is used at 33 percent of releases in remediation.

Potential Opportunity

Continue to consider MNA as a remedial technology where appropriate.

Releases

Variable number of releases

South Carolina Finding

10 percent of closed releases use MNA.

Potential Opportunity

Continue to consider MNA as a remedial technology where appropriate.

Releases

Variable number of releases

³⁰ For more information, see earth1.epa.gov/swerosps/bf/success/greenville.pdf.

³¹ For more information regarding appropriate use of MNA, see www.epa.gov/swerust1/pubs/tums.htm and EPA Directive Number 9200.4-17P, *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, available online at: www.epa.gov/oust/directiv/d9200417.htm.

CONCLUSION

South Carolina LUST Program Contact Information

South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
Underground Storage Tank Program
2600 Bull Street
Columbia, SC 29201

Phone: 803-896-6396

Fax: 803-896-6245

www.scdhec.gov/eqc/ust/index.html

In this state chapter, EPA presented the analysis of LUST data submitted by DHEC and highlighted information on the state's UST program. Based on the analytic results, EPA developed potential opportunities that could be used to address specific backlog issues within South Carolina. Over the course of the entire study, EPA analyzed data from 14 states, including South Carolina. Findings and opportunities that apply to all 14 states are discussed in the national chapter of the report. Each opportunity represents one potential approach among many to address the backlog. Discussion of the opportunities as a whole is intended as a starting point for further conversations among EPA, South Carolina and the other states on strategies to reduce the backlog. EPA will work with our partners to develop the backlog reduction strategies. Development of the strategies might include targeted data collection, reviewing particular case files, analyzing problem areas, and sharing best practices. Final strategies could involve actions from EPA, such as using additional program metrics, targeting resources for specific cleanup actions, clarifying and developing guidance, and revising policies. EPA, in partnership with states, is committed to reducing the backlog of confirmed UST releases and to protecting the nation's groundwater and land and communities affected by these releases.

CHAPTER NOTES

SOUTH CAROLINA DATA BY ATTRIBUTE

The following table provides details on the data elements of interest in this analysis. Data were provided by DHEC staff in 2008 and 2009 for use in this analysis. Several data elements of interest could not be addressed with the information available. All available data elements were analyzed and only those data elements that revealed informative patterns of interest are included in the report.

Data Element	South Carolina Data	Use in Analysis
Administrative Cost	Estimates were provided by DHEC staff.	Included in the “Program Summary” section and in the national chapter.
Affiliated Party	Data were obtained from the “RP” field in the “ust_payments.xls” file.	Used to calculate the number of releases associated with each unique RP.
Age	Age was calculated for closed releases by subtracting the confirmed release date from the closure date and dividing by 365. Age was calculated for open releases by subtracting the confirmed release date from the data date and dividing by 365. Any values less than -.1 were left blank. Values between -.1 and 0 were counted as 0. All dates were rounded to one decimal point. Ages of releases with insufficient or invalid data were left blank.	Variable in all analyses.
Cleanup Financing	Data were obtained from the “RELEASE_FIN_TYPE_CODE” data field from the “UST_REL.txt” file (see Finance Type Reference Table).	Examined in the “Cleanup Financing” section.
Cleanup Standards	No site-specific data available.	State-wide standards examined in the national chapter.
Closure Date	Data were obtained from the “CLEANUP_COMP” data field from the “UST_REL.txt” file. When a release had a valid date entry in this data field, it was used as the closure date for the release.	Included in the calculation of release age.
Confirmed Release Date	Data were obtained from the “CONFIRMED_DATE” and “RELEASE_DATE” fields from the “UST_REL.txt” file. When a release did not have a confirmed release date, the reported release date was used instead.	Included in the calculation of release age.
Data Date	May 4, 2009, is used for all records. This is the date the “UST_REL.txt” file was received.	Included in the calculation of release age.
Federally-Regulated LUST Releases	All releases in the “UST_REL.txt” file were marked as federally regulated.	Identified the appropriate universe of releases for analysis.
Finance Type	Data were obtained from the “RELEASE_FIN_TYPE_CODE” data field from “UST_REL.txt.”	No informative patterns were identified.
Free Product	Data were obtained from the “Rank” data field from “SC Database for EPA.xls.”	Examined in the “Presence of Free Product” section.
Institutional and Engineering Controls	No data available.	Not applicable (NA).
Latitude and Longitude	Data were obtained from the LUST facility geospatial data set downloaded from South Carolina’s GIS website (www.scdhec.gov/gis/GIS.aspx). Where possible, coordinates for releases without existing latitude and longitude values were obtained by EPA staff by geocoding address and street locations.	Used in geospatial analysis calculating the number of open releases within a one-mile radius of other open releases.
Lead	Data were obtained from the “RELEASE_FIN_TYPE_CODE” field in the “UST_REL.txt” file. Code “DS” indicates state-lead releases and code “WS” indicates RP-lead releases.	Examined in “Cleanup Financing” section.

Data Element	South Carolina Data	Use in Analysis
Media	Data were obtained from the "Type" data field in the "SC Database for EPA.xls" file (see Media Reference Table). Releases with groundwater contamination marked (in addition to any other media) were counted as "groundwater." Releases with only soil contamination marked were counted as "soil." Releases counted as "unknown" might include those for which there are no data available in the database, but for which information is available in other files, and releases at which the media contaminated are truly unknown.	Examined in the "Media Contaminated" section.
Methyl Tertiary Butyl Ether	No data available.	NA
Monitored Natural Attenuation (MNA)	Data were obtained from the list of releases in the "MNA through Aug4 2009.pdf" file.	Examined in the "Use of Monitored Natural Attenuation" section.
Number of Releases per Affiliated Party	Calculated as the total number of open releases associated a unique associated entity.	Examined in the "Number of Releases per Affiliated Party" section.
Orphan	No data available.	NA
Owner Type	Data were obtained from the "CATEGORY" data field in the "UST_TANKS.txt" field. These data list the types of tank owners tracked by DHEC, including federal, state, county or municipal government, and retail.	No informative patterns were identified.
Possible Property Transaction (Comfort Letter)	Data were obtained from eight lists of releases that had received comfort letters. Due to a small sample size, these data were not analyzed.	Data not suitable for analysis.
Proximity	Geospatial analysis performed by EPA revealed the number of other open releases located within a one-mile radius of each open release.	Examined in the "Geographic Clusters" section.
Public Spending	Data were obtained from the "PAID_AMT" field in the "ust_payments.xls" file. The reimbursement amount was adjusted for inflation using the 2008 Consumer Price Index based on the year of the date recorded in the "PYMT_DATE" data field in the "ust_payments.xls" field.	Examined in the "Cleanup Financing" section and in the national chapter.
Release Priority - Rank and Score	Data were obtained from the "Score" and "Rank" data fields from "SC Database for EPA.xls." Rank ranges from 1 through 5, with 1 being highest priority to 5 being lowest priority; 2A and 2B are usually used for high priority releases (see Release Priority Rank Reference Table). Scores are a calculated total score for a release based on individual score for each of the contaminants, derived by the measured value divided by the risk-based screening level. In addition, DHEC's project managers perform annual reviews of the rank classifications.	Examined in the "Release Priority" section.
RP Recalcitrance	No data available.	NA
Staff Workload	Data were obtained from "Historical PM inventory reports for backlog study.pdf" file.	Examined in the "Program Summary" section and in the national chapter.
Stage of Cleanup	Data were obtained from the "ST" field in "all releases through May 4 2009.xls" file (see of Cleanup Stage Reference Table). When a release did not have an entry in this data field, it was marked as "Confirmed Release."	Variable in all analyses.
State Fund Eligibility	Data were obtained from the "QUALIFIED_IND" field from the "UST_REL.txt" file. Releases that had a "Y" in this data field were counted as "State Fund Eligible;" releases that had an "N" in this data field were counted as "State Fund Ineligible;" releases with a blank entry in this data field were marked as "Unknown."	Examined in the "Cleanup Financing" section.
Status	Data were obtained from the "CLEANUP_COMP" field from the "UST_REL.txt" file. When a release had a valid date entry in this data field, it was marked as "Closed;" other releases were marked as "Open."	Identified the appropriate universe of releases for tree analysis.
Voluntary Cleanup Program	No data available.	NA

Media Reference Table

Type	Standard Media
[Blank]	Unknown
GW	Groundwater
SOIL	Soil
SOILGW	Groundwater
UNKNOWN	Unknown

Finance Type Reference Table

Code	Finance Type Description	Standard
CNQ	Cannot Qualify (not in South Carolina) - release cannot be funded by SUPERB because the UST system was not in substantial compliance at the time of the release.	Private Financing
DS	DHEC/SUPERB - release qualified for SUPERB and work is being done directly by DHEC on tank owner/operator's request. Cannot be used on deductible releases until deductible amount has been documented.	State Fund
QNW	Qualified Not Working - release is qualified for SUPERB but funding is not currently available based on priority classification.	State Fund
R25	Recoverable SUPERB Deductible - release is qualified for SUPERB but the UST owner/operator is unwilling or unable to do the required work under the deductible; SUPERB funds will be used to conduct work and the UST Program will seek cost recovery for funds expended.	State Fund
RS	Recoverable SUPERB - release is from an unknown source or the UST owner/operator is deceased, cannot be located, or is unwilling or unable to do the required work; SUPERB funds will be used to conduct work and the UST Program will seek cost recovery for funds expended.	LUST Trust

Code	Finance Type Description	Standard
T25	With Trust \$25,000 Deductible - release is qualified for SUPERB but the UST owner/operator is unwilling or unable to do the required work under the deductible; federal trust funds will be used to conduct work and the UST Program will seek cost recovery for funds expended.	State Fund
UNK	Unknown - used when the financial mechanism cannot be determined based on current information submitted.	Unknown
W25	With SUPERB \$25,000 Deductible - release was reported after June 30, 1993 period and the UST owner/operator is responsible for expending and documenting \$25,000 before SUPERB funds become available. Code changes to WS or DS once the deductible is met unless another code is appropriate.	State Fund
WC	With SUPERB Contract - release is SUPERB qualified but direct funding from the SUPERB account is not available based on the priority classification of the release; UST Program has provided technical approval and preapproved costs for future possible SUPERB reimbursement.	State Fund
WI	With Insurance - release activities are funded by an insurance policy.	Private Financing
WID	With Insurance Deductible - SUPERB fund is paying for the deductible of an insurance policy on a SUPERB qualified release.	Private Financing
WO	Without (not SUPERB eligible) - release is from a federal facility or non-petroleum UST.	Private Financing
WOC	Without Compensation (SUPERB eligible/qualified) - release is eligible or qualified for SUPERB, but the current scope of work is not being funded by SUPERB, or the owner owes the UST Program information necessary to qualify the release for SUPERB.	State Fund
WS	With SUPERB Funding - release qualified for SUPERB funding and work being conducted by the owner/operator or their selected contractor to directly bill the SUPERB account.	State Fund

Code	Finance Type Description	Standard
WT	With Trust - releases where site rehabilitation is being conducted utilizing federal monies.	LUST Trust

Stage of Cleanup Reference Table

Each release has multiple action records and releases were assigned to a specific stage of cleanup depending on the most recent release code. When a release did not have any relevant records, it was marked as "Confirmed Release."

ST	Release Code	Release Description	Stage
5	INACT	Currently Inactive	Confirmed Release
6	CONT	Contacted	Confirmed Release
1	CIRA	Conduct Invest/Risk Assessment	Site Assessment
7	APPROVED	Approved MNA	Site Assessment
8	AFUND	Awaiting Funding	Site Assessment
2	FPRO	Free Product Recovery Only	Remediation
3	MNA	MNA	Remediation
4	ACA	Active Corrective Action	Remediation

Rank	Rank Description
3AB	Water supply >1yr and <2yr downgradient
3AC	Sensitive habitats <1yr
3BA	Free product >0.01 foot thick
3BB	Chemicals detected n/potable
3BC	Hydrocarbon soil <3 feet below
3BD	Sensitive habitat <500 feet
3BE	Sensitive hydrologic setting
3BF	GW <15 feet in sand or gravel
4AA	Long term >2 yr threat
4AB	Water supply >2 yr <5 yr downgrade
4AC	n/potable <1 yr downgrade
4BA	Free product sheen in well
4BB	n/potable <1000 feet downgrade
4BC	GW <15 feet in silt or clay
5A	no pending threat, additional data
5B	Assessment data not conclusive
Unknown	Unknown

Release Priority Rank Reference Table

Rank	Rank Description
1A	Emergency situation
1B	Fire or explosion hazard
1C	Vapors or free product in structure/utility
1D	Chemicals detected in water
1E	Free Product on surface water
2AA	0-to-1 year threat to health
2AB	Water supply wells <1 yr downgradient
2BA	Free product >1 foot
2BB	Water supply wells <1,000 feet downgradient
3AA	Short-term 1-2 year threat