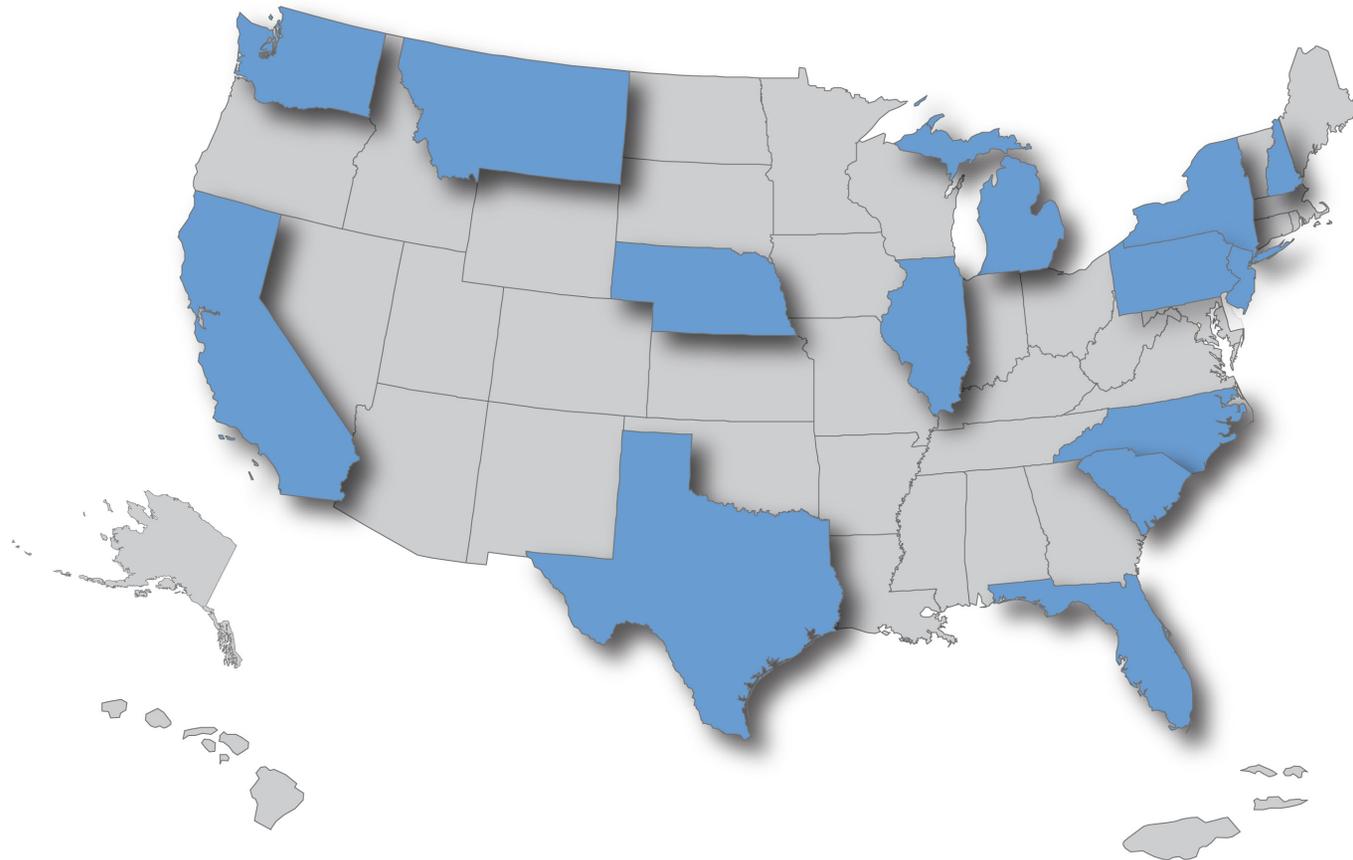


The National LUST Cleanup Backlog: A Study of Opportunities





THE NATIONAL LUST CLEANUP BACKLOG: A STUDY OF OPPORTUNITIES

STATE SUMMARY CHAPTER: PENNSYLVANIA

LIST OF ACRONYMS

eFACTS	Environment, Facility, Application, Compliance Tracking System
EPA	United States Environmental Protection Agency
ESA	Expedited Site Assessment
DEP	Pennsylvania Department of Environmental Protection
FY	Fiscal Year
LUST	Leaking Underground Storage Tank
MNA	Monitored Natural Attenuation
MSA	Multi-Site Agreement
MTBE	Methyl Tertiary Butyl Ether
NCR	Northcentral Region
NER	Northeast Region
NWR	Northwest Region
RP	Responsible Party
UST	Underground Storage Tank
USTIF	Underground Storage Tank Indemnification Fund
SCR	Southcentral Region
SER	Southeast Region
SWR	Southwest Region

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.² 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 the 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 PENNSYLVANIA DATA

Pennsylvania's Department of Environmental Protection (DEP) has made significant progress toward reducing its LUST cleanup backlog. As of May 2009, DEP had completed 12,146 LUST cleanups, which is 80 percent of all known releases in the state.³ At the time of data collection, there were 3,084 releases remaining in its backlog. Pennsylvania's backlog of active UST cleanups is approximately 20 percent of the total number of historical releases while the national state average is 29 percent.⁴ 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 Pennsylvania to participate in its national backlog study because Pennsylvania has one of the higher numbers of UST facilities and UST releases and, therefore, one of the ten largest backlogs in the United States. In this chapter, EPA characterized Pennsylvania's releases that have not been cleaned up, analyzed these releases based on categories of interest, and developed potential opportunities for DEP and EPA to explore that might improve the state's cleanup progress and reduce its backlog. Building on the potential cleanup opportunities identified in the study, EPA will continue to work with DEP to develop backlog reduction strategies.

In Pennsylvania, as in every state, many factors affect the pace of cleaning up releases such as the availability of state funds, whether cleanups ineligible for state funds have financing in place, and program structure. The recent economic downturn has also had an impact on the ability of many states to make progress on cleanups.

EPA included potential cleanup opportunities in this report even though current circumstances in Pennsylvania might make pursuing certain opportunities challenging or unlikely. Also, in some cases, DEP is already using similar strategies as part of

- 1 Data were provided in May 2009 by DEP staff and are not identical to the UST performance measures reported on EPA's website, available at: www.epa.gov/oust/cat/camarchv.htm.
- 2 EPA, *National Water Quality Inventory: 2000 Report*, pp. 50-52. www.epa.gov/305b/2000report/chp6.pdf.
- 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 According to Craig Olewiler, LUST Program Manager, Pennsylvania DEP.
- 5 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.

Pennsylvania LUST Data By the Numbers¹

National Backlog Contribution	3.3%
Cumulative Historical Releases	15,230
Closed Releases	12,146/80%
Open Releases	3,084/20%
Stage of Cleanup	
Confirmed Release	954/31%
Site Assessment	257/8%
Remediation	1,873/61%
Media Contaminated	
Groundwater	668/22%
Soil	477/15%
Other	38/1%
Unknown ⁵	1,901/62%
Median Age of Open Releases	7.9 years

its ongoing program. The findings from the analysis of DEP's data and the potential cleanup opportunities are summarized below in eight study areas: stage of cleanup, media contaminated, state regional backlogs, cleanup financing, presence of methyl tertiary butyl ether (MTBE) contamination, multi-site agreements (MSAs), geographic clusters, and data management.

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

Pennsylvania Finding	Potential Opportunity	Releases
20 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 still in site assessment. 	<ul style="list-style-type: none"> • Expedite site assessments at old releases to identify releases that can be closed with minimal effort or moved toward remediation. • Implement enforcement actions at stalled releases. • Encourage stakeholders to examine public and private funding options such as petroleum brownfields grants for low priority releases with no viable responsible party (RP). 	630
28 percent of releases are: <ul style="list-style-type: none"> • 10 years old or older; and • in remediation. 	Use a systematic process to explore opportunities to accelerate cleanups and reach closure, such as: <ul style="list-style-type: none"> • periodically review release-specific treatment technologies; • review site-specific cleanup standards; • consider use of institutional or engineering controls; and • implement enforcement actions if cleanup has stalled. 	867

Pennsylvania has releases that are taking a long time to move through the cleanup process, and Pennsylvania also has a large number of old releases in the early stages of cleanup. There are several reasons why many releases in the backlog are old including: remaining releases are complex and therefore take a long time to address, the RP has not performed required cleanup actions and DEP has not pursued enforcement, and some releases lack a viable RP. Nevertheless, EPA believes it is important for DEP to explore opportunities to accelerate cleanups at older releases and to make progress toward bringing all releases to closure.

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

Pennsylvania Finding	Potential Opportunity	Releases
62 percent of releases are not electronically tracked according to the type of media contaminated; these untracked releases are much older than those with known recorded media contamination.	Track media in the Environment, Facility, Application, Compliance Tracking System (eFACTS) database to support a routine and automated file review process.	1,901
7 percent of releases: <ul style="list-style-type: none"> • have not begun site assessment; and • impact soil only. 	Use expedited site assessments to identify releases with soil contamination that can be: <ul style="list-style-type: none"> • targeted for closure with minimal effort; and • moved more quickly into remediation. 	223

It is difficult to fully characterize Pennsylvania's backlog by type of media impacts due to the lack of available data for the majority of releases. Most of the releases with unknown media impacts have either begun site assessment or have completed site assessment and are in remediation; the media contaminated should be available for these releases because site assessment reports have been submitted to DEP. Reliable, regular data entry and proactive data management practices could identify releases that pose a higher risk to human health and the environment, as well as those that might be closed or moved into remediation. Of releases with recorded media impacts, many releases contaminate only soil and are still unaddressed or are in the early stages of remediation, even though soil contamination is relatively easy to remediate. These releases might pose a lower risk to receptors and be classified by DEP as "inactive." Nevertheless, EPA believes progress toward closure should continue for all cleanups.

State Regional Backlogs *(see page PA-13 for more details)*

Pennsylvania Finding	Potential Opportunity	Releases
Media contamination, release age, and data management of Pennsylvania's backlog vary among the DEP regions.	Develop region-specific strategies for moving releases toward remediation and closure.	Variable number of releases ⁶

EPA identified differences in the backlog among DEP's six regions. Often, areas of higher population result in areas of larger backlogs and property transfers provide incentives for cleanup, particularly in urban areas. Also, differences in geology and terrain can make releases in one part of the state more difficult to clean up than releases in other parts of the state. Differences in the management and administration of remedial actions might be causing differences in cleanup outcomes. These differences might reveal opportunities for region-specific backlog reduction. DEP should work with its regions to address their specific backlog issues.

Cleanup Financing *(see page PA-16 for more details)*

Pennsylvania Finding	Potential Opportunity	Releases
17 percent of releases: <ul style="list-style-type: none"> • have not begun site assessment; • are not eligible for the state fund; and • are 4.9 years old or older. 	Explore opportunities to move cleanups not eligible for the state fund into remediation and closure, including: <ul style="list-style-type: none"> • pursuing enforcement actions; • providing cleanup guidance; and • encouraging RPs and stakeholders to examine all available public and private funding options. 	521

EPA and state programs are interested in exploring successful financing strategies for completing cleanups quickly. EPA acknowledges that the recent economic downturn has impacted cleanup financing. EPA also believes the availability of funding for cleanup is essential to reducing the backlog, so in addition to this study, EPA is increasing its focus on oversight of state funds as well as conducting a study of private insurance.

In Pennsylvania, releases that occurred prior to 1994 are not eligible for state funds. For post-1994 releases, RPs have 60 days after a release's discovery to file a claim

⁶ Opportunities marked as "variable number of releases" relate to programmatic opportunities and affect an unknown number of releases, potentially including all open releases.

for the state fund. Nearly all of the releases with no known financial responsibility mechanism are significantly older than this 60-day timeframe and, therefore, are no longer eligible for state funding. RPs for privately-financed cleanups can initiate cleanup immediately upon discovery. Since many have not, these releases might not be adequately financed and might need additional assistance or attention to move the cleanups forward. DEP should explore opportunities to expedite this process, such as pursuing enforcement actions, providing guidance, or encouraging RPs and stakeholders to examine all available public and private funding options.

Presence of MTBE Contamination

(see page PA-18 for more details)

Pennsylvania Finding	Potential Opportunity	Releases
83 percent of releases with MTBE contamination are in remediation.	Reevaluate the current remedial plan and utilize optimal remedial technologies for the removal of MTBE.	496
	When MTBE is identified in the site assessment, continue to move quickly to address MTBE contamination to prevent migration into groundwater.	Variable number of releases
62 percent of releases in DEP's eFACTS database do not include a list of the contaminants present.	Evaluate contamination present and utilize optimal treatment technologies for contaminants.	1,900

MTBE can be a complicating factor at LUST releases. The majority of releases with MTBE in Pennsylvania are in remediation; as with any release in remediation, it is important to have a system in place for regular reevaluation of the cleanup strategy. Furthermore, EPA believes it is important to respond quickly to releases with MTBE contamination to prevent migration of the contaminants to groundwater, where they can be more difficult and costly to remediate. DEP already uses this approach where MTBE contamination is known. The majority of releases in DEP's eFACTS database do not have data on the contaminants present, which could facilitate effective response to MTBE contamination. Evaluating the contamination present at releases and consistently recording this information will help DEP to better characterize the state backlog and respond effectively.

Multi-Site Agreements *(see page PA-19 for more details)*

Pennsylvania Finding	Potential Opportunity	Releases
MSAs have yielded a relatively high proportion of closures.	Consider extending use of MSAs to additional releases.	Variable number of releases

DEP has forged two voluntary MSAs with RPs of multiple releases. Of the 330 sites included in these MSAs, 189 (57 percent) have been closed since 2001. This performance is promising, indicating DEP should consider the expanded use of MSAs with other RPs or the addition of more releases to the current MSAs to achieve more closures.

Geographic Clusters *(see page PA-20 for more details)*

Pennsylvania Finding	Potential Opportunity	Releases
20 percent of releases are clustered within a one-mile radius of five or more releases.	Target releases within close proximity for resource consolidation opportunities.	Targeted number of releases ⁷

Another multi-site approach DEP could use is targeting cleanup actions at geographically-clustered releases. This approach might offer opportunities for new community-based reuse efforts, using economies of scale, and addressing commingled contamination. EPA believes that highlighting geographic clusters of releases and working with state and local governments in area-wide initiatives will improve DEP's pace of cleaning up releases. EPA intends to work with the states to conduct further geospatial analyses on clusters of 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 Opportunities marked as "targeted number of releases" relate to geographic opportunities that will address a limited number of releases within select designated geographic areas.

Data Management *(see page PA-20 for more details)*

Pennsylvania Finding	Potential Opportunity	Releases
Several key data fields are not included, consistently maintained, or routinely tracked in DEP's eFACTS database.	Improve the eFACTS database to enhance program management and backlog reduction efforts.	Variable number of releases

Multiple data management limitations prevent a full assessment of the backlog and associated strategies for backlog reduction. Because of data limitations, EPA could not analyze a number of aspects of DEP's program including type of financial responsibility mechanism, contaminants of concern, and the types of media impacted by releases. Additional improvements to data management could allow for easier overall program management within DEP as well as provide an improved tool for developing strategies to reduce the cleanup backlog.

CONCLUSION

This chapter contains EPA's data analysis of Pennsylvania's LUST cleanup backlog and identifies potential opportunities to reduce the backlog in Pennsylvania. EPA discusses the findings and opportunities for Pennsylvania, along with those of 13 additional states, in the national chapter of this report. EPA will work with states to develop potential approaches and detailed strategies for reducing the backlog. 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 Pennsylvania Department of Environmental Protection (DEP) Bureau of Waste Management, Storage Tank Division, regulates underground storage tanks (USTs), including all registration, permitting, certification of third-party installers and inspectors, enforcement, and compliance requirements. The cleanup of leaking underground storage tank (LUST) releases is administered by the Remediation Service Division, Hazardous Sites and Storage Tanks Corrective Action Section in the Harrisburg Central Office. DEP's Environmental Cleanup Program in the six Regional Offices located throughout the state has the regulatory authority for enforcing tank regulations, including the financial responsibility requirements. DEP prioritizes regional staff time to review reports due to the requirement for review within 90 days; the reports are otherwise considered approved. The state's Underground Storage Tank Indemnification Fund (USTIF) is managed separately within the Pennsylvania Department of Insurance.

Cleanup Financing

USTIF makes claim payments to eligible owners or operators for damages caused by a release. To be eligible for funding, the release must have occurred on or after February 1, 1994, the owner must be in compliance with the permitting, registration, and applicable product fees required by the Pennsylvania Storage Tank and Spill Prevention Act, and a claim must be filed within 60 days of release discovery. Responsible parties (RPs) are responsible for paying a deductible per tank per occurrence for each UST that contributed to the release.

Cleanup Standards

There are four options for meeting LUST cleanup standards in Pennsylvania: (1) background levels, (2) state-wide health standards, (3) site-specific risk-based standards, and (4) a combination of standards. The RP is allowed to select the appropriate cleanup standard or combination of standards. RPs opting to remediate to site-specific standards are required to submit a remedial investigation report to DEP for review and approval. Releases cleaned up to either background or state-wide health standards were closed in significantly less time than releases where site-specific standards were applied (Table 1 to the right).¹¹ According to DEP, it is common for smaller releases with localized contamination to be cleaned up to the state-wide

Table 1. Age of Closed Releases by Type of Cleanup Standards

Type of Cleanup Standards	Number of Releases	Median Age at Closure
Background or State-wide Health Standards	1,009	6.3 years
Site-Specific Standards	588	8.7 years
Both Site-Specific and Background or State-wide Health Standards	89	9.7 years
No Data	10,460	7.4 years

Pennsylvania LUST Program At a Glance

Cleanup Rate

In fiscal year (FY) 2009, DEP confirmed 201 releases and completed 554 cleanups.⁸

Cleanup Financing

Of open releases, 46 percent (1,426 releases) have received state funding.

Cleanup Standards

The program allows background level, state-wide health standards, or risk-based cleanup approaches.

Priority System

Pennsylvania does not have a formal scoring system to prioritize cleanups.

Average Public Spending on Cleanup

\$180,818⁹

Releases per Project Manager

Each project manager is on average responsible for 116 open releases.¹⁰

Administrative Funding (2008)

\$2.7 million

⁸ Based on FY 2009 *UST Performance Measures End of Year Activity Report*.

⁹ Data provided by DEP staff based on information from the Financial Assurance Program for FY 2009.

¹⁰ Based on a total of 32 project managers spending 83 percent of their time on LUST releases.

¹¹ The Pennsylvania eFACTS database does not distinguish use of background level cleanup standards or state-wide health standards.

health standard, while site-specific risk-based standards are more often applied at larger releases with more extensive contamination.¹² Some cleanups include institutional controls.

Release Prioritization

DEP does not have a formal scoring system to prioritize the state's releases but does prioritize emergency cases for immediate response. The state classifies releases as "inactive" if six criteria are met: 1) no product is in the UST; 2) no free product is in the environment; 3) risks to human health have been mitigated; 4) there is not a strong potential for impacts to receptors; 5) an RP is not performing or planning to perform corrective action; and 6) a case is at least two years old. Releases might change status to active if the RP initiates cleanup. Such cases are mostly driven by property transactions. At the time of this analysis there were 3,298 inactive releases. Releases are closed by DEP when the required cleanup standards have been attained. Releases deemed inactive based on the six criteria are reported to EPA as cleanup completed but are not officially considered closed by DEP.

State Backlog Reduction Efforts

DEP has undertaken three efforts directed at reducing the state's backlog. The first is an ongoing file review that began in 2006, where DEP has worked with USTIF to identify and contact old state fund-eligible cleanups to notify RPs that cleanup action and filing of claims are required to retain their funding eligibility. This effort has led to the closure of 203 releases. The second effort was undertaken in 2008, when DEP's Southwest Regional Office hired interns to review old releases and update the Environment, Facility, Application, Compliance Tracking System (eFACTS) database. The third effort is ongoing and involves the administrative closeout of releases; when a new release occurs at a facility with a pre-existing release, the older release is administratively closed and the two cleanups are considered as a single cleanup. DEP has closed 891 releases through its administrative closeout process. Although contamination at these sites could persist from the previous release, the site continues in active remediation under the identity of the newer release.

¹² According to Craig Olewiler, LUST Program Manager, Pennsylvania DEP.

ANALYSIS AND OPPORTUNITIES

In this study, EPA analyzed Pennsylvania's federally-regulated releases that have not been cleaned up (open releases). EPA conducted a multivariate analysis on DEP's data.¹³ This technique provided an objective analysis of multiple release characteristics and allowed EPA to highlight the traits most commonly associated with older releases. Next, EPA divided the 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 DEP's data.¹⁵ 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 DEP might use as a starting point for collaborative efforts to address the backlog. Although EPA's analysis covered all releases in Pennsylvania, there are 387 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 eight areas of Pennsylvania's backlog with potential opportunities for its further reduction:

- Stage of cleanup
- Media contaminated
- State regional backlogs
- Cleanup financing
- Presence of methyl tertiary butyl ether (MTBE) contamination
- Multi-site agreements (MSAs)
- Geographic clusters
- Data management

LUST Data Source

Electronic data for LUST releases occurring between March 1979 and February 2009 were compiled by DEP staff in 2008 and 2009.¹⁴ Data were obtained from the Pennsylvania eFACTS and USTIF databases and selected based on quality and the ability to address areas of interest in this analysis.

Data Limitation – Release Date

Due to a software change in 2002, 25 percent of the releases prior to June 2002 (460 releases) do not have an accurate release date in the electronic database. The database instead lists a default date of August 5, 1989, for these releases. While the ages of these 460 releases between 1989 and 2002 are therefore overestimated, they were included in the analyses to incorporate all open releases and to illustrate the impact of using a default date for a large number of releases.

¹³ For a detailed description of the analytic tree method, see Appendix A.

¹⁴ For a detailed description of the Pennsylvania data used in this analysis, see the Chapter Notes section.

¹⁵ For a detailed description of release stages, see the Chapter Notes section (Stage of Cleanup Reference Table).

STAGE OF CLEANUP

As of March 2, 2009, the Pennsylvania backlog consisted of 3,084 releases. EPA analyzed the age of these LUST releases and their distribution among the stages of cleanup. To facilitate analysis, EPA classified Pennsylvania’s releases into three stages of cleanup: the Confirmed Release stage (releases where site assessment reports have not been submitted), the Site Assessment stage (releases where remedial plans have not been submitted), and the Remediation stage (releases where remedial plans have been received).¹⁶ While EPA grouped the releases into linear stages for this analysis, EPA recognizes cleanups might not proceed in a linear fashion. Cleanup can be an iterative process where releases go through successive rounds of site assessment and remediation. However, ultimately, this approach might be both longer and more costly. Acquiring good site characterization up front can accelerate the pace of cleanup and avoid the extra cost of repeated site assessment.

Pennsylvania Finding

20 percent of releases are either:

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

Potential Opportunity

Releases

- Expedite site assessments at old releases to identify releases that can be closed with minimal effort or moved toward remediation.
- Implement enforcement actions at stalled releases.
- Encourage stakeholders to examine public and private funding options such as petroleum brownfields grants for low priority releases with no viable RP.

630

Releases 5 years old or older in the Confirmed Release stage

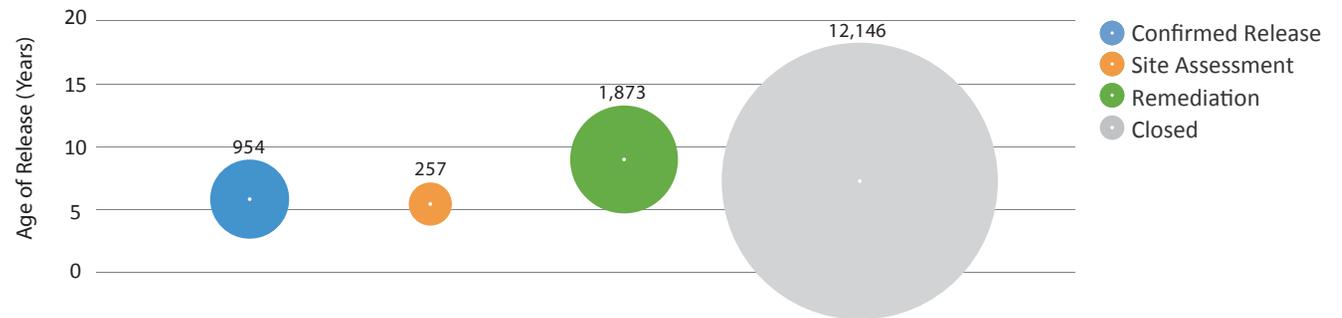
555

Releases 10 years old or older in the Site Assessment stage

75

Since Pennsylvania’s LUST program began, DEP has closed 12,146 releases, half of which were closed in fewer than 8.0 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. In addition, DEP has 3,298 inactive releases. Releases deemed inactive based on DEP’s six criteria are reported to EPA as cleanup completed but are not officially considered closed by DEP. These inactive releases are included in the closed numbers for this report. Also, national program policy allows states to report confirmed releases that require no further action at the 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



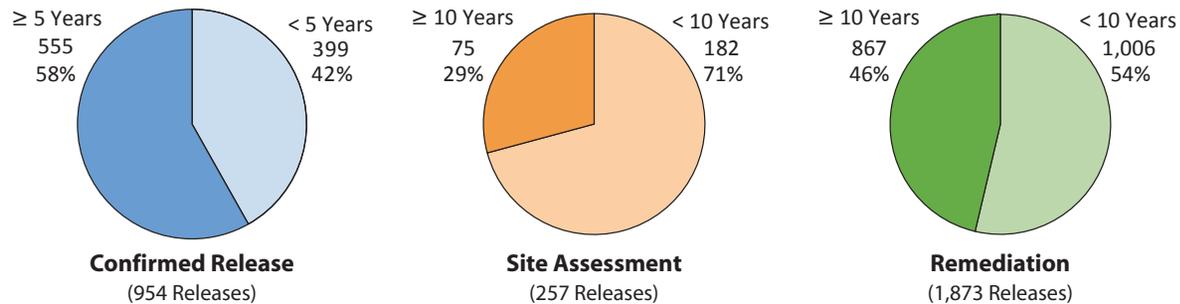
The white dot at the center of each circle represents the median age of releases. Each circle is labeled with, and scaled to, the number of releases within each stage. Included in the release counts and size of circles are 31 closed releases for which release age is unknown. These releases are not part of the median age calculation.

DEP has undertaken three efforts using file reviews to identify releases that can be moved more quickly through cleanup and closed; DEP closed over 1,000 releases through these combined efforts. Additional opportunities for closure with minimal effort are most likely found at lower risk 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.

¹⁶ Releases were classified into stages based on available data and discussion with DEP staff. For more information, see the Chapter Notes section.

Pennsylvania has many old LUST releases not in remediation. Figure 2 below shows the backlog of open releases by age and stage of cleanup. Figure 2 breaks out the 555 older releases (18 percent of the backlog) that have not been assessed five years or more after the releases were confirmed. It also shows 75 releases in the Site Assessment stage (2 percent of the backlog) that have not entered the Remediation stage, 10 years or more after the releases were confirmed. This subset of older releases in the early stages of cleanup accounts for 20 percent of Pennsylvania's total backlog. DEP's data indicate that these releases have not moved into remediation quickly. Many of these cleanups might be privately financed, in which case, DEP should consider enforcement actions to move stalled releases toward cleanup. For low priority releases without a viable RP, DEP could investigate the availability of additional funding sources through public/private partnerships such as petroleum brownfields grants.

Figure 2. Release Age Distribution among Stages of Cleanup



EPA encourages 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. To assist states and regulators in implementing these objectives, EPA developed its *Expedited Site Assessment (ESA) guide*.¹⁷ The guide explains the overall ESA process as well as specific site assessment tools and methods. The ESA process rapidly characterizes site conditions to help support cost-effective corrective action decisions. ESAs can identify releases that can be closed with minimal effort or will provide all the information needed to move a release into remediation. Conducting site assessments efficiently and quickly might help reduce the backlog by accelerating the pace of cleanup and ultimately decreasing overall project costs.

Pennsylvania also has many old releases in the Remediation stage. Twenty-eight percent of Pennsylvania's releases (867 releases) are in remediation and are 10 years old or older (Figure 2). This older group of releases represents 46 percent of all the releases in remediation (Figure 2). Because EPA only has the date that a release was confirmed but not when it moved from one stage to the next (e.g., from assessment to remediation), EPA can calculate the overall age of the release but not the actual time spent in the Remediation stage. It is possible that some of these releases might have only recently begun remediation. DEP should consider establishing a systematic process to evaluate existing releases in remediation and optimize cleanup approaches, including choice of technology and site-specific risk-based decision making. This process might save DEP resources and bring releases to closure more quickly. DEP can also continue to use institutional or engineering controls to reduce the time to closure by eliminating exposure pathways and allow for less stringent cleanup standards where protective and appropriate. Use of enforcement actions could also help move stalled releases through remediation to closure.

¹⁷ 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.

Pennsylvania Finding

28 percent of releases are:

- 10 years old or older; and
- in remediation.

Potential Opportunity

Releases

Use a systematic process 867

to explore opportunities to accelerate cleanups and reach closure, such as:

- periodically review release-specific treatment technologies;
- review site-specific cleanup standards;
- consider use of institutional or engineering controls; and
- implement enforcement actions if cleanup has stalled.

MEDIA CONTAMINATED

Groundwater is an important natural resource that is at risk from petroleum contamination. Groundwater contamination generally takes longer and is more expensive to clean up than soil contamination. In this study, EPA examined media as a factor contributing to the backlog. However, data on the type of media contaminated are not available for the majority of releases in Pennsylvania, so it is not possible to determine the true impact of this factor on cleanup rates in Pennsylvania. The following analysis classified contaminated media into four categories: groundwater (668 releases), soil (477 releases), other media, which includes vapor and surface water (38 releases), and “unknown” media, which includes releases with no media specified (1,901 releases).¹⁸

Pennsylvania Finding

62 percent of releases are not electronically tracked according to the type of media contaminated; these untracked releases are much older than those with known recorded media contamination.

Potential Opportunity

Track media in the eFACTS database to support a routine and automated file review process.

Releases

1,901

Pennsylvania Finding

7 percent of releases:

- have not begun site assessment; and
- impact soil only.

Potential Opportunity

Use expedited site assessments to identify releases with soil contamination that can be:

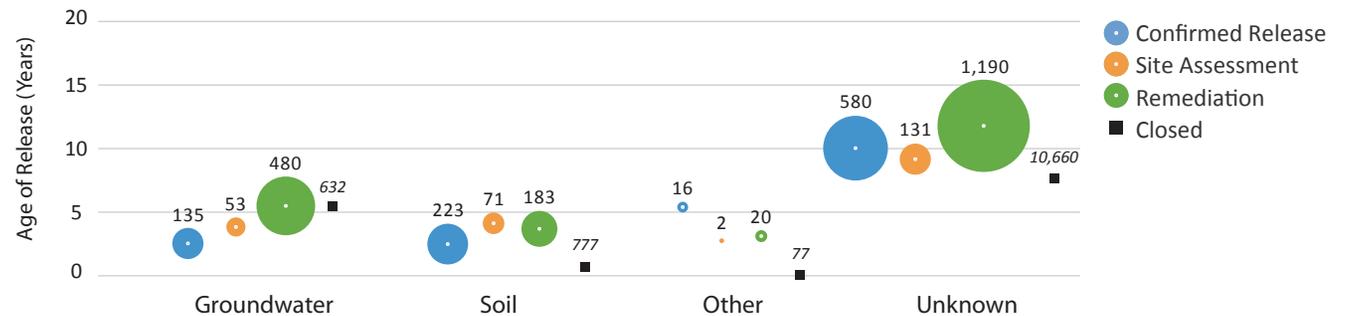
- targeted for closure with minimal effort; and
- moved more quickly into remediation.

Releases

223

DEP does not track the type of media contaminated for a large number of releases in its eFACTS database. These releases are much older than releases where media impacted is tracked. The media contaminated is not tracked electronically for 62 percent of releases (1,901 releases) in Pennsylvania (Figure 3 below). Of these unrecorded media releases, 1,321 releases (69 percent) are in the Site Assessment or Remediation stages (Figure 3). The media contaminated should be known for these releases because site assessment reports have been submitted to DEP. Cleanups with unrecorded media tend to be older than both groundwater and soil cleanups within each stage of cleanup (Figure 3).¹⁹ Reliable, regular data entry and proactive data management practices could identify releases that might be closed or moved on to remediation and closure.

Figure 3. 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.

The younger age of releases with documented groundwater or soil contamination suggests that media contamination has been more thoroughly tracked for recent releases.²⁰ Most of the groundwater and soil cleanups within the Remediation stage are 5 years of age or younger, indicating a relatively short time between release confirmation and initiation of remediation. However, DEP might be able to quickly address the 50 percent of soil cleanups that remain in the Confirmed Release stage (223 releases, 7 percent of the total backlog). DEP should consider the use of ESAs to help rapidly characterize site conditions and move releases into remediation and to closure sooner. Expediting site assessments might also identify releases that can be closed with minimal effort.

¹⁸ For a detailed description of media contamination classifications, see the Chapter Notes section.

¹⁹ This pattern remains consistent when the 460 releases with the default date are removed.

²⁰ Although the median ages for groundwater and soil cleanups would be older if the media contamination was known for the remaining two-thirds of open releases.

STATE REGIONAL BACKLOGS

EPA analyzed cleanup backlogs within DEP's six regions to identify patterns and opportunities for targeted backlog reduction strategies within each DEP region. Media contamination, release age, and data management of Pennsylvania's backlog vary among the six DEP regions (Figure 4 below, right and Table 2 below). Releases with unknown media contamination are a large portion of the backlog in all but the Northeast region (Table 2). In addition, the Northwest, Southeast, and Southwest regions have significantly more releases with unknown media than those releases with known media.

These regional backlogs might be related to regional workloads and reporting by DEP's regional staff. For example, DEP prioritizes regional staff time to review reports due to the requirement for review within 90 days; the reports are otherwise considered approved. Case managers are therefore more likely to devote time to reviewing reports and have less time to update data fields in the eFACTS database.

Releases with unknown media contamination appear to be significantly older within the Northcentral, Northwest, and Southcentral regions than in other regions (Figure 5 and Figure 6, Node 2.1, page 14). This observed difference in age of release is primarily due to the frequent use of the default release date in these regions (Figure 7, page 15).²² The Northeast and Southeast regions have actual release dates for the majority of their 722 unknown media releases (23 percent of the backlog), yet the more accurate median age of 11.7 years for these releases is still old, and media contamination should be known and

Table 2. Pennsylvania Backlog by DEP Region

	NWR	NCR	NER	SWR	SCR	SER
Cumulative Historical Releases	852	896	2,296	3,441	3,348	4,397
Closed Releases	640/75%	735/82%	1,861/81%	2,700/78%	2,850/85%	3,360/76%
Open Releases	212/25%	161/18%	435/19%	741/22%	498/15%	1,037/24%
Media						
Groundwater	9/4%	68/42%	164/38%	30/4%	157/32%	240/23%
Soil	7/3%	19/12%	180/41%	31/4%	102/20%	138/13%
Other	0/0%	2/1%	21/5%	0/0%	8/2%	7/1%
Unknown	196/93%	72/45%	70/16%	680/92%	231/46%	652/63%
Median Age of Open Releases	19.6 years	10.3 years	5.8 years	7.4 years	7.3 years	9.0 years

Pennsylvania Finding

Media contamination, release age, and data management of Pennsylvania's backlog vary among the DEP regions.

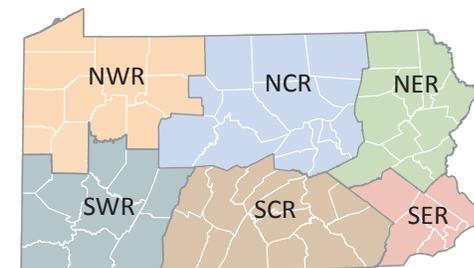
Potential Opportunity

Develop region-specific strategies for moving releases toward remediation and closure.

Releases

Variable number of releases²¹

Figure 4. DEP Regions

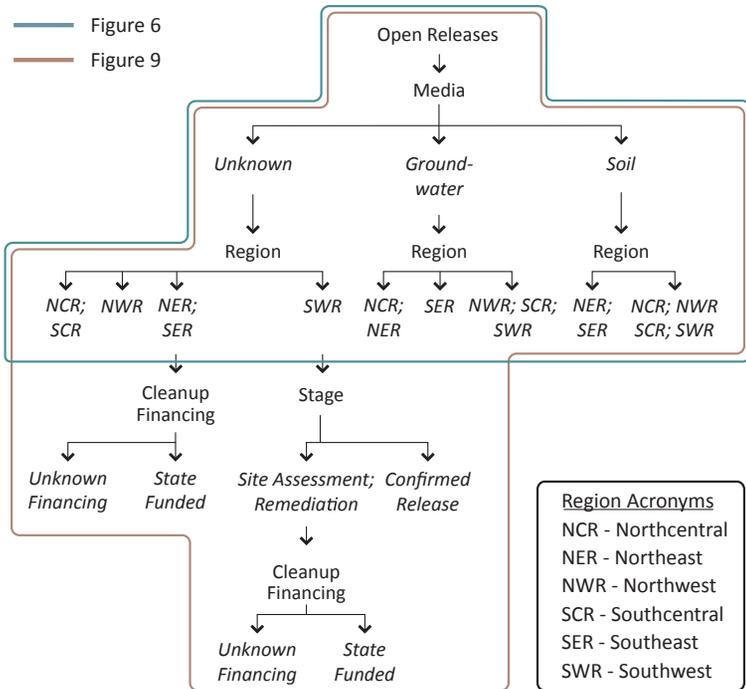


NCR - Northcentral Region
 NER - Northeast Region
 NWR - Northwest Region
 SCR - Southcentral Region
 SER - Southeast Region
 SWR - Southwest Region

²¹ Opportunities marked as "variable number of releases" relate to programmatic opportunities and affect an unknown number of releases, potentially including all open releases.

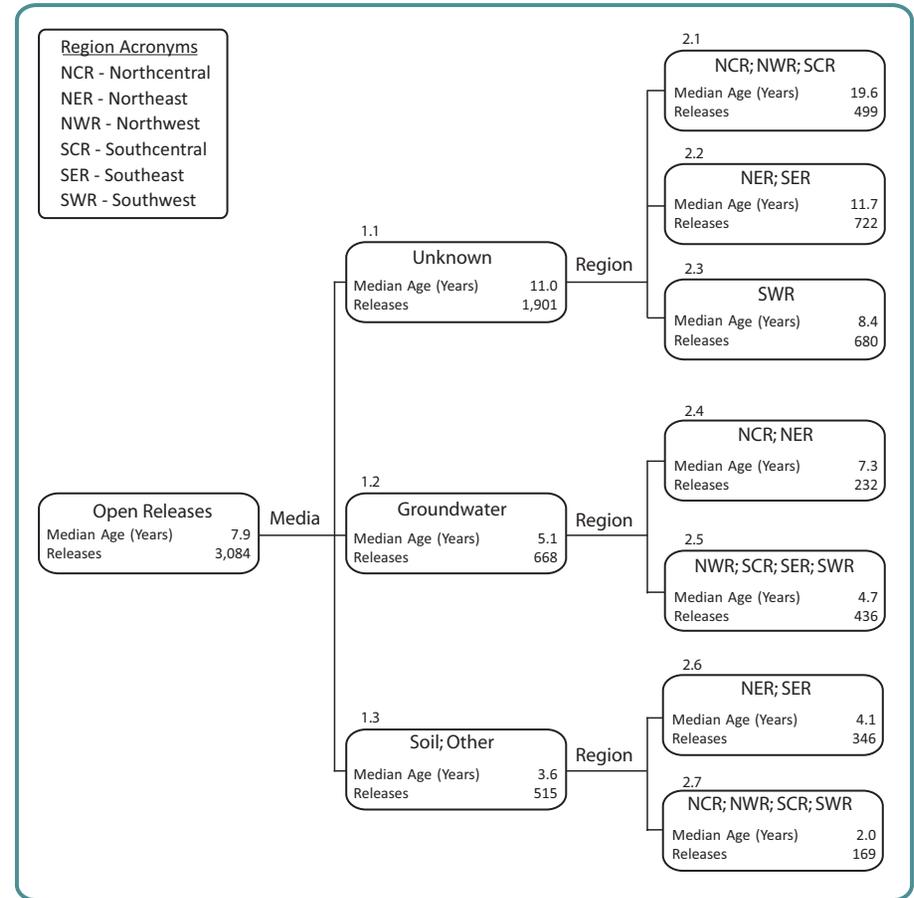
²² Many releases within these regions have a default release date of August 5, 1989, suggesting that the ages of many unknown media releases are overestimated.

Figure 5. Complete Tree Analysis of Open Release Age – Outline



A simplified outline of the analytic tree structure is shown above. Specific branches are shown in greater detail in Figures 6 and 9. For additional information on the analytic tree method, see the Chapter Notes section.

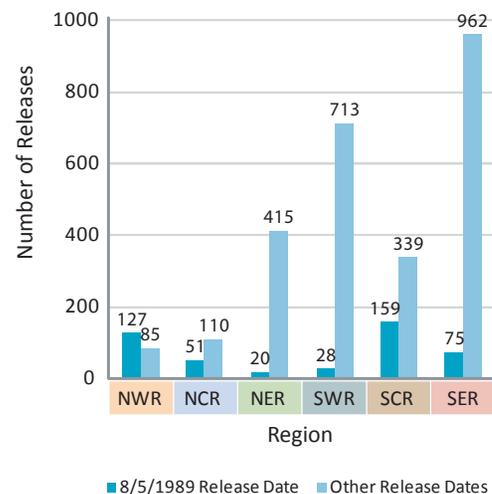
Figure 6. Tree Analysis of Open Release Age – First Level



tracked within this timeframe (Figure 6, Node 2.2). This finding might reflect the fact that project managers are responsible for data entry but have insufficient time for this activity.

Differences in regional backlogs also exist within releases with known media contamination. The Northcentral and Northeast regions have significantly older releases that affect groundwater than the other regions (Figure 6, Node 2.4). Within releases that impact soil and other media, the Northeast and Southeast regions account for more than two-thirds of these releases in Pennsylvania (346 releases) and these releases are on average two years older than similar releases in other regions (Figure 6, Node 2.6). These media-related age differences might be due to variation in regional geology settings or the distribution of tanks and releases or be a product of regional data management. Urban areas with larger populations can have a greater financial incentive for cleanup due to property transfers. A strategic regional approach to these unique backlog characteristics should help reduce the backlog. Performing regional file reviews to identify releases for expedited closure and to update the eFACTS database with reliable data could help improve regional program management and identify opportunities to reduce the backlog. EPA encourages DEP to look for opportunities to share best practices among its regions and with other states.

Figure 7. Frequency of Default Release Date Use among the Six DEP Regions

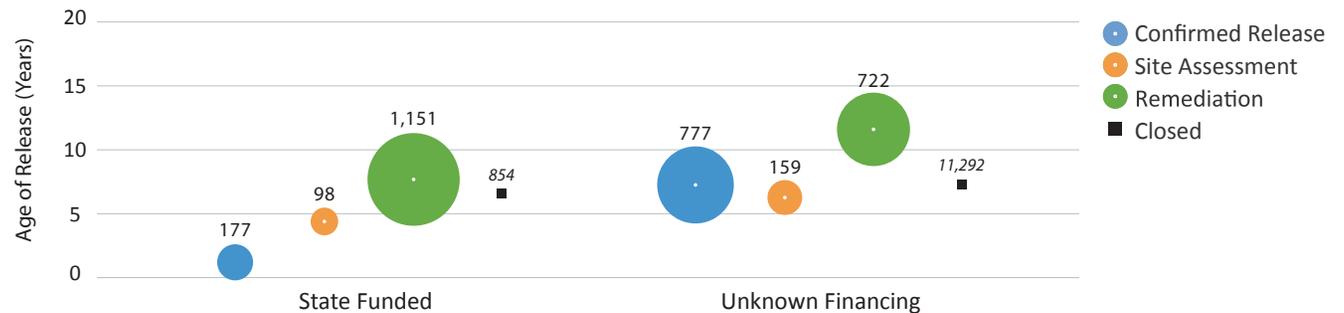


CLEANUP FINANCING

EPA and state programs are interested in exploring successful financing strategies for completing cleanups quickly. EPA acknowledges that the recent economic downturn has impacted cleanup financing. EPA also believes the availability of funding for cleanup is essential to reducing the backlog, so in addition to this study, EPA is increasing its focus on oversight of state funds as well as conducting a study of private insurance. EPA analyzed the age and stage of cleanups with respect to state-fund or unknown types of cleanup financing. Pennsylvania does not track whether a release is eligible for the state fund in the eFACTS database. The program’s insurance fund, USTIF, tracks all claim information.

Claims have been filed to Pennsylvania’s state fund for 1,426 releases (46 percent of the backlog). Nearly all state-funded cleanups are in the Remediation stage; these cleanups tend to be younger within each stage of cleanup compared to releases that have not filed claims to the fund (Figure 8 below). In addition, state-funded cleanups tend to be younger than releases with unknown cleanup financing within several subsets across the backlog (Figure 9, Nodes 1.2, 1.4, and 2.2, page 17).²³ For state fund eligible releases where claims have been filed but cleanup is not progressing, DEP sends a Notice of Violation if 180 days pass and the RP has not submitted a report. However, according to DEP, such a case might not go forward because of the resources needed to prosecute.

Figure 8. Age of Releases, by Stage of Cleanup and Cleanup Financing



Pennsylvania Finding

17 percent of releases:

- have not begun site assessment;
- are not eligible for the state fund; and
- are 4.9 years old or older.

Potential Opportunity

Releases

Explore opportunities to move cleanups not eligible for the state fund into remediation and closure, including:

- pursuing enforcement actions;
- providing cleanup guidance; and
- encouraging RPs and stakeholders to examine all available public and private funding options.

521

No data are available for financial mechanisms at the remaining 1,658 releases (54 percent of the backlog). Releases that occurred prior to 1994 are not eligible for state funds. For releases that occurred post-1994, RPs have 60 days after the date the release is discovered to file a claim to be eligible for the state fund. Nearly all of the 1,658 releases with no known financial responsibility mechanism are significantly older than 60 days and, therefore, are no longer eligible for state funding.

Within the Confirmed Release stage, releases with unknown financing are significantly older than releases that have received state funds (Figure 9, Nodes 1.2, 1.4, and 2.2). There are 241 unassessed releases (8 percent of the backlog) that are at least 12.4 years old with unknown cleanup financing and an additional 280 releases (9 percent of the backlog) with unknown financing that are between 4.9 and 12.3 years old (Figure 10, Node 2.3, page 17). This subset of older unassessed releases with unknown cleanup financing comprises 17 percent of Pennsylvania’s backlog. These releases might not be adequately financed and might need additional assistance or attention in order for cleanups to progress. Conducting outreach to RPs or

²³ See yellow nodes on Figure 9.

pursuing enforcement actions where necessary to initiate cleanup activities at state fund ineligible releases and moving them into remediation could further help to reduce the backlog. If releases are stalled, DEP should encourage RPs and stakeholders to pursue alternative public and private funding sources, particularly petroleum brownfields grants in the case of low priority releases with no viable RP.

Figure 9. Tree Analysis of Open Release Age – Second Level

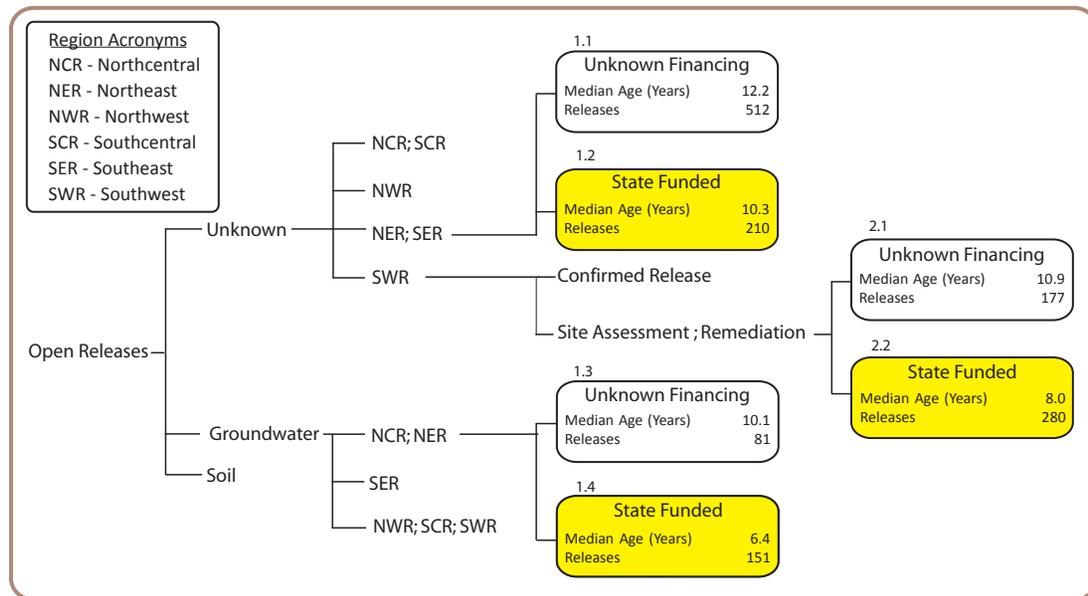
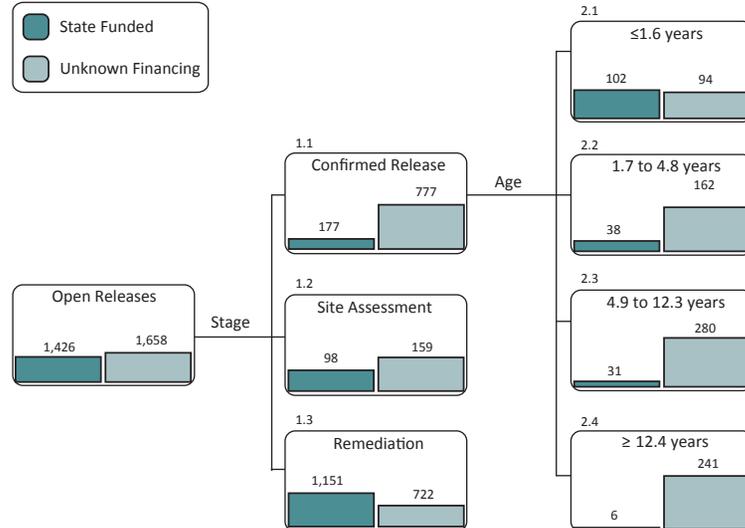


Figure 10. Backlog Distribution, by Cleanup Financing



PRESENCE OF MTBE CONTAMINATION

Pennsylvania Finding

83 percent of releases with MTBE contamination are in remediation.

Potential Opportunity

Releases

Reevaluate the current remedial plan and utilize optimal remedial technologies for the removal of MTBE. 496

When MTBE is identified in the site assessment, continue to move quickly to address MTBE contamination to prevent migration into groundwater. Variable number of releases

Pennsylvania Finding

62 percent of releases in DEP's eFACTS database do not include a list of the contaminants present.

Potential Opportunity

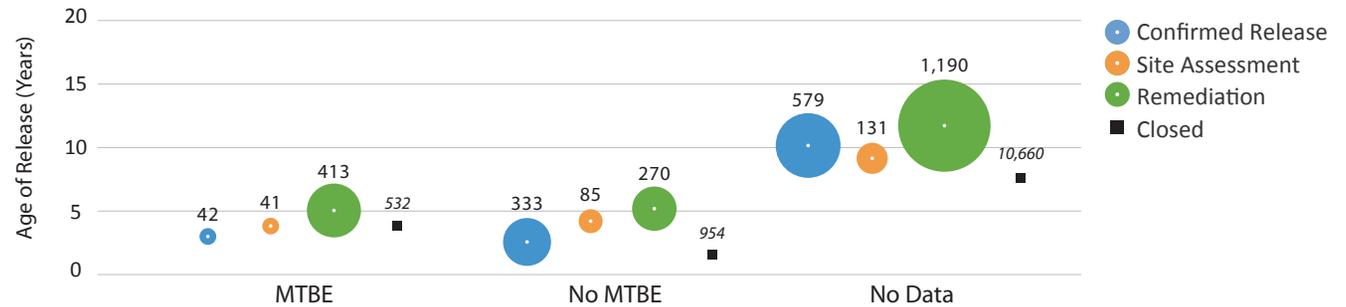
Releases

Evaluate contamination present and utilize optimal treatment technologies for contaminants. 1,900

DEP has data on contaminants for 38 percent of its backlog. MTBE is documented as present at 496 releases (16 percent of the backlog), 83 percent of which (413 releases) are in the Remediation stage (Figure 11 below). In contrast, only 39 percent of releases with no MTBE present (270 releases) are in the Remediation stage. No data are available for the presence or absence of MTBE or other contaminants at the remaining 1,900 releases (62 percent of the backlog).

Because MTBE is not readily degraded in groundwater, releases involving MTBE require more aggressive management and remediation than releases where MTBE is not present.²⁴ DEP should consider evaluating whether optimal treatment technologies are in use at releases with MTBE. Continuing to pursue active remediation of releases with MTBE and employing innovative technologies could allow for faster cleanups. Early response to releases contaminated with MTBE can minimize spread to groundwater. Efforts to track and address MTBE contamination in soil prior to migration into groundwater might help reduce future complex groundwater cleanups.

Figure 11. Age of Releases, by Presence of MTBE and Stage of Cleanup



24 For more information, see: [www.clu-in.org/contaminantfocus/default.focus/sec/Methyl_Tertiary_Butyl_Ether_\(MTBE\)/cat/Treatment_Technologies](http://www.clu-in.org/contaminantfocus/default.focus/sec/Methyl_Tertiary_Butyl_Ether_(MTBE)/cat/Treatment_Technologies).

MULTI-SITE AGREEMENTS

In 2001, DEP initiated the first of two voluntary MSAs with companies and RPs with multiple LUST releases. MSAs were designed to improve progress toward meeting cleanup goals while providing current owners with a measure of control over year-to-year costs. MSAs have been signed with BP Amoco and a joint MSA with Motiva Enterprises LLC, Jiffy Lube International, and the Pennzoil-Quaker State Company.

DEP credits MSAs with accelerating cleanups.²⁵ Cleanups are implemented to address contamination at a site, including sites with multiple LUST releases. Data were unavailable for the individual releases, but were provided for the site-level cleanup status (Figures 12 and 13 below). The MSA with BP Amoco includes 234 sites, 130 of which (55 percent) have been closed. The MSA with Motiva includes 96 sites, 59 of which (61 percent) have been closed. The majority of the remaining sites in both MSAs are in the Remediation stage. The MSA with Motiva has ended. Both MSAs resulted in significant closures and DEP should consider using MSAs with other RPs.

Pennsylvania Finding

MSAs have yielded a relatively high proportion of closures.

Potential Opportunity

Consider extending use of MSAs to additional releases.

Releases

Variable number of releases

Figure 12. BP Amoco Releases under an MSA, by Stage of Cleanup

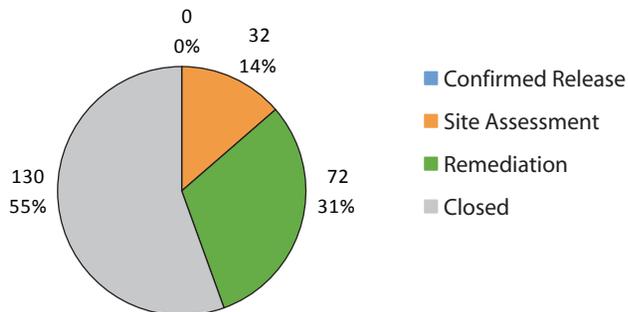
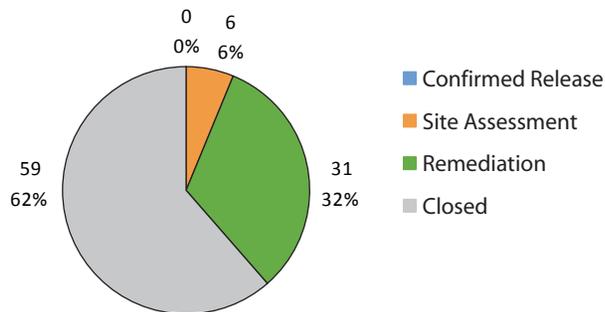


Figure 13. Motiva Releases under an MSA, by Stage of Cleanup



25 For more information on DEP's MSAs, see: www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1241&Q=455843&landrecwasteNav=|.

GEOGRAPHIC CLUSTERS

Pennsylvania Finding

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

Potential Opportunity

Target releases within close proximity for resource consolidation opportunities.

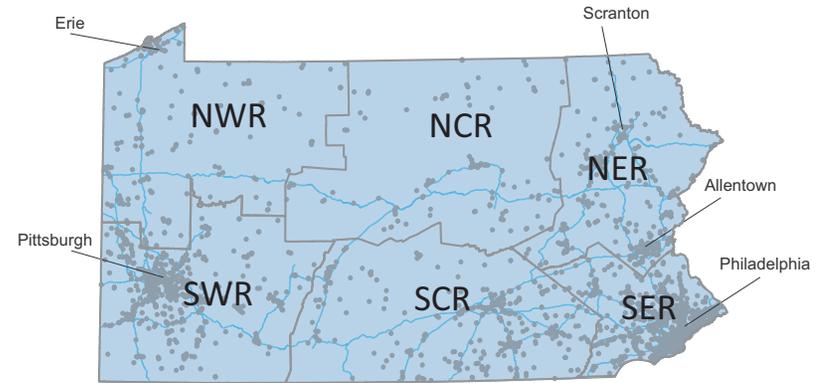
Releases

Targeted number of releases²⁶

EPA performed a geospatial analysis to look for different 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 might present 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.

State and local governments can utilize geographic clusters for area-wide planning efforts. EPA's analysis identified 623 releases (20 percent of releases) located within a one-mile radius of five or more releases (Figure 14 above). Of these releases, 137 (4 percent of releases) are located within a one-mile radius of 10 or more releases. Approaching the assessment and cleanup needs of an area impacted by LUSTs can be more effective than focusing on individual sites in isolation from the adjacent or surrounding area. Considering geographically-clustered releases might pave the way for new community-based revitalization efforts, economies of scale to yield benefits such as reduced equipment costs, and present opportunities to develop multi-site cleanup strategies, especially at locations with commingled contamination. EPA encourages states to look for opportunities for resource consolidation and 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. EPA intends to conduct further geospatial analyses on clusters of 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.

Figure 14. Map of All Releases, by DEP Region



DATA MANAGEMENT

Multiple database limitations prevent a full assessment of the backlog and associated strategies for backlog reduction. Notably, the absence of complete data for release date and the use of a default release date prevented an accurate analysis of release age. In addition, data for media contamination, type of financial responsibility mechanism, and contaminants of concern were incomplete and limited this analysis. In addition, there are regional differences in data entry based on how project managers enter and update the databases. Because case managers must review cleanup reports within specified timeframes, they might have insufficient time available to update data fields in the eFACTS database. DEP staff have performed data conversions and improved the LUST tracking system, but a legacy of poor data quality remains in the current eFACTS database. Additional improvements to database management could allow for easier overall program management as well as provide an improved tool for developing strategies to reduce the cleanup backlog.

Pennsylvania Finding

Several key data fields are not included, consistently maintained, or routinely tracked in DEP's eFACTS database.

Potential Opportunity

Improve the eFACTS database to enhance program management and backlog reduction efforts.

Releases

Variable number of releases

²⁶ Opportunities marked as "targeted number of releases" relate to geographic opportunities that will address a limited number of releases within select designated geographic areas.

CONCLUSION

In this state chapter, EPA presented the analysis of LUST data submitted by DEP and highlighted information on Pennsylvania's LUST program. Based on the analytic results, EPA identified potential opportunities that could be used to address specific backlog issues in Pennsylvania. Over the course of the entire study, EPA also analyzed data from 13 other states. 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, Pennsylvania, and the other states on strategies to reduce the backlog. EPA will work with the states to develop detailed strategies for reducing the backlog. Development of the strategies might include targeted data collection, reviewing particular case files, analyzing problem areas, and sharing best practices. The 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 the states, is committed to reducing the backlog of confirmed UST releases and to protecting the nation's groundwater and land and the communities affected by these releases.

Pennsylvania LUST Program Contact Information

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[www.depweb.state.pa.us/landrecwaste/
cwp/view.asp?a=1241&O=461919&landrecw
asteNav=|30816|](http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1241&O=461919&landrecwasteNav=|30816|)

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Underground Storage Tanks Indemnification
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CHAPTER NOTES

PENNSYLVANIA DATA BY ATTRIBUTE

The following table provides details on the data elements of interest in this analysis. Data were provided by DEP 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	Pennsylvania Data	Use in Analysis
Administrative Cost	Estimates were provided by DEP staff.	Included in the "Program Summary" section and in the national chapter.
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.
BP Amoco MSA	Data were obtained from the "facility_id" field in the "BP_site_inventory_list_2_24_2009.xls" file downloaded from the DEP website (www.depweb.state.pa.us/landrecwaste/cwp/view.asp?a=1241&Q=455843&landrecwasteNav=). Releases located at a BP facility currently listed under BP MSA were marked as "BP MSA site."	Examined in the "MSAs" section.
Cleanup Standards	Data were obtained from the "Milestone" field in "Closed_Standard_met.xls." There are two different entries in "Milestone" field: "RACRS - Cleanup Complete to Site Specific Standard" and "RACRB - Cleanup Complete to Background or Statewide Health Standard." Therefore, a release was marked as either type of cleanup standards or as using both standards. Because these data are available mostly on closed releases, it is not included in analyses that involve only open releases.	Site-specific standards examined in the "Program Summary" section. State-wide standards examined in the national chapter.
Closure Date	Data were obtained from the "Date Status" field in the "Backlog Data 3-2-09.xls" file.	Included in the calculation of release age.
Confirmed Release Date	Data were obtained from the "Rel Conf Date" and "Rel Susp Date" fields in the "Backlog Data 3-2-09.xls" file. DEP staff cautioned that 95 percent of the pre-2002 releases still have the default date "8/5/1989" as their confirmed release date ("Rel Conf Date"); others have been updated based on dates on the paper files. DEP staff suggested that the suspect release date ("Rel Susp Date") could be used to replace the default confirmed release date because suspect release dates are real dates (no default used); however, applying this method only affected one record (from 8/5/1989 to 8/1/1989).	Included in the calculation of release age.
Data Date	March 2, 2009, is used for all records. This is the date the data were sent.	Included in the calculation of release age.
DEP Region	Data were obtained from the "Org Code" field in "Backlog Data 3-2-09.xls." Each of the releases was assigned to one of the six DEP regions in Pennsylvania (Ord Code = 4100 is Region "SER" etc.).	Independent variable in all analyses.
Federally-Regulated LUST Releases	Data were obtained from the "Status" field in the "Backlog Data 3-2-09.xls" file. Releases with a value of 2, 3, 4, 5, or 8 in this field were included (see Status Reference Table).	Included the appropriate universe of releases for analysis.
Free Product	No data available.	Not Applicable
Institutional and Engineering Controls	No data available.	Not Applicable
Latitude and Longitude	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.

Data Element	Pennsylvania Data	Use in Analysis
Media	Data were obtained from the “Env Impacts Desc” field in the “Backlog Data 3-2-09.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 with any other combination of media were counted as “other.” 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.
Monitored Natural Attenuation (MNA)	Data were obtained from the “Remedial Code Desc” field in the “Backlog Data 3-2-09.xls” file. Releases with a value of “Natural Attenuation” in the “Remedial Code Desc” field were marked as using MNA; other releases were marked as not using MNA.	No informative patterns were identified.
MTBE	Data were obtained from the “Chemical Desc” field in the “Backlog Data 3-2-09.xls” file.	No informative patterns were identified.
Number of Releases per RP	No data available.	Not Applicable
Orphan	No data available.	Not Applicable
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	No data available for public spending on individual releases. However, Pennsylvania provided an estimated cleanup cost of \$180,818 per release on average from its Financial Assurance Program (USTIF).	Average cleanup cost examined in the “Program Summary” section.
Release Priority	The only priority system that DEP uses is a specific status code “5” (from the “Status” field in Backlog Data 3-2-09.xls), which indicates “low priority.” By definition these “low priority” releases are also considered “closed;” DEP does not prioritize cleanups among open releases.	Not Applicable
RP	No data available.	Not Applicable
RP Recalcitrance	Data were obtained from facility IDs listed in the “State Lead” worksheet in the “Tank_Funded_Proj._FY08_1-09 re-run 4-16-09.xls” file.	No informative patterns were identified.
Staff Workload	DEP staff workload is estimated at 116 cases per project manager, based on 32 staff and 83 percent of their time working on 3,084 open LUST releases.	Examined in the “Program Summary” section and in the national chapter.
Stage of Cleanup	Data were obtained based on values in the “Milestone” field in the “Backlog Data 3-2-09.xls” file. For example, open releases with a value of “NOC” in the Milestone field (“NOC” is “Notification of Contamination Form Received”) are grouped into the “Confirmed Release” stage; open releases with a value of “SCRR” in the Milestone field (“SCRR” is “Site Characterization Report Received”) are grouped into the “Site Assessment” stage; and open releases with a value of “PROGR” in the Milestone field (“PROGR” is “Remedial Action Progress Report Received”) are grouped into the “Remediation” stage (see Stage of Cleanup Reference Table).	Variable in all analyses.
State Funded	Data were obtained from the “Facility ID” field in the “12-31-08_DEP_Regions_Report_All_Regions.xls” file. If a facility was listed as having an open claim, the releases at the facility were marked as “State Fund.”	Examined in the “Cleanup Financing” section.
Status	Data were obtained from the “Status” field in the “Backlog Data 3-2-09.xls” file. Releases that had a status code of 3, 4, 5, or 8 were marked as “Closed;” releases that had a status code of 2 were marked as “Open” (see Status Reference Table).	Identifies the appropriate universe of releases for tree analysis.
Voluntary Cleanup Program	No data available.	Not Applicable

Media Reference Table

Releases are assigned the environmental impacts in the eFACTS database. These data were used to identify the media contaminated.

Environmental Impacts	Environmental Impacts Description	Media
CONTD	Release Contained - No Environmental Impact	Other
ECOR	Ecological Receptors	Other
GW	Ground Water	Groundwater
SED	Sediment	Other
SOIL	Soil	Soil
SW	Surface Water	Other
VAPOR	Vapors/Product in Basements	Other
WS	Water Supplies	Other

Stage of Cleanup Reference Table

Each release has various milestone dates documented in the eFACTS database. These data were used to identify the stage of cleanup.

Milestone	Milestone Description	Stage
NOC	Notification of Contamination Form Received	Confirmed Release
NORV	Verbal Notification of Reportable Release Received	Confirmed Release
NORWF	Follow-up - Written Notification of Reportable Release Received	Confirmed Release
NORWI	Initial - Written Notification of Reportable Release Received	Confirmed Release
OWNER	Owner Written Notification of Contamination	Confirmed Release
SC310	310(B) Site Characterization Report Received	Site Assessment
SCRBW	Site Characterization Report Received - Background/Statewide	Site Assessment
SCRR	Site Characterization Report Received	Site Assessment
SCRS	SS Site Char. Report Received - Site Specific	Site Assessment
SCRV	Site Characterization Report Reviewed	Site Assessment
PRCPL	Post Remediation Care Plan Received	Remediation
PROGR	Remedial Action Progress Report Received	Remediation
PRREP	Post Remediation Report Received	Remediation
QSTAT	Quarterly Status Report Received	Remediation
RACPV	Remedial Action Completion Report Reviewed	Remediation
RACRB	Remedial Action Complete Rep Received - Background/Statewide	Remediation

Milestone	Milestone Description	Stage
RACRR	Remedial Action Completion Report Received	Remediation
RACRS	SS Remedial Action Completion Report Received - Site Specific	Remediation
RAPBW	BG/SW Remedial Action Plan Received - Background/Statewide	Remediation
RAPR	Remedial Action Plan Received	Remediation
RAPS	SS Remedial Action Plan Received - Site Specific	Remediation
RAPSU	Verbal Notification of Remedial Action Plan Suspension Received	Remediation
RAPV	Remedial Action Plan Reviewed	Remediation
RPROG	Remedial Action Progress Report Received	Remediation
NUAQR	Non-Use Aquifer Request Received	Not Applicable
USTIF	USTIF Claim Notification Received	Not Applicable
90DAY	90 Day Interim Report	Not Applicable
COVEN	Covenant Received	Not Applicable
EXTRQ	Extension Request from RP	Not Applicable
MSTAT	Monthly Status Report Received	Not Applicable

Status Reference Table

Each release is assigned one status in the eFACTS database. These data were used to identify federally-regulated USTs and their status.

Status Description	Status Comment	Federally-Regulated LUST Releases	Release Status (Open/Closed)
Interim Remedial Actions Not Initiated	A confirmed release where no cleanup was initiated (open case but not counted as active/ongoing cleanup); this information is not included in the backlog number that DEP reports to EPA.	No	Not Applicable
Interim or Remedial Actions Initiated	The backlog number that DEP reports to EPA.	Yes	Open
Attainment Monitoring in Progress	Part of the closed releases information that DEP reports to EPA.	Yes	Closed
Cleanup Completed	Part of the closed releases information that DEP reports to EPA.	Yes	Closed
Inactive	Part of the closed releases information that DEP reports to EPA. There are six criteria that need to be met for a site to remain inactive - inactive releases are considered closed but not complete (complete means that cleanup standards must be met).	Yes	Closed
Suspected Release - Investigation Pending or Initiated	This is a suspected release and is not considered as a release until confirmed.	No	Not Applicable
Suspected Release - Invest. Complete, No Release Confirmed	Releases were not confirmed and therefore are not counted as a release.	No	Not Applicable
Administrative Close Out	This is part of the closed releases that DEP reports to EPA.	Yes	Closed