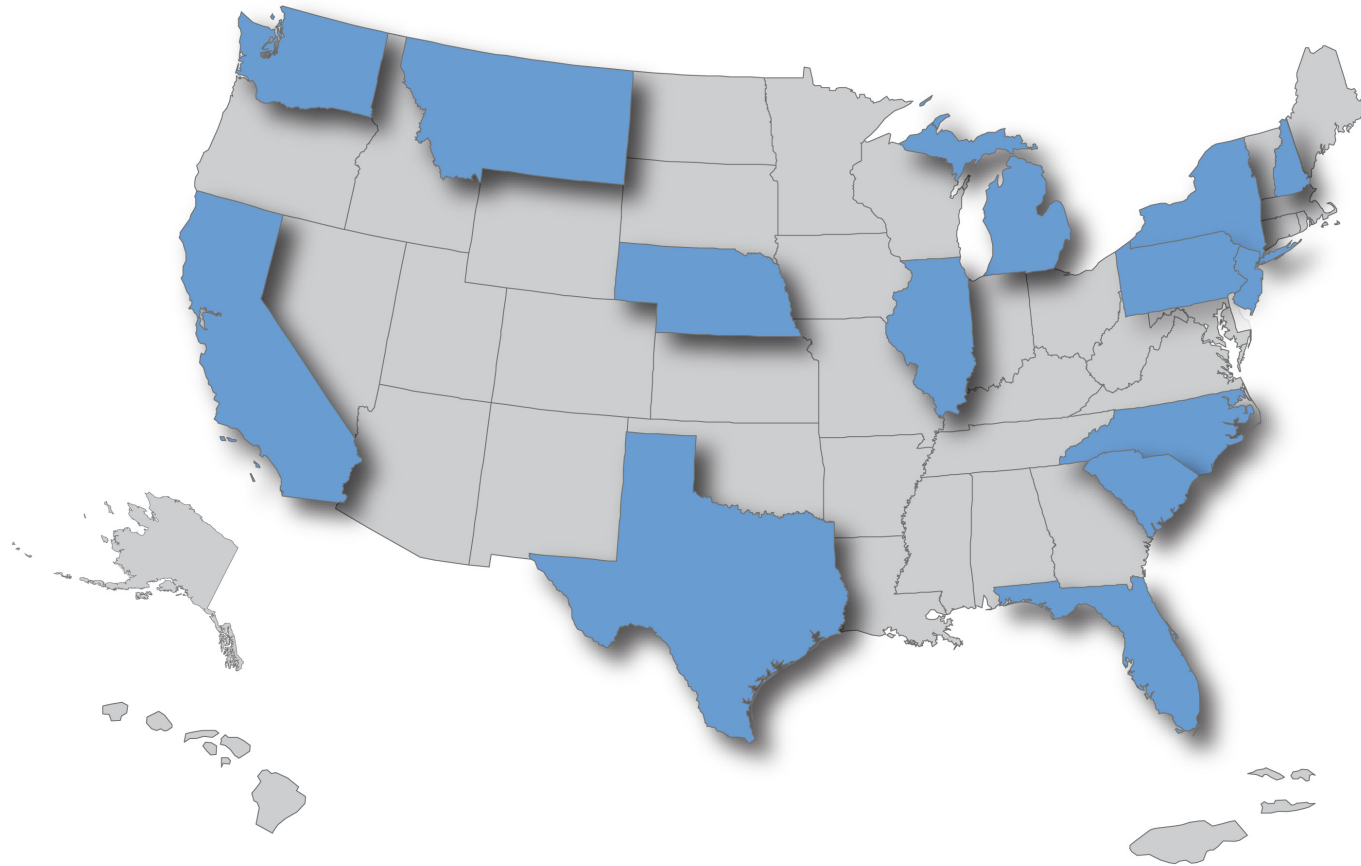


The National LUST Cleanup Backlog: A Study of Opportunities





THE NATIONAL LUST CLEANUP BACKLOG: A STUDY OF OPPORTUNITIES

STATE SUMMARY CHAPTER: MICHIGAN

LIST OF ACRONYMS

APC	Approved Partial Closure
DEQ	Michigan Department of Environmental Quality
EPA	United States Environmental Protection Agency
ESA	Expedited Site Assessment
FY	Fiscal Year
LUST	Leaking Underground Storage Tank
MNA	Monitored Natural Attenuation
MSA	Multi-Site Agreement
MTBE	Methyl Tertiary Butyl Ether
MUSTFA	Michigan Underground Storage Tank Financial Assurance
PRP	Potentially Responsible Party
RBCA	Risk-Based Corrective Action
RP	Responsible Party
TRP	Temporary Reimbursement Program
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.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 these confirmed releases needing closure, 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 MICHIGAN DATA

Michigan's Department of Environmental Quality (DEQ) has made significant progress toward reducing its LUST cleanup backlog. As of April 2009, DEQ had completed 12,623 LUST cleanups, which is 58 percent of all known releases in the state. At the time of data collection, there were 9,169 releases remaining in its backlog.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 Michigan to participate in its national backlog study because Michigan has one of the ten largest backlogs in the United States.

In this chapter, EPA characterized Michigan's releases that have not been cleaned up, analyzed these releases based on categories of interest, and developed potential opportunities for DEQ 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 DEQ to develop backlog reduction strategies.

In Michigan, 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. The recent economic downturn has also had an impact on the ability of many states to make progress on cleanups. The LUST program in Michigan in particular has faced significant budget and staffing shortfalls in the last several years, limiting DEQ's ability to reduce the backlog.

Michigan LUST Data By the Numbers¹

National Backlog Contribution	8.9%
Cumulative Historical Releases	21,792
Closed Releases	12,623/58%
Open Releases	9,169/42%
Stage of Cleanup	
Confirmed Release	3,025/33%
Site Assessment/ Remediation ³	6,144/67%
Media Contaminated	
Groundwater	8,816/96%
Soil	1/<1%
Unknown ⁵	352/4%
Median Age of Open Releases	14.0 years

- 1 Data were provided by DEQ staff in April 2009 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 DEQ's Storage Tank Information Database does not provide a method for distinguishing between releases in the Site Assessment and Remediation stages.
- 4 EPA tracks individual releases rather than sites in its performance measures. Therefore, the analyses in this report account for numbers of releases, not sites.
- 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.

EPA included potential cleanup opportunities in this report even though current circumstances in Michigan might make pursuing certain opportunities challenging or unlikely. Also, in some cases, DEQ is already using similar strategies as part of its ongoing program. The findings from the analysis of DEQ's data and the potential cleanup opportunities are summarized below in nine study areas: stage of cleanup, media contaminated, release priority, cleanup financing, state district backlogs, presence of methyl tertiary butyl ether (MTBE) contamination, use of monitored natural attenuation (MNA), number of releases per potentially responsible party (PRP), and geographic clusters.

Stage of Cleanup *(see page MI-11 for more details)*

Michigan Finding	Potential Opportunity	Releases
26 percent of releases: <ul style="list-style-type: none"> are 5 years old or older; and have not started site assessment. 	<ul style="list-style-type: none"> Use expedited site assessments or encourage responsible parties (RPs) to use expedited 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. 	2,426
50 percent of releases are: <ul style="list-style-type: none"> 10 years old or older; and in site assessment/remediation. 	Identify opportunities to move releases toward remediation and to closure, such as: <ul style="list-style-type: none"> expediting site assessments; periodically reviewing release-specific treatment technologies; reviewing site-specific cleanup standards; continuing use of institutional or engineering controls; and implementing enforcement actions if cleanup has stalled. 	4,621

Michigan's releases are taking a long time to move through the cleanup process, and many old releases are in the early stages of cleanup. There are several reasons why many releases in the backlog are old including: releases with no liable party to perform the cleanup; many releases are complex and therefore take a long time to address; and releases that remain unaddressed in the backlog for reasons such as a low priority ranking. EPA recognizes DEQ's funding limitations and the amount of staff effort necessary to adhere to the state's statute regarding causation. Nevertheless, EPA believes it is important for DEQ to explore opportunities to accelerate cleanups at older releases and to make progress toward bringing these old releases to closure.

Media Contaminated *(see page MI-14 for more details)*

Michigan Finding	Potential Opportunity	Releases
50 percent of releases: <ul style="list-style-type: none"> are 10 years old or older; are in site assessment/ remediation; and contaminate groundwater. 	Systematically evaluate cleanup progress at old releases with groundwater impacts and consider alternative cleanup technologies or other strategies to reduce time to closure.	4,611

Releases contaminating groundwater have always been the largest part of the national backlog and 96 percent of releases in Michigan are documented as contaminating groundwater. In general, groundwater contamination is more technically complex to remediate and 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. DEQ is faced with a large backlog of releases, almost every one of which impact groundwater resources. Nevertheless, EPA encourages DEQ to continue to work toward bringing all releases to closure.

Release Priority *(see page MI-15 for more details)*

Michigan Finding	Potential Opportunity	Releases
16 percent of releases are high priority releases considered to be an immediate risk to human health.	Expedite site assessments and evaluate cleanup progress of high priority releases to ensure that: <ul style="list-style-type: none"> all releases are appropriately ranked; releases with immediate risk are actively being worked on; and all releases make progress toward closure. 	1,446
10 percent of releases are low priority releases, half of which are 15 years old or older.	Explore opportunities to expedite the remediation and closure of low priority releases, including: <ul style="list-style-type: none"> using targeted backlog reduction efforts to close low priority releases; using enforcement actions for stalled releases when necessary; and examining public and private funding options such as petroleum brownfields grants for low priority releases. 	888
33 percent of releases have not been assigned a priority classification due to a lack of site characterization information.	Expedite site assessments and track information to assign initial priority classifications for releases with unknown priority to: <ul style="list-style-type: none"> ensure that releases with immediate risk are actively being worked on; and identify those that could be closed with minimal effort. 	3,025

An appreciable number of releases are considered high priority by the state and still remain open after a considerable length of time. Sixteen percent of the backlog consists of high priority releases that are still being addressed. Some of these are state lead cleanups; the others are led by RPs. In an effort to work within its resource limitations for releases needing state funds for cleanup, DEQ staff work at releases until the immediate risks are addressed and then direct resources to other high priority releases. An additional 33 percent of releases have not been assigned a priority due to lack of site characterization information. Some of these releases could end up being high priority. With Michigan's budget limitations in mind, EPA will work with DEQ to develop strategies to move all releases toward closure and to ensure that there are no immediate risks to human health and the environment from the high priority releases that have not been addressed.

Low priority releases and releases that have not been prioritized constitute over 40 percent of the backlog and offer opportunities for backlog reduction. Expediting site assessments, tracking information on priority, using enforcement actions and considering public and private funding are all options which might move releases more quickly to remediation and closure.

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

Michigan Finding	Potential Opportunity	Releases
PRPs are listed for 89 percent of “inactive” or “stopped” releases in Michigan’s backlog.	<ul style="list-style-type: none"> Explore options for conducting liability determinations for all PRPs; Conduct outreach to PRPs; or Pursue enforcement actions where necessary to initiate cleanup activities. 	Variable number of releases ⁶
	Explore additional funding options to address the large number of orphan releases in Michigan, such as public/private partnerships.	Approximately 4,500 releases ⁷

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.

Michigan’s LUST program has faced budget and staffing shortfalls over the last several years. The biggest impact to DEQ’s program has been the loss of the state fund to finance cleanups in the state. In addition, under Michigan’s causation-based liability law, a PRP is liable for the cleanup if the PRP caused the release, or if they become the PRP after March 6, 1996, and did not provide a Baseline Environmental Assessment within a prescribed time. The current facility owner might not be responsible for an older release that occurred prior to their purchase, occupancy, or foreclosure, and the state has the burden of proof in establishing liability. Due to this causation liability standard, DEQ’s LUST program has to invest significant resources to identify and hold a PRP liable. As releases age, it becomes more difficult to link a release with a particular PRP. Consequently, a large number of releases are likely orphan releases for which the financial responsibility for cleanup will likely rest with the state.

DEQ provided data on the current work status at releases (“active,” “inactive,” or “stopped”) to facilitate the analysis of potential orphan releases. The majority of “inactive” or “stopped” cleanups have PRPs listed in Michigan’s database. EPA will explore options with DEQ for conducting liability determinations for PRPs. Conducting liability determinations for all PRPs and performing outreach or pursuing

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

⁷ Estimate provided by DEQ staff.

enforcement actions might help move these releases to closure. Also, DEQ might explore alternative funding options to complete the cleanups of orphan releases.

State District Backlogs *(see page MI-18 for more details)*

Michigan Finding	Potential Opportunity	Releases
Release age and the distribution of releases among stages of cleanup vary among DEQ’s eight districts.	Develop region-specific strategies for moving releases toward remediation and closure.	Variable number of releases

EPA identified differences in the distribution of the backlog among DEQ’s eight administrative districts, including differences in release age and stage of cleanup. Differences in the management and administration of remedial actions might be causing some of the differences in cleanup outcomes. Other external factors such as geologic and geographic differences might also contribute to the difference in the backlog. For example, areas of higher population usually result in areas of larger backlogs. Property transfers can provide incentives for cleanup, particularly in some urban areas. 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. These differences might reveal opportunities for district-specific backlog reduction. DEQ should work with its district offices to address their specific backlog issues and facilitate the sharing of information and best practices among the districts.

Presence of MTBE Contamination

(see page MI-19 for more details)

Michigan Finding	Potential Opportunity	Releases
27 percent of releases have MTBE contamination.	Consider reevaluating the current remedial plan and utilizing optimal remedial technologies for the removal of MTBE.	2,486

MTBE can be a complicating factor at LUST releases. As with any release in remediation, DEQ should consider having a system in place for regular reevaluation of the cleanup strategy. Although some releases could be lower risk or priority, EPA believes it is important to respond quickly to releases with MTBE contamination to prevent further migration of the contaminants in groundwater.

Number of Releases per PRP *(see page MI-20 for more details)*

Michigan Finding	Potential Opportunity	Releases
18 percent of releases are associated with 69 PRPs each with 10 or more releases.	Identify PRPs and explore possibilities for multi-site agreements (MSAs) or enforcement actions with parties associated with multiple releases.	1,676

EPA analyzed the number of releases per PRP to identify the PRPs that might be the largest potential contributors to Michigan's cleanup backlog. EPA was able to identify groups of 10 or more releases associated with the same PRP. In Michigan, 69 PRPs are each associated with 10 or more releases and account for 18 percent of the Michigan backlog. DEQ and EPA can use this information to identify possible participants for multi-site strategies to clean up groups of releases.

Geographic Clusters *(see page MI-21 for more details)*

Michigan Finding	Potential Opportunity	Releases
64 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 ⁸

Another multi-site approach that DEQ could use is targeting cleanup actions at geographically-clustered releases. This approach could 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 DEQ'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.

⁸ 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

This chapter contains EPA's data analysis of Michigan's LUST cleanup backlog and identifies potential opportunities to reduce the backlog in Michigan. EPA discusses the findings and opportunities for Michigan, 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

Michigan LUST Program At a Glance

Cleanup Rate

In fiscal year (FY) 2009, DEQ confirmed 183 releases and completed 203 cleanups.¹⁰

Cleanup Financing

Of open releases, 53 percent (4,892 releases) have received state funding from either the Michigan Underground Storage Tank Financial Assurance (MUSTFA) program or the Refined Petroleum Temporary Reimbursement Program (TRP) fund. Both the MUSTFA and TRP programs have since terminated and there is currently no state cleanup fund.

Cleanup Standards

A three-tier risk-based corrective action (RBCA) system is in place to evaluate threats to human health and the environment.

Priority System

DEQ prioritizes releases based on risk to receptors and length of time until impact.

Average Public Spending on Cleanup

\$400,000¹¹

Releases Per Project Manager

Each project manager is on average responsible for 141 open releases.

Administrative Funding

\$1.7 million.¹¹

State LUST Program Organization and Administration

Oversight of and financial assistance for the investigation and remediation of petroleum contamination resulting from leaking underground storage tanks (LUSTs) is managed by Michigan Department of Environmental Quality's (DEQ's) Remediation and Redevelopment Division. DEQ operates on a \$20 million annual budget to address "orphan" LUST releases posing the highest risk to receptors within each district, where the liable party is unknown, deceased, or bankrupt, or to address emergency situations where the liable party is recalcitrant.⁹ These releases are partially addressed with public funds to remove the greatest risks (e.g., source area remediation or containment of contaminant plumes) but are not generally cleaned up to closure levels due to a lack of adequate program funding. When DEQ determines that additional state investment is not warranted due to reduced risk, these partial cleanups can be recommended for DEQ's Approved Partial Closure (APC) status.

Approval of an APC status means these cleanups are considered closed from the standpoint of public funds investment but does not relieve liable parties, if they can be identified, of remaining cleanup obligations. Since no further action will be conducted at these sites using public funds, DEQ reports these releases as closed to EPA. Should funding become available, DEQ intends to conduct additional cleanup activities at these sites to complete the cleanups and, therefore, tracks APC as a separate closure category.

At the time of a release, the owner/operator is responsible for corrective action and is required to hire Qualified Underground Storage Tank (UST) Consultants to perform corrective actions and to submit cleanup reports including Initial Assessment Reports, Final Assessment Reports, and Closure Reports. DEQ's Remediation and Redevelopment Division is charged with selectively auditing the various reports that are submitted and must audit closure reports when institutional controls are sought for off-site contamination, a mixing zone determination is requested, in-situ injection is proposed as a corrective action, or groundwater waivers are requested.

Cleanup Financing

Michigan's former state fund, the MUSTFA program, previously paid for eligible LUST cleanups but was declared insolvent in 1995 and ceased reimbursements in 2001. Eligible cleanups had to have been discovered and reported on or after July 18, 1989, occurred from a tank that was in compliance with state requirements, and reported within 24 hours after its discovery.¹² Michigan no longer has a state fund. The TRP began July 20, 2006, to provide limited funding to responsible parties (RPs) for high risk releases that had previously been approved under the MUSTFA program. All funds have since been disbursed under TRP and it is no longer a source of cleanup financing.

⁹ DEQ tracks and categorizes three types of release response activities: 1) Releases where work had started but no correspondence has been received in over a year (categorized as "Stopped"); and 2) Confirmed releases for which no additional information has ever been received (categorized as "Inactive"). Orphan releases are likely to be in one of these two categories. The third category is releases for which correspondence has been received within the last year (categorized as "Active").

¹⁰ Based on FY 2009 *UST Performance Measures End of Year Activity Report*.

¹¹ This is based on the total amount of operational expenditures spent on projects.

¹² For more information see

[www.legislature.mi.gov/\(S\(zopg1I55jhtent45qcrttgql\)\)/mileg.aspx?page=getObject&objectName=mcl-324-21510](http://www.legislature.mi.gov/(S(zopg1I55jhtent45qcrttgql))/mileg.aspx?page=getObject&objectName=mcl-324-21510).

Since 1996, Michigan has operated with a causation-based liability law where the owner/operator of the tank at the time of the release is considered responsible for the cleanup, even after the property changes hands. A subsequent owner/operator might not be liable if they provide a Baseline Environmental Assessment within a prescribed period of time. This unique liability clause places the burden on DEQ to prove and establish RP liability for the releases in the backlog, which further complicates DEQ's ability to hold a RP liable for a cleanup.

DEQ staff attempt to identify past owners and establish liability, but the age of releases and occurrence of property transactions, as well as insufficient program funding and staffing resources, make it difficult to identify and pursue RPs. When the causation liability law was enacted, the state recognized that it would result in higher numbers of orphan sites. Additional funding from the General Fund was provided at first to help identify RPs. Unfortunately, program funding has eroded over the years to the point where there are not enough staff resources to conduct formal liability determinations on all releases. DEQ estimates there are approximately 4,500 orphan releases.

Cleanup Standards

DEQ's RBCA approach allows for the development of site-specific cleanup standards. The option to use a tiered approach to address releases is available in Michigan. A Tier 1 evaluation can be used if the liable party wishes to satisfy closure requirements using generic cleanup criteria. Tier 2 or Tier 3 evaluation approaches can be used to meet closure requirements using site-specific criteria or institutional controls. Remediation of all impacted media (i.e., groundwater, soils, and sediments) must achieve the appropriate risk-based screening levels.

The number of releases closed with institutional controls increased in the late 1990s. Institutional controls accounted for between 10 and 18 percent of annual closures between 2000 and 2008 (Figure 1 to the right). Nearly all of these institutional controls were Notices of Corrective Action documented with the County Register of Deeds.

Release Prioritization

DEQ requires that all releases be classified based on the immediacy of their threat to human health and the environment.¹³ Release class ranges from Class 1, where there is an immediate threat to the public or environment, to Class 4, where there is no demonstrable long-term threat. Releases are classified primarily by professional contractors' judgments rather than full risk assessments, and classification is usually done at the time when sufficient information is available to make a classification

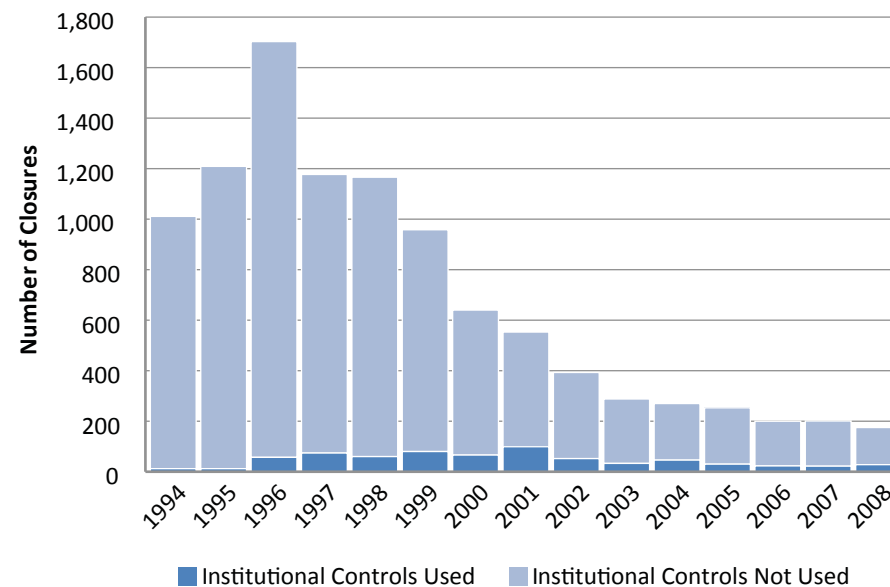
13 For more information, see www.michigan.gov/documents/deq/deq-rrd-opMEMO3_249985_7.pdf.

determination. DEQ revises the priority as additional information becomes available and as corrective actions occur. In situations where public funds will be used to address risks at tank or non-tank contamination sites, an additional prioritization system has been developed to allow DEQ to direct its resources to those releases that present the greatest threat and are in most urgent need of initial response actions. At these sites, activities that are considered "low" cost (under \$20,000) that, if implemented, could achieve an APC or closure, may be assigned to a higher priority category in order to qualify for public funding.¹⁴

State Backlog Reduction Efforts

In an effort to enforce reporting requirements and compel greater progress toward release closure, DEQ is pursuing additional enforcement strategies including seeking late reporting penalties for a number of cleanups where a big oil company is the RP. DEQ identified candidate releases in 2008 and commenced litigation to seek multi-site compliance.

Figure 1. Use of Institutional Controls over Time



14 Based on interviews with DEQ staff and the guidance document *Criteria for Funding Prioritization, FY2006-FY 2008 and Beyond*, prepared by DEQ's Remediation and Redevelopment Division.

[This page has intentionally been left blank.]

ANALYSIS AND OPPORTUNITIES

In this study, EPA analyzed Michigan's federally-regulated releases that have not been cleaned up (open releases). EPA conducted a multivariate analysis on DEQ's data. However, this technique did not identify strong underlying patterns in the data.¹⁵ 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 DEQ's data.¹⁷ 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 DEQ might use as a starting point for collaborative efforts to address the backlog. Although EPA's analysis covered all releases in Michigan, there are 428 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 nine areas of Michigan's backlog with potential opportunities for its further reduction:

- Stage of cleanup
- Media contaminated
- Release priority
- Cleanup financing
- State district backlogs
- Presence of methyl tertiary butyl ether (MTBE) contamination
- Use of monitored natural attenuation (MNA)
- Number of releases per potentially responsible party (PRP)
- Geographic clusters

STAGE OF CLEANUP

As of April 30, 2009, the Michigan backlog consisted of 9,169 open releases. EPA analyzed the age of these LUST releases and their distribution among the stages of cleanup. To facilitate analysis, EPA classified Michigan's open releases into two stages of cleanup: the Confirmed Release stage (releases where assessments have not begun) and the Site Assessment/Remediation stage (releases where assessments or remedial activities have begun).¹⁸ While EPA grouped the releases into linear stages for this analysis, the Agency recognizes that 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, in the long run, 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.

Since it began, the Michigan program has closed 12,623 releases, half of which were closed in fewer than 2.0 years (Figure 2, page 12). The young median age of closed LUST releases might be attributable to the rapid closure of relatively easy to remediate releases and the former operation of a state fund. 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.

¹⁵ 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.

¹⁶ For a detailed description of the Michigan data used in this analysis, see the Chapter Notes section.

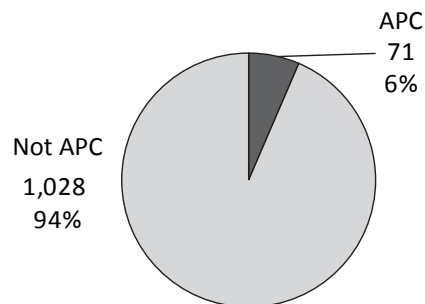
¹⁷ For a detailed description of release stages, see the Chapter Notes section (Stage of Cleanup Reference Table).

¹⁸ Releases were classified into stages based on available data and discussion with DEQ staff. Data were not available to distinguish between the Site Assessment and Remediation stages. For more information, see the Chapter Notes section.

LUST Data Source

Electronic data for LUST releases occurring between March 1970 and April 2009 were compiled with DEQ staff in 2008 and 2009.¹⁶ Data were obtained from DEQ's Storage Tank Information Database and selected based on quality and the ability to address areas of interest in this analysis.

Figure 3. Standard Closures and APC Closures, 2004 - 2008



Michigan Finding

26 percent of releases:

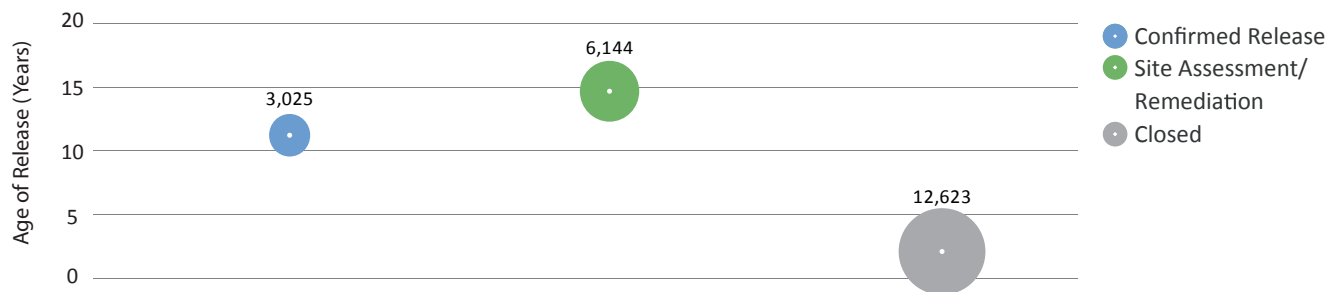
- are 5 years old or older; and
- have not started site assessment.

Potential Opportunity

Releases

- Use expedited site assessments or encourage RPs to use expedited 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.

Figure 2. 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 130 closed releases and 66 open releases for which release age is unknown. These releases are not part of the median age calculation.

Of the 1,099 releases closed between 2004 and 2008, approximately 6 percent (71 releases) were state lead releases that officially closed as APCs (Figure 3 to the left). A DEQ panel evaluated these releases and determined that immediate risks have been addressed and DEQ does not intend to spend additional public funds on the cleanup. Final cleanup standards were not attained at the time of partial closure for these releases and DEQ tracks them separately from other closures. The remaining 1,028 closures (94 percent of releases closed between 2004 and 2008) were performed by RPs and audited by the state as necessary.

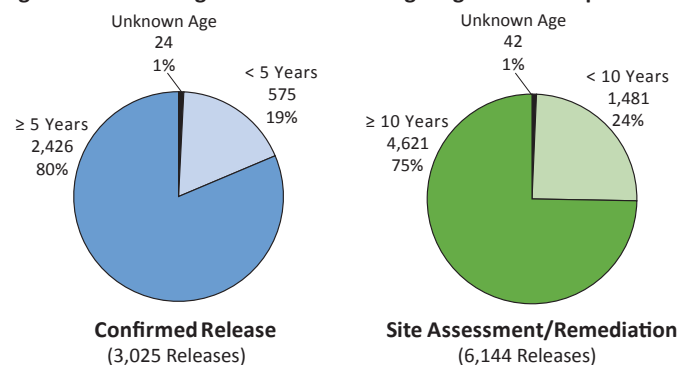
DEQ has undertaken efforts to reduce Michigan’s backlog by pursuing enforcement strategies, including seeking late report penalties for a number of cleanups where a big oil company is the RP. Agencies in other states have been able to initiate targeted backlog reduction efforts to look for easy closures and discovered old releases that can be closed with minimal effort.¹⁹ States might find opportunities for closure with minimal effort 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. Michigan has several low priority (Class 4) releases that might benefit from this type of review.

Michigan has many old LUST releases not in remediation. Figure 4 on page 13 shows the backlog of open releases by age and stage of cleanup and allows for the identification of older releases by stage. Figure 4 breaks out the 2,426 older releases in the Confirmed Release stage (26 percent of the backlog) that have not been assessed, 5 years or more after the releases were confirmed. It also shows the 4,621 older releases in the Site Assessment/Remediation stage (50 percent of the backlog) that remain open, 10 years or more after the release was confirmed. Based on available data, it is not possible to identify the subset of releases that have completed site assessment and begun remediation. This is partly because, under state law, owners and operators are required to take initial response actions to address immediate and dangerous risks at the time that a risk is discovered. However, it is likely that some of the 4,621 releases in the Site Assessment/Remediation stage have not fully completed site assessment. In those cases, expediting site assessments might identify releases to be closed with minimal effort or moved toward remediation. Implementing enforcement actions at stalled releases could also help move releases toward remediation and closure.

¹⁹ See State Backlog Reduction Efforts in the Program Summary of the state chapters.

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.²⁰ The guide explains the overall ESA process as well as specific site assessment tools and methods. The ESA process rapidly characterizes site conditions to make cost-effective corrective action decisions. ESAs will help identify releases that can be closed with minimal effort or 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 decrease overall project costs. DEQ can also encourage RPs to use ESAs to streamline the corrective action process.

Figure 4. Release Age Distribution among Stages of Cleanup



Michigan has many old releases in the Site Assessment/Remediation stage. Fifty percent of Michigan's releases (4,621 releases) are in the Site Assessment/Remediation and are 10 years old or older (Figure 4 to the left). This older group of releases represents 75 percent of the releases in remediation. There are a total of 6,144 releases in the Site Assessment/Remediation stage (67 percent of releases) (Figure 4). Although it is not possible with Michigan's data to distinguish between those releases where remediation has begun and those where it has not, it is likely that several releases in this category have already begun remediation. In

addition, because EPA only has the date that a release was confirmed but not when it moved from one stage to the next (i.e., from Confirmed Release to Site Assessment/Remediation), EPA can calculate the overall age of the release but not the actual time spent in any stage. It is possible that some of these older releases might have only recently begun remediation. DEQ should explore opportunities to move more releases into remediation and closure. For releases that have not completed site assessment, ESAs will help identify releases that can be closed with minimal effort or provide all the information needed to move a release into remediation sooner. DEQ should also consider establishing a systematic process to evaluate state-funded cleanups in remediation and optimize cleanup approaches, including choice of technology and site-specific risk-based decision making. This process might save DEQ resources and bring releases to closure more quickly. This would allow DEQ to move on to other releases that need attention and remove releases from the backlog within existing budget limitations. DEQ should also consider enforcement actions against RPs that are not moving forward with cleanup.

Michigan Finding

50 percent of releases are:

- 10 years old or older; and
- in site assessment/remediation.

Potential Opportunity

Releases

Identify opportunities to move releases toward remediation and to closure, such as:

4,621

- expediting site assessments;
- periodically reviewing release-specific treatment technologies;
- reviewing site-specific cleanup standards;
- continuing use of institutional or engineering controls; and
- implementing enforcement actions if cleanup has stalled.

²⁰ 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.

MEDIA CONTAMINATED

Groundwater is an important natural resource that is at risk from petroleum contamination. Old releases impacting groundwater make up the majority of Michigan’s backlog. In general, groundwater contamination 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. The following analysis classified contaminated media into three categories: groundwater (8,816 releases), soil (1 release), and “unknown” media, which includes releases with no media specified (352 releases).²¹

In Michigan, 96 percent of releases (8,816 releases) involve groundwater contamination and have a median age of 14.3 years (Figure 5 below). Only one release is documented as contaminating only soil. The type of media impacted by the remaining 4 percent of releases (352 releases) is unknown. In contrast, 48 percent of closed releases with known type of media contamination (2,147 releases) involved groundwater contamination. These closed releases have a significantly younger mean age of 5.1 years compared to the median age of open releases (Figure 5).²² Of the 6,085 groundwater cleanups in the Site Assessment/Remediation stage, 76 percent (4,611 releases) are 10 years old or older (Figure 6 below, to the left). This subset of older releases that contaminate groundwater and are in site assessment/remediation makes up 50 percent of Michigan’s total backlog. Groundwater contamination is typically more complex and difficult to remediate. However, if DEQ could identify opportunities to improve cleanup efficiencies, it might be able to accelerate the pace of cleanups. For example, using a systematic process to evaluate cleanup progress, current contaminant levels, and treatment technologies might move releases through cleanup and to closure faster.

Michigan Finding

50 percent of releases:

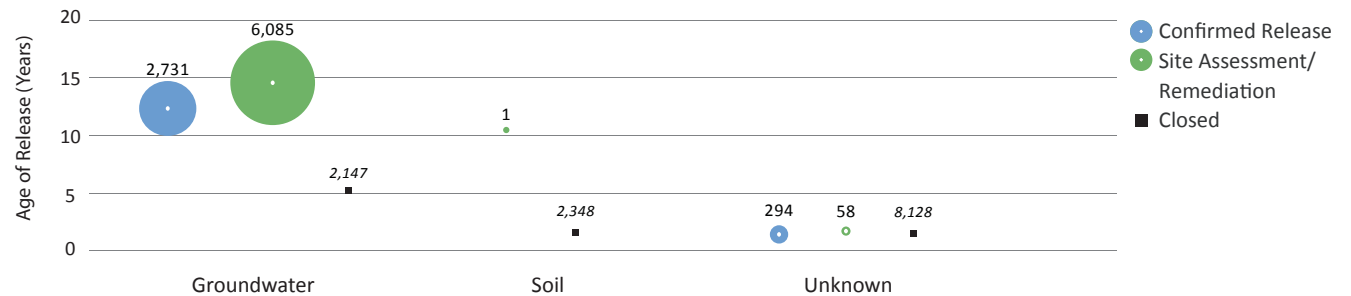
- are 10 years old or older;
- are in site assessment/ remediation; and
- contaminate groundwater.

Potential Opportunity

Releases

Systematically evaluate cleanup progress at old releases with groundwater impacts and consider alternative cleanup technologies or other strategies to reduce time to closure.

Figure 5. Age of Releases by Media Contaminated and Stage of Cleanup



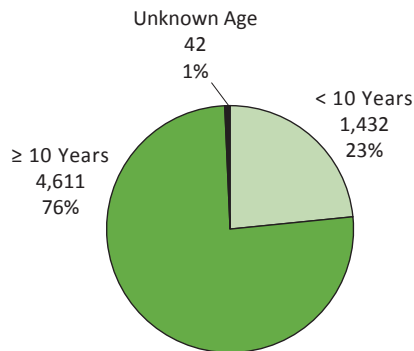
Squares indicating closed releases are not scaled to the number of releases in that stage.

DEQ can continue to use institutional or engineering controls to reduce the time to closure by eliminating exposure pathways where protective and appropriate. Institutional controls accounted for between 10 and 18 percent of DEQ annual closures between 2000 and 2008. In addition, evaluation of the cleanup progress of releases with groundwater impacts might identify releases where MNA can be applied. In these cases, treatment times need to remain reasonable compared to other methods. Michigan’s cleanup costs might be reduced by applying MNA.

²¹ For a detailed description of media contamination classifications, see the Chapter Notes section.

²² The type of media contaminated is unknown for 64 percent of closed releases (8,128 releases).

Figure 6. Age of Site Assessment/Remediation Stage Releases with Groundwater Impacts

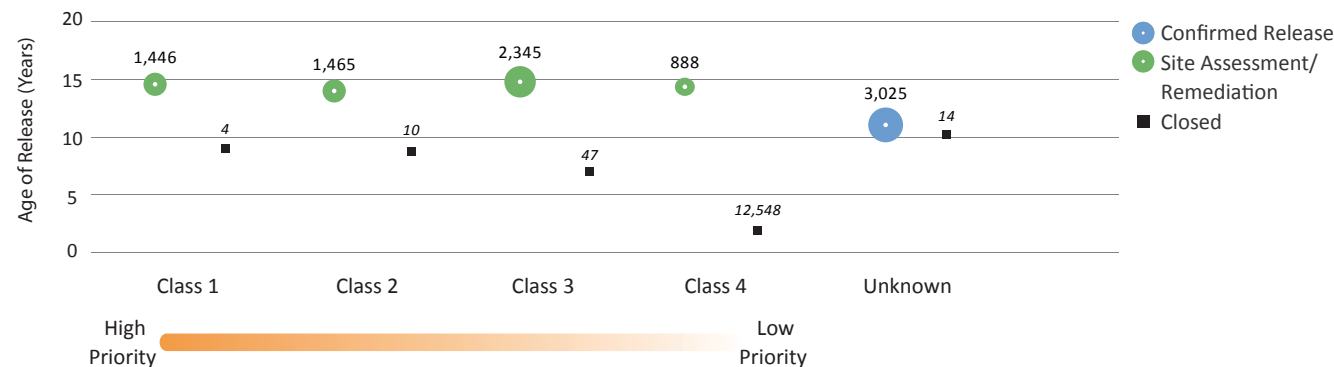


RELEASE PRIORITY

Many state programs employ prioritization systems to decide how to best allocate state resources for assessments and cleanups. States approach cleanup priority differently, and there might be opportunities using Michigan's prioritization system to increase the number of closures. DEQ follows its priority rankings as a matter of policy, but can make exceptions to address lower priority releases on a case-by-case basis. In an effort to address their resource limitations at releases needing state funds for cleanup, DEQ staff work at releases until the immediate risks are addressed and then move on to other high priority releases. Release closures are thereby traded off for risk reduction at a greater number of high priority releases.

The Michigan backlog includes a significant number of old, high priority releases. This analysis identified 1,446 Class 1 releases (16 percent of the backlog) that are considered to be an immediate risk to human health, yet have a median age of 14.7 years (Figure 7 below). Class 1 releases generally pose an immediate risk of exposure to free product. DEQ should explore options to expedite site assessments and evaluate cleanup progress of high priority releases to ensure that all releases are appropriately ranked. With Michigan's budget limitations in mind, EPA will work with DEQ to develop strategies to move all releases toward closure and to ensure that there are no immediate risks to human health and the environment from the high priority releases that have not been addressed.

Figure 7. Age of Releases by Priority Class and Stage of Cleanup²³



Priority classification can change over time, meaning that the removal of immediate threats leads to reclassification and lower prioritization of a Class 1 release as risks are addressed. Therefore, most releases are expected to be Class 4 at the time of closure. At the time of data collection, 888 releases (10 percent of the backlog) were considered Class 4, approximately half of which are 15 years old or older (Figure 7). DEQ should explore opportunities to expedite the remediation and closure of these releases by using targeted backlog reduction strategies to close low priority releases with minimal effort, implementing enforcement actions at stalled releases, and examining public and private funding options such as petroleum brownfields grants for low priority releases with no viable RP.

²³ The large number of Class 4 closures is due to the reduction in risk as a release is remediated. These 12,548 closed Class 4 releases therefore would be expected to include releases that had been categorized as Class 1, 2, or 3 prior to completing remedial activities. Class 4 releases are generally defined as having no demonstrable long-term threats to human health, safety, or sensitive environmental receptors.

Michigan Finding

16 percent of releases are high priority releases considered to be an immediate risk to human health.

Potential Opportunity Releases

Expedite site assessments and evaluate cleanup progress of high priority releases to ensure that:

- all releases are appropriately ranked;
- releases with immediate risk are actively being worked on; and
- all releases make progress toward closure.

Michigan Finding

10 percent of releases are low priority releases, half of which are 15 years old or older.

Potential Opportunity Releases

Explore opportunities to expedite the remediation and closure of low priority releases, including:

- using targeted backlog reduction efforts to close low priority releases;
- using enforcement actions for stalled releases when necessary; and
- examining public and private funding options such as petroleum brownfields grants for low priority releases.

Michigan Finding

33 percent of releases have not been assigned a priority classification due to a lack of site characterization information.

Potential Opportunity**Releases**

Expedite site assessments and track information to assign initial priority classifications for releases with unknown priority to:

3,025

- ensure that releases with immediate risk are actively being worked on; and
- identify those that could be closed with minimal effort.

Michigan Finding

PRPs are listed for 89 percent of “inactive” or “stopped” releases in Michigan’s backlog.

Potential Opportunity**Releases**

- Explore options for conducting liability determinations for all PRPs,
- Conduct outreach to PRPs, or
- Pursue enforcement actions where necessary to initiate cleanup activities.

Variable number of releases²⁵

Explore additional funding options to address the large number of orphan releases in Michigan, such as public/private partnerships.

Approximately 4,500 releases²⁷

There are 3,025 releases (33 percent of the backlog) with a median age of 11.4 years that have not begun site assessments and have not been assigned an initial priority classification (Figure 7). In the past, DEQ classified releases with unknown priority as Class 2 releases. This approach was not uniformly implemented and prioritization of these releases is now classified as unknown. Expediting site assessments and tracking information to assign initial priority classifications for these releases will help to ensure that releases that pose immediate risks are actively being worked on and can identify releases that could be closed with minimal effort.

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. Michigan’s LUST program in particular has faced critical budget and staffing shortfalls over the last several years. The biggest impact to DEQ’s program has been the loss of the state fund to finance cleanups in the state.

Under Michigan’s causation-based liability law, a PRP is liable for the costs of cleanup if they caused the release or if they became the PRP after March 6, 1996, and did not provide a Baseline Environmental Assessment within a prescribed time.²⁴ The current facility owner might not be responsible for an older release that occurred prior to their purchase, occupancy, or foreclosure, and the state has the burden of proving a PRP is responsible for a release. Due to the causation liability clause, DEQ’s LUST program has to invest significant resources to identify and hold the PRP liable. As releases age, it becomes more difficult to link a release with a particular PRP. Consequently, a large number of releases are likely orphan releases for which the financial responsibility for cleanup could likely rest with the state.

DEQ staff estimate that the number of orphan releases could be as high as 4,500 releases (49 percent of the backlog), and DEQ is facing the burden of financing the cleanup of thousands of releases without an operating state fund. Over the past several years, the state’s LUST program has operated under an annual budget of \$20 million, which DEQ uses to reduce risks at high priority orphan releases. DEQ staff estimate the average cost of cleanup in the state at \$400,000 per release. With the high number of potential orphan releases, DEQ’s LUST program could need as much as \$1.8 billion to address the state-funded portion of the backlog.²⁶

The difficulty in identifying the PRPs for releases contributes to the delay in the reduction of the Michigan backlog. An investigation of liability status is conducted before public money is spent on a cleanup. DEQ staff track information on PRPs for many releases, giving the state a starting point for its PRP investigations. DEQ staff place releases into one of three activity categories based on their level of communication with the PRP over the past year: “active” (releases for which correspondence has been received within the last year), “inactive” (releases for which no additional information has ever been received), and “stopped” (releases at which work has started but no correspondence has been received in the past year) (Figure 8, page 17).

²⁴ Michigan’s Storage Tank Information Database does not track the RP but it does have a field for a PRP.

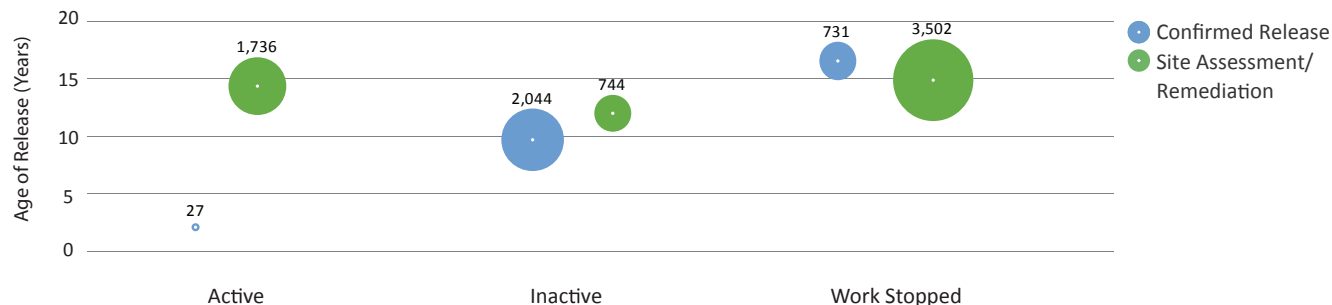
²⁵ Opportunities marked as “variable number of releases” relate to programmatic opportunities and affect an unknown number of releases, potentially including all open releases.

²⁶ Estimate based on an average \$400,000 cost per cleanup for 4,500 orphan releases.

²⁷ Estimate provided by DEQ staff.

Potential orphan releases are usually found in the latter two categories, both of which have a large number of releases that have not yet been assessed.

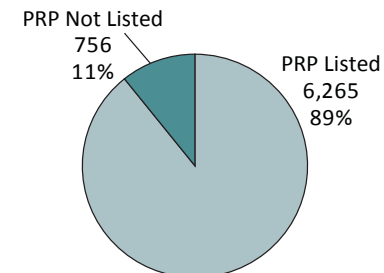
Figure 8. Age of Releases by Current Work Status and Stage of Cleanup²⁸



DEQ's LUST program faces a significant financial burden in addressing its backlog. The program has two challenges: identifying whether a PRP or the state is responsible for each cleanup and identifying the funding source to address all orphan releases. With regard to the first challenge, if funding were provided to support formal liability determinations for all PRPs, the need for future publicly-funded cleanups could be better defined. PRPs are listed for 89 percent (6,265 releases) of "inactive" and "stopped" releases (Figure 9 to the right). Reviewing these PRPs and, where possible, identifying RPs and pursuing enforcement actions where necessary would reduce the potential burden on the state to address these cleanups.

The second challenge is to fund state-lead work. Michigan is the only state in this backlog study that takes on responsibility for a significant number of cleanups without having a state fund or other funding mechanism specifically in place to finance LUST cleanups. At current program funding levels (i.e., \$20 million per year) and using the average estimated cost for each cleanup (\$400,000), it could take the state 90 years to address current potential orphan releases.²⁹ Without additional funding, Michigan's backlog will not be addressed in the foreseeable future.

Figure 9. PRP Documentation for "Inactive" and "Stopped" Cleanups



²⁸ There are 385 releases (4 percent of the backlog) for which the activity category is unknown. These releases are not depicted in this graphic.

²⁹ This estimate is based on \$1.8 billion needed to address 4,500 orphan cleanups and an average annual budget of \$20 million. The estimate does not factor in annual escalated costs.

STATE DISTRICT BACKLOGS

Michigan Finding

Release age and the distribution of releases among stages of cleanup vary among DEQ's eight districts.

Potential Opportunity

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

Releases

Variable number of releases

EPA analyzed cleanup backlogs within DEQ's eight districts to identify patterns and opportunities for targeted backlog reduction strategies within each DEQ district. Release age and distribution of releases among stages of cleanup vary among the districts (Figure 10 to the right and Table 1, page 19). Differences in density of LUSTs among DEQ districts are likely due to the large number of USTs located in the state's densely populated urban centers. Almost every release in each district impacts groundwater resources.

The Southeast Michigan District has the highest rate of unknown media contamination of any district (5 percent, 139 releases) (Table 1). The Southeast Michigan District also has the largest district backlog (2,946 releases comprising 32 percent of the state backlog) as well as the largest population in the state, while the other districts are each responsible for between 7 and 14 percent of releases (Table 1). In some cases, urban areas with greater populations provide a greater financial incentive for cleanup due to property transfers. In the Upper Peninsula District, 62 percent of releases (599 releases) remain open and 44 percent of these releases (266 releases) remain in the Confirmed Release stage, while over half of the releases in the Lansing District have been closed (1,399 releases) and only 10 percent of the remaining open releases (125 releases) are in the Confirmed Release stage (Table 1). These regional differences might be due to administrative or geologic variation. District-specific strategies might help reduce the backlog. EPA encourages DEQ to look for opportunities to share best practices among its regions and with other states. According to DEQ staff, the success of the district offices depends on program funding and enforcement resources and DEQ has lacked both these resources since 1995.

Figure 10. DEQ Districts Map

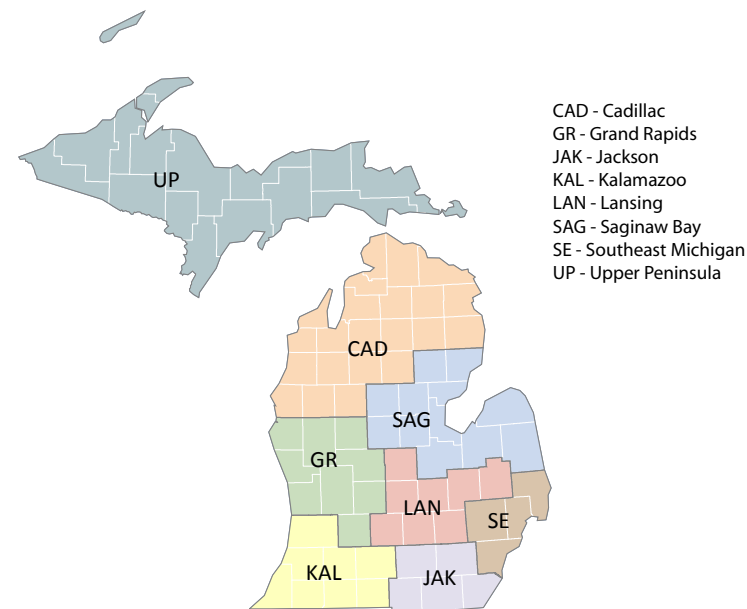
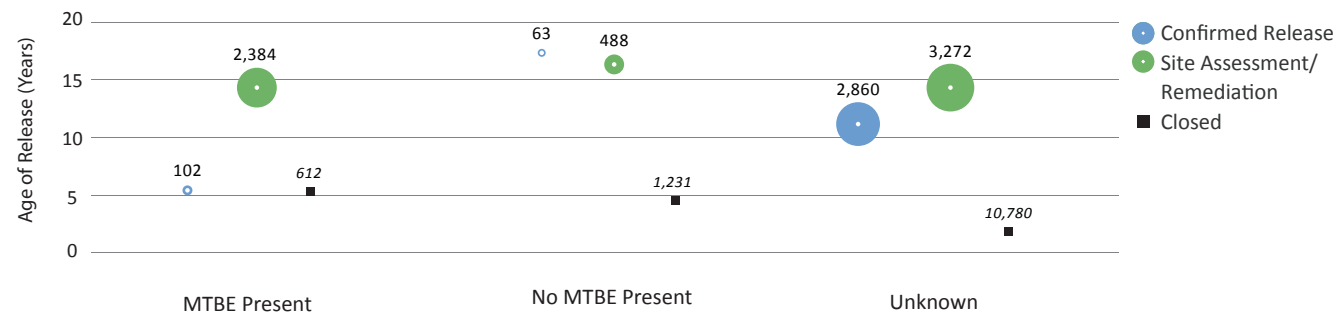


Table 1. Michigan Backlog by DEQ District³⁰

	CAD	GR	JAK	KAL	LAN	SAG	SE	UP
State Backlog Contribution	9%	11%	7%	9%	14%	10%	32%	7%
Cumulative Historical Releases	1,603	2,337	1,660	1,903	2,689	2,033	7,538	970
Closed Releases	815/51%	1,302/56%	1,046/63%	1,088/57%	1,399/52%	1,080/53%	4,592/61%	371/38%
Open Releases	788/49%	1,035/44%	614/37%	815/43%	1,290/48%	953/47%	2,946/39%	599/62%
Stage of Cleanup								
Confirmed Release	171/22%	279/27%	143/23%	238/29%	125/10%	497/52%	1,232/42%	266/44%
Site Assessment/ Remediation	617/78%	756/73%	471/77%	577/71%	1,165/90%	456/48%	1,714/58%	333/56%
Media Contaminated								
Groundwater	782/99%	1,016/98%	587/96%	782/96%	1,268/98%	933/98%	2,807/95%	585/98%
Soil	0/0%	0/0%	0/0%	0/0%	0/0%	0/0%	0/0%	0/0%
Unknown	6/1%	19/2%	27/4%	33/4%	22/2%	20/2%	139/5%	14/2%
Median Age of Open Releases	14.4 years	14.7 years	13.8 years	13.5 years	16.0 years	13.2 years	12.9 years	13.9 years

PRESENCE OF MTBE CONTAMINATION

MTBE can be a complicating factor at LUST releases. MTBE contamination from LUST releases is common in Michigan and might be contributing to longer remediation times for active cleanups. Because MTBE is not readily degraded in groundwater, releases involving MTBE require more aggressive management and remediation than releases where MTBE is not present.³¹ Data on the presence of MTBE exist for 3,037 releases (33 percent of the backlog), 2,486 of which (82 percent) are contaminated with MTBE (Figure 11 below). Requiring active remediation of releases with MTBE, especially for RP-financed cleanups, and employing innovative technologies where feasible could allow for faster cleanups. As with any release in remediation, DEQ should consider having a system in place for regular reevaluation of the cleanup strategy. Although some releases could be lower risk or priority, EPA believes it is important to act quickly for releases with MTBE contamination, to prevent further migration of the contaminants in groundwater.

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

³⁰ Data for DEQ district is unknown for 930 closed and 129 open releases. These releases are not included in Table 2.

³¹ 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).

Michigan Finding

27 percent of releases have MTBE contamination.

Potential Opportunity

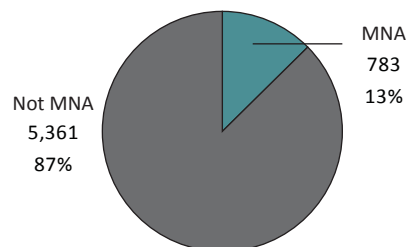
Consider reevaluating the current remedial plan and utilizing optimal remedial technologies for the removal of MTBE.

Releases

2,486

USE OF MNA

Figure 12. Use of MNA for Releases in the Site Assessment/Remediation Stage



DEQ has MNA listed as a remedial treatment technology at 13 percent (783 releases) of the 6,144 releases in the Site Assessment/Remediation stage (Figure 12 to the left).³² 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. While EPA supports the appropriate use of MNA, EPA also encourages ongoing evaluation of cleanup progress where MNA is used to address contamination. MNA should not be considered a default or presumptive remedy at any contaminated site.³³ If MNA is not expected to address contamination in a reasonable time frame, the Agency encourages the use of other strategies where feasible. On the other hand, if an expensive, active technology is being used for remediation and is having little or no effect on contamination, a reevaluation of cleanup progress might reveal that MNA could be a more cost-effective technology to use, as long as cleanup times do not become unreasonable.

NUMBER OF RELEASES PER PRP

EPA analyzed the number of releases per PRP to identify PRPs that are the largest potential contributors to the state's cleanup backlog.³⁴ A total of 69 PRPs are each associated with 10 or more releases and account for 18 percent of the Michigan backlog (1,676 releases; Table 2 to the right).³⁵ Of these, 45 gasoline retail, distribution, and refining businesses are the PRPs for 1,335 releases (15 percent of the backlog), and seven convenience store chains are the PRPs for 104 releases (1 percent of the backlog; Table 2). DEQ and EPA can use these data to identify possible participants for multi-site strategies to clean up these groups of releases. Focused effort engaging these 69 PRPs through collaborative cleanup agreements or enforcement actions might expedite the closure of many of these releases.

Table 2. PRPs with 10 or More Open Releases

Type of PRP	Number of Releases	Number of PRPs
Gasoline - Retail/Distribution/Refining	1,335	45
Convenience Store Chain	104	7
Government – Local	73	6
Manufacturer	60	5
Government – State	39	2
Utility	36	2
Supermarket Chain	29	2
Total	1,676	69

Michigan Finding

18 percent of releases are associated with 69 PRPs each with 10 or more releases.

Potential Opportunity

Identify PRPs and explore possibilities for multi-site agreements (MSAs) or enforcement actions with parties associated with multiple releases.

Releases

1,676

³² This might overestimate the use of MNA in Michigan; for releases where the site assessment has not been completed, the remedial method has not yet been approved even if it is listed in the database.

³³ 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.

³⁴ DEQ provided data on parties that are potentially legally responsible for cleanups, but have not necessarily been legally established as the RPs.

³⁵ No federal government entities were identified as being the PRPs for 10 or more open releases.

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 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 5,843 releases (64 percent of releases) located within a one-mile radius of five or more other releases (Figure 13 to the right). Of these releases, 3,633 releases (40 percent of releases) are located within a one-mile radius of 10 or more other 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, utilize 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 13. Map of All Open Releases by DEQ District



Michigan Finding

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

Potential Opportunity	Releases
Target releases within close proximity for resource consolidation opportunities.	Targeted number of releases ³⁶

³⁶ 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

Michigan LUST Program Contact Information

Michigan Department of Environmental
Quality
Remediation & Redevelopment Division
Leaking Underground Storage Tank Program
P.O. Box 30426
Lansing, MI 48909-7926

Phone: 517-373-9837

Fax: 517-373-2637

www.michigan.gov/deq/0,1607,7-135-3311_4109_4215---,00.html

In this state chapter, EPA presented the analysis of LUST data submitted by DEQ and highlighted information on Michigan's LUST program. Based on the analytic results, EPA identified potential opportunities that could be used to address specific backlog issues in Michigan. 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, Michigan, and the other states on strategies to reduce the backlog. EPA will work with 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.

CHAPTER NOTES

MICHIGAN DATA BY ATTRIBUTE

The following table provides details on the data elements of interest in this analysis. Data were provided by DEQ 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	Michigan Data	Use in Analysis
Administrative Cost	Data were obtained from the "Fiscal Year," "Expenditure GAAP," and "Expenditure Type" data fields in the "Part 213 Project expenditures as of 12-9-08.xls" file. When the expenditure amount had a type of "Operational," it was counted as an administrative cost. All operational expenditures were totaled for a given FY.	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.
APC	Data were obtained from the list of releases in the "APC_query_MI_2-23-09.xls" file.	Examined in the "Stage of Cleanup" section.
Baseline Environmental Assessment	Data were obtained from releases listed in the "All data" spreadsheet of "releases_related_to_BEAs.xls." Releases that had baseline environmental assessments were more likely on properties with some real estate interests.	No informative patterns were identified.
Cleanup Activity	Data were obtained from the "PRP_CORR_ACT_STAT_CD" field in the "Open-closed releases-site activity-site class-etc 5-1-09.xls" file.	Examined in the "Cleanup Financing" section.
Cleanup Financing	Data from the MUSTFA program (facilities in "7132 Claims Final.xls," "Approved MUSTFA Claims query 118.xls," "Open with MUSTFA Claims 4-30-09.xls," and "releases with MUSTFA claims that have closed 4-30-09.xls") and Part 213 (Environmental Response Network Information Exchange) releases cleanup project (facilities, as identified by "SID#" field, in all spreadsheets in "213 state funded sites in ERNIE.xls"), were used to mark selected releases as "Public Financing."	Examined in the "Program Summary" section.
Cleanup Standards	No site-specific data available.	State-wide standards examined in the national chapter.
Closure Date	Data were obtained from the "CLOSED_DT" field in the "open and closed mtbe present and other impact 4-30-09.xls" file. "1/1/1900" was treated as unknown.	Included in the calculation of release age.
Confirmed Release Date	Data were obtained from the "Release Date" field in the "LUST_LIST_Closed_6-29-09.xls" and "LUST_LIST_Open_6-29-09.xls" files. For releases with no "Release Date," the "Discovery_DT" field from "open and closed mtbe present and other impact 4-30-09.xls" was used. "1/1/1900" was treated as unknown.	Included in the calculation of release age.
Data Date	April 30, 2009, is used for all records. This is the date the data were obtained.	Included in the calculation of release age.
DEQ District	Data were obtained from the "District" field in the "LUST_LIST_Closed_6-29-09.xls" and "LUST_LIST_Open_6-29-09.xls" files.	Examined in "District Office Backlogs" section.
Facility Type	Data were obtained from the "TYPE_DESC" field in the "Facilities IDs with descriptions and addresses 8-17-09.xls" file.	No informative patterns were identified.

Data Element	Michigan Data	Use in Analysis
Federally-Regulated LUST Releases	A list of relevant releases was provided by DEQ staff in the “open and closed mtbe present and other impact 4-30-09.xls,” “LUST_LIST_Closed_6-29-09.xls,” and “LUST_LIST_Open_6-29-09.xls” files.	Identifies the appropriate universe of releases for analysis.
Free Product	No data available.	Not applicable.
Institutional and Engineering Controls	Data were obtained from the “Fac_Restriction” field in the “closed releases with other restriction mechanisms 4-30-09.xls,” “closed releases with ordinance restrictions.xls,” “closed releases MDOT permit 4-30-09.xls,” and “closed releases with Notice of Corrective Action.xls” files. Releases with multiple records were marked as “Multiple.” Releases marked as “Unknown” can include both releases that have no data as well as releases previously marked as “Unknown.”	Examined in the “Cleanup Standards” section and in the national chapter.
Latitude and Longitude	Data were obtained from the “Latitude” and “Longitude” fields in the “LUST_LIST_Open_6-29-09.xls” and “LUST_LIST_Closed_6-29-09.xls” files. 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.
Media	Data were obtained from the “GW_IMPACT” and “SW_IMPACT” fields in the “Closed sites-gw sw rc etc 4-27-09.xls” file. The fields “GW_Remediated,” “Priv_Wells_Affected,” “Muni_Wells_Affected,” “Homes_Water_Impacted,” “Homes_Alt_Water,” and “MTBE_IN_GW” in the “open and closed mtbe present and other impact 4-30-09.xls” file were also used to identify releases with groundwater contamination. Releases with groundwater contamination marked (in addition to any other media) were counted as “groundwater.” Releases with any other combination of media were counted as “other.” Releases that had soil remediation records in “Remediation Technology data for soil 4-30-09.xls” but were not marked as “groundwater” or “other” were marked as “soil.” However, this additional rule identified only one open soil cleanup. Releases with no data were categorized as “Unknown.” Unknown releases might include those releases for which there were no data available in the database, but for which information was available in other files and releases for which the type of media contaminated is truly unknown.	Examined in the “Media Contaminated” section.
Monitored Natural Attenuation (MNA)	Data were obtained from the “GW_Method” field in the “Open and Closed releases gw method and code.xls” file and the “Soil_Method” field in the “Remediation Technology data for soil 4-30-09.xls” file. Releases listed as having “Natural Attenuation” in either “GW_Method” or “Soil_Method” field were marked as using MNA.	Examined in the “Use of MNA” section.
Methyl Tertiary Butyl Ether (MTBE)	Data were obtained from the “MTBE_IN_GW” data field in the “open and closed mtbe present and other impact 4-30-09.xls” field.	Examined in “Presence of MTBE” section.
Number of Releases per PRP	Calculated as the total number of open releases affiliated with a unique PRP name.	Examined in the “Number of Releases per PRP” section.
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.
PRP	Data were obtained from the “PRP_Name” field in the “PRP and facility code 4-30-09.xls” file. Releases with more than one record were categorized as “Multiple.” Because dates of ownership were not available, releases marked as “Multiple” might include releases with only one current owner. Releases marked as “Unknown” include both releases that have no data as well as releases previously marked as “Unknown.”	Used to calculate the number of releases associated with each unique PRP.
Public Spending	No release-level data were available. The cumulative public spending was assigned to a specific release when it was the only release at a facility. The cumulative spending was not assigned to a release if it was at a facility with more than one release. These aggregate data could not be adjusted for inflation. DEQ provided an estimated average cleanup cost.	Average cleanup cost examined in the “Program Summary” section. Release-level data not suitable for analysis.
Release Priority	Data were obtained from the “CURR_SITE_CLS” field in the “Closed releases with latlong 4-26-09.xls” and “Open releases with latlong 4-26-09.xls” files (see Release Priority Reference Table).	Examined in the “Release Priority” section.
RP Recalcitrance	No data available.	Not applicable.

Data Element	Michigan Data	Use in Analysis
Staff Workload	Calculated from the total number of unique Part 213 project managers listed in "Count_of_open_releases_assigned_to_MI_project_managers_2-23-09.xls" file and the total number of open releases in Michigan.	Examined in the "Program Summary" section and in the national chapter.
Stage of Cleanup	Data were not available to differentiate between the Site Assessment and Remediation stages. For any open release, if the "CURR_SITE_CLS" field in the "Closed releases with latlong 4-26-09.xls" and "Open releases with latlong 4-26-09.xls" files was "UNK," the release was marked "Confirmed Release." Otherwise, it was marked "Site Assessment / Remediation." Closed releases were marked "Closed."	Variable in all analyses.
Status	Releases were considered "Closed" if the "CLOSED_DT" field in the "open and closed mtbe present and other impact 4-30-09.xls," "LUST_LIST_Closed_6-29-09.xls," or "LUST_LIST_Open_6-29-09.xls" files had a valid closure date entry. All other releases were considered "Open."	Identifies the appropriate universe of releases for tree analysis.
Voluntary Cleanup Program	No data available.	Not applicable.

Release Priority Reference Table

Site class ranges from Class 1, where there is an immediate threat to the public or environment, to Class 4, where there is no demonstrable long-term threat.

Risk Class	Description
Class 1	General Scenario: Immediate threat to human health, safety, environment, or sensitive environmental receptors.
Class 2	General Scenario: Short-term (0-2 years) threat to human health, safety, or sensitive environmental receptors.
Class 3	General Scenario: Long-term (>2 years) threat to human health, safety, or sensitive environmental receptors.
Class 4	General Scenario: No demonstrable long-term threats to human health, safety, or sensitive environmental receptors.

[This page has intentionally been left blank.]