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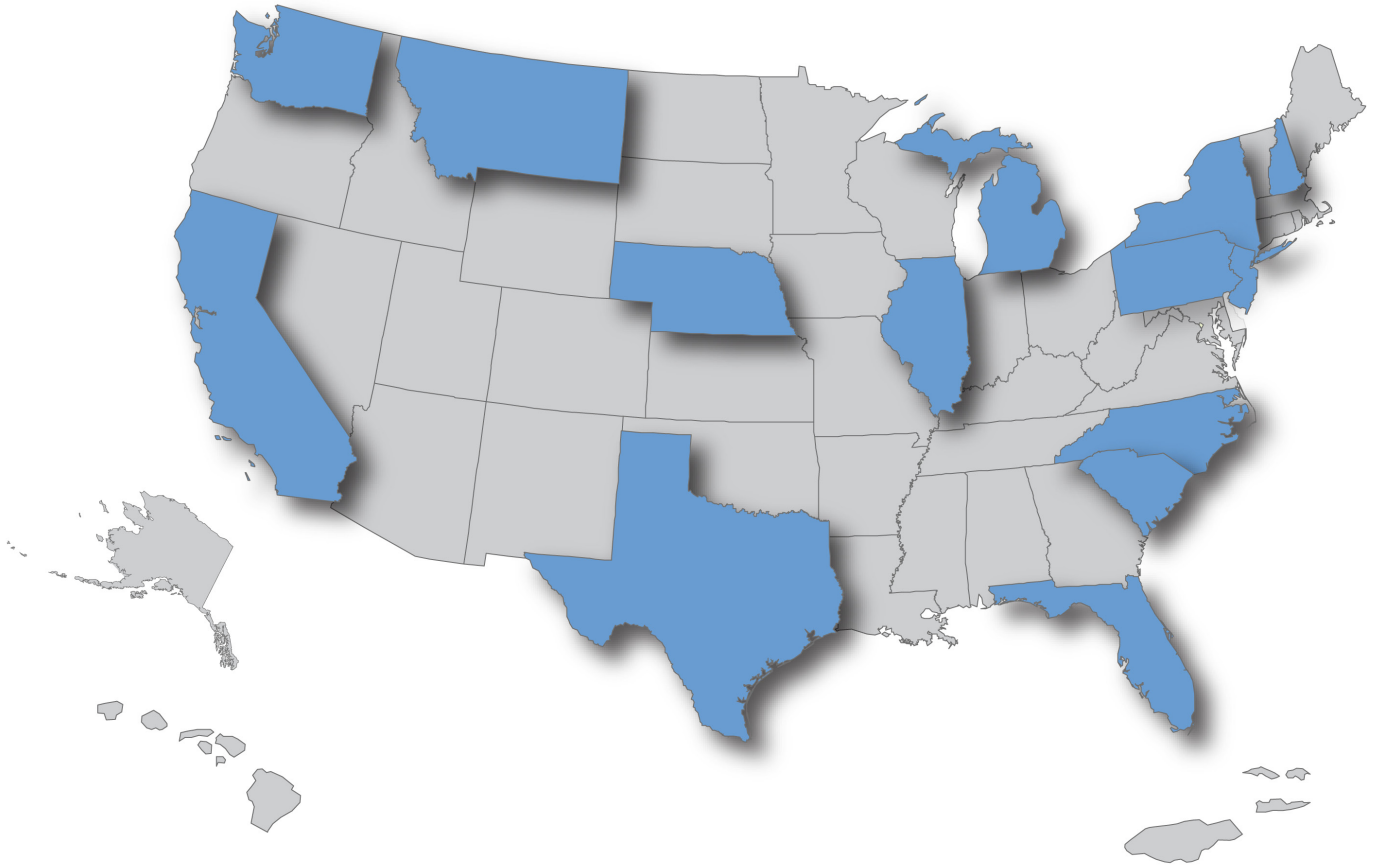
The National LUST Cleanup Backlog:
A Study of Opportunities



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APPENDIX B:
PHASE 1 ANALYSIS OF THE BACKLOG OF OPEN LUST RELEASES AS OF NOVEMBER 2006

Office of Solid Waste and Emergency Response
Office of Underground Storage Tanks
September 2011

LIST OF ACRONYMS

ASTSWMO	Association of State and Territorial Solid Waste Management Officials
EPA	U.S. Environmental Protection Agency
FY	Fiscal Year
LUST	Leaking Underground Storage Tank
OUST	Office of Underground Storage Tanks
SDWA	Safe Drinking Water Act
UST	Underground Storage Tank

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EXECUTIVE SUMMARY

Many underground storage tank (UST) releases were discovered due to the implementation of new federal release prevention and detection requirements and state cleanup programs. The total number of federally-regulated open (i.e., incomplete) leaking underground storage tank (LUST) releases is commonly referred to as the cleanup backlog or the backlog. Although the national backlog has declined since 2000, a large backlog of open LUST releases continues to exist despite cleanup efforts, and fewer cleanups are being completed annually by states. Several factors may have contributed to the decrease in annual cleanups completed by states since 2000, or more broadly, to the persistence of a cleanup backlog. In an effort to better characterize the composition of the LUST cleanup backlog, the U.S. Environmental Protection Agency's (EPA's) Office of Underground Storage Tanks (OUST) invited states to voluntarily share their LUST cleanup data for analysis. Forty-three states, Puerto Rico, and the District of Columbia volunteered data files.[1] The aggregate LUST cleanup backlog for the 45 states is 104,884 releases which is 92 percent of the 2006 national backlog of 113,915 releases. In this report, the backlog of 104,884 releases is a proxy for the "national backlog." These data provided a snapshot of the cleanup backlog as of November 2006.

Analysis of the state data identified several major characteristics of the backlog:

- Approximately two-thirds (64 percent; 67,147 releases) of releases in the national backlog are concentrated in 10 states.
- More than half (59 percent; 62,149 releases) of releases involve impacts to groundwater resources.
- More than half (55 percent; 57,588 releases) of cleanups in the backlog are 10 years of age or older:
    - Of releases that impact groundwater, 60 percent are 10 years old or older;
    - Of releases that contaminate soil only, 40 percent are 10 years old or older; and
    - Of releases where the impacted media is unknown, 48 percent are 10 years old or older.
- Approximately 21 percent of cleanups involve "unknown" media contamination, where the impacted media is not specified in the available data.
- There is an estimated $2.3 billion budget shortfall for cleanups for the 24 states with relevant data that could be analyzed.

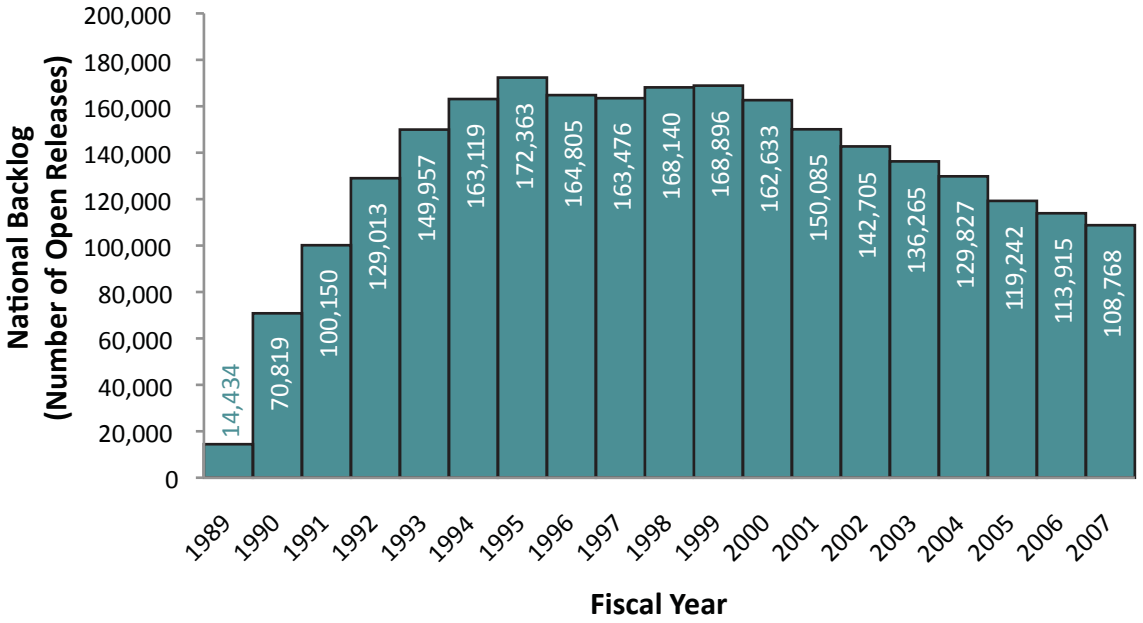
The 16,856 releases in the backlog that contaminate soil only could potentially offer an opportunity to reduce the cleanup backlog. More time will be needed to complete the 62,149 releases impacting groundwater. There are an additional 4,274 releases that impact other media. The true classification of the 21,605 releases where the contaminated media is unknown needs to be addressed to make a fully informed decision about how best to proceed with reducing the backlog. Closer tracking of impacted media and of older stalled cleanups would be very helpful to target and reduce the backlog of open LUST releases.

1. Arizona, Connecticut, Massachusetts, Maine, Vermont, Georgia, and South Dakota did not send in a data file. Ohio did not provide the release date necessary for the age calculation but did provide the number of backlogged cleanups and the type of media impacted.

BACKGROUND

In 1984, Congress passed Subtitle I of the Solid Waste Disposal Act (SWDA), which required EPA to develop a comprehensive program for regulation of underground tanks and underground tank systems and led to the promulgation of the federal UST regulations in 1988. The widespread implementation of new state release prevention, leak detection, and cleanup programs identified many additional open releases requiring cleanup. As states enforced regulations for UST release cleanups, the number of open LUST releases began increasing. This trend continued until Fiscal Year (FY) 1999, after which the number of open LUST releases began to decline (Figure 1 below). This decline illustrates that from 1999 to 2007, state programs were successfully reducing the national backlog by completing cleanups faster than new releases were being reported.

Figure 1. LUST National Backlog FY89 - FY07*

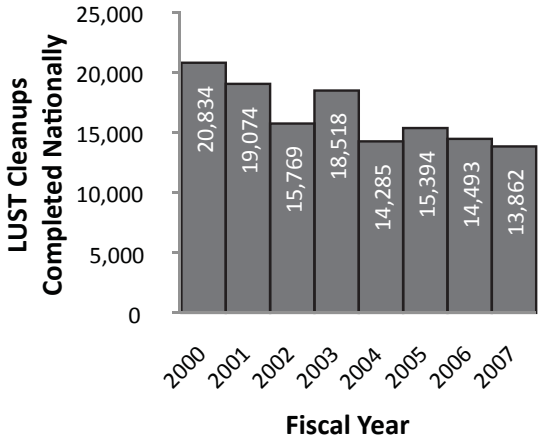


** Year 2000 dollars were calculated using the Bureau of Labor Statistics' Consumer Price Index inflation calculator.*

NUMBER OF CLEANUPS COMPLETED EACH YEAR HAS TRENDED DOWNWARD

Despite this reduction in the cleanup backlog (Figure 1, page 6), since 2000, fewer cleanups are being completed annually by state UST programs (Figure 2 below). With the exception of 2003, the number of cleanups completed annually by state UST programs has gradually decreased from 20,834 in 2000 to 13,862 in 2007.

Figure 2. Annual Cleanups Completed FY00 - FY07*

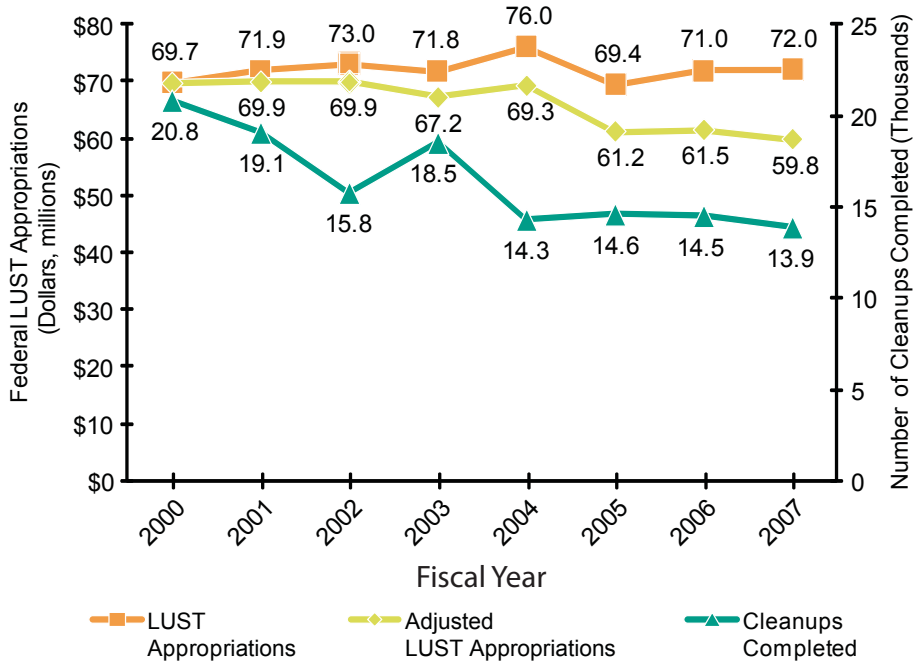


** Year 2000 dollars were calculated using the Bureau of Labor Statistics' Consumer Price Index inflation calculator.*

FEDERAL LUST SPENDING HAS TRENDED DOWNWARD WHEN ADJUSTED FOR INFLATION

During this same timeframe, annual federal LUST Trust Fund appropriations have declined when adjusted for inflation, although they have remained level in terms of current year dollars (Figure 3 below). These federal LUST dollars represent only a small portion of state cleanup funding and leverage much larger amounts of state resources that finance and oversee the large majority of LUST cleanups.

Figure 3. FY00-FY07 Cleanups Completed and LUST Appropriations (Actual and Year 2000 Dollars*)



** Year 2000 dollars were calculated using the Bureau of Labor Statistics' Consumer Price Index inflation calculator.*

TRENDS SLOWING STATE CLEANUPS

State cleanup funds have financed most active and completed cleanups in the backlog. In 2006, 36 states maintained active state cleanup funds for LUSTs. The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) State Fund Task Force reports from these states illustrate some state-level trends that likely affect the remaining backlog.[2] According to these reports, from 1994 to 2008 the 36 states with active cleanup funds processed more claims per year (Figure 4 top left), experienced increased caseloads per staff worker (Figure 5 top right), and incurred higher average cleanup cost at closure (Figure 6 bottom left). Figures 4-6 include fitted lines (orange) to better illustrate the increasing trends. In addition, the aggregate dollar value of unpaid claims against state funds often exceeds the funds' balance (Figure 7 bottom right).

Figure 4. Number of New Claims per Year

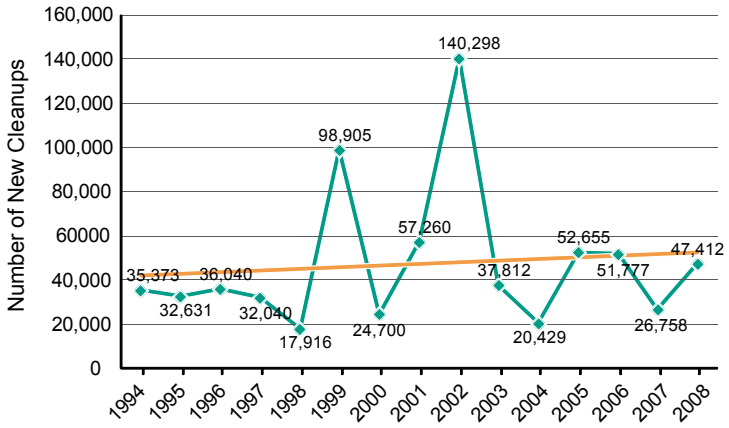


Figure 5. Average Staff Member Caseload

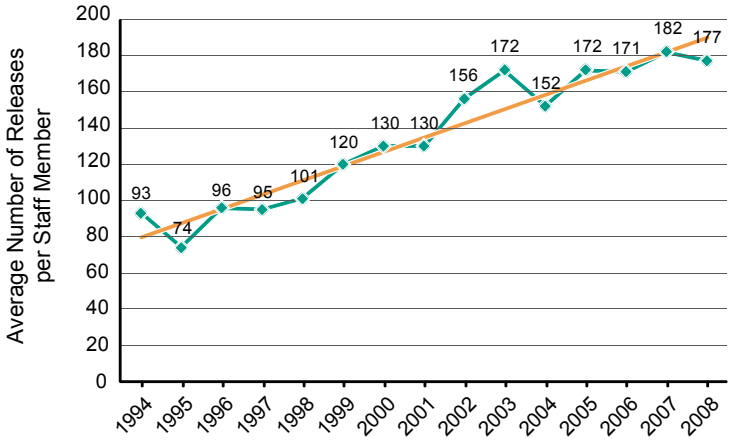


Figure 6. Average Cleanup Cost at Closure

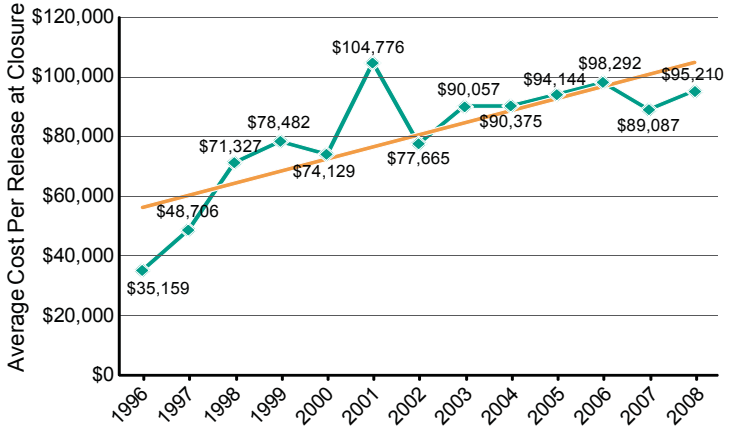
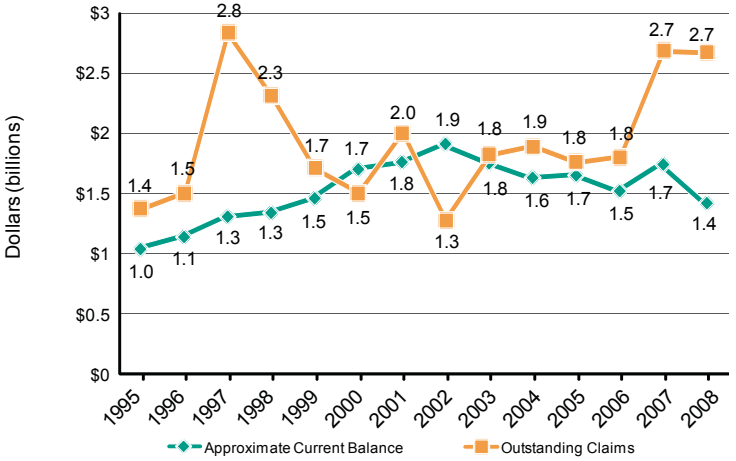


Figure 7. Aggregate State Fund Balances and Outstanding Claims



2. ASTSWMO Tanks Subcommittee publications www.astswmo.org/Pages/Policies_and_Publications/Tanks.htm.

A SNAPSHOT OF THE CLEANUP BACKLOG

In order to better characterize the composition of the LUST cleanup backlog, OUST invited states to voluntarily share data on their LUST releases as of November 2006. Forty-three states, Puerto Rico, and the District of Columbia volunteered data files.[3] For convenience, Puerto Rico and the District of Columbia will be considered as states throughout this report and data will be described as coming from 45 states.

Backlog data from these 45 states were analyzed by geographic distribution, age, and type of media impacted. For 24 states with available data, FY 2006 LUST cleanup funding was also analyzed. Data from 15 of the 45 states were used to identify the brand name associated with cleanup sites. These analyses identified several major characteristics of the backlog.

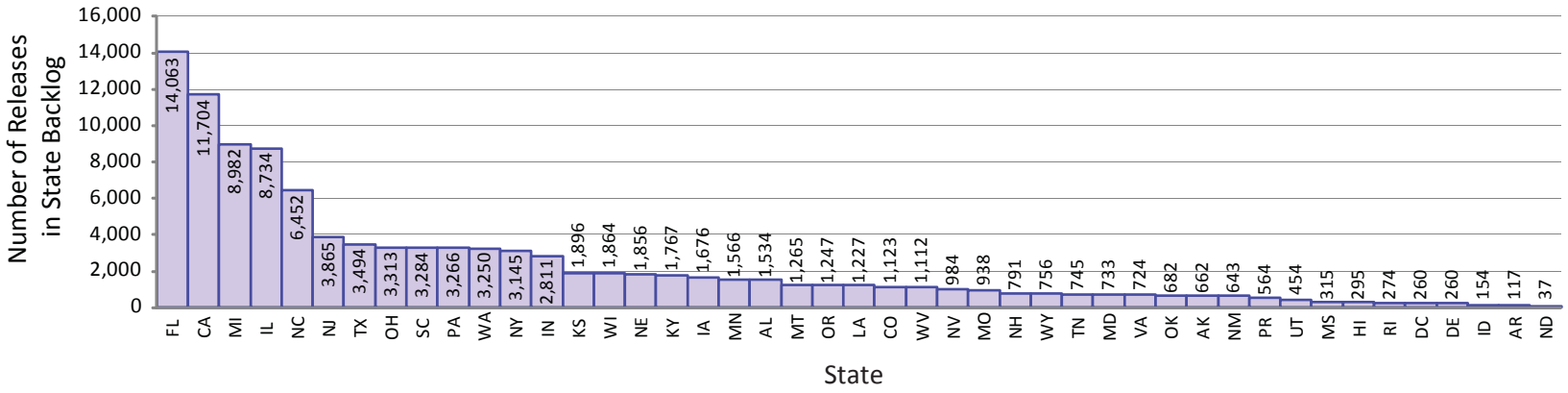
MORE THAN HALF OF THE NATIONAL BACKLOG IS CONCENTRATED IN 10 STATES

There are a total of 104,884 releases in the November 2006 data from the 45 states. The majority of the cleanup backlog is concentrated in relatively few states. More than 64 percent (67,157 releases) of the national backlog is concentrated in 10 states, and more than 48 percent (49,935 releases) is within five states. Figure 8 below displays the number of releases per state from highest (14,063 releases in Florida) to lowest (37 releases in North Dakota).

The 10 states that have the largest backlogs include Florida, California, Michigan, Illinois, North Carolina, New Jersey, Texas, Ohio, South Carolina, and Pennsylvania. Among these states, Florida and California have over 10,000 releases each, followed by Michigan and Illinois with over 8,500 releases each, and North Carolina with approximately 6,500 releases. The remaining five states each have approximately 3,000 releases.

However, the majority (32 states) of the 45 states analyzed has a relatively small backlog, each reporting less than 2,000 releases in November 2006. The states with the largest backlogs are located in six of the ten EPA Regions, with Regions 4 and 5 having the largest backlogs.

Figure 8. Cleanup Backlogs, by State

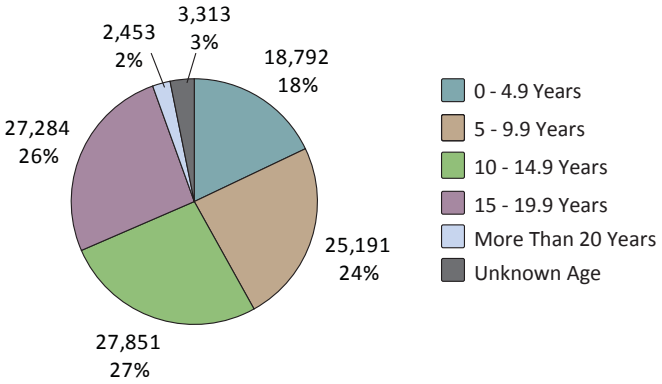


3. Arizona, Connecticut, Massachusetts, Maine, Vermont, Georgia, and South Dakota did not send in a data file. Ohio did not provide the release date necessary for the age calculation but did provide the number of backlogged cleanups and the type of media impacted.

More Than Half of Releases Are at Least 10 Years Old

The majority of the cleanup backlog is composed of relatively older releases. Considering releases affecting all types of media, 55 percent (57,588 releases) of releases are 10 years old or older (Figure 9 below).

Figure 9. Release Age Distribution



More Than Half of Releases Contaminate Groundwater

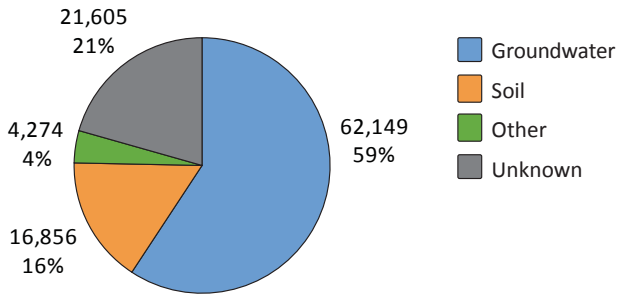
With all age classes combined, releases impacting groundwater constitute more than 59 percent (62,149 releases) of the national backlog.[4] Soil-only releases constitute 16 percent (16,856 releases) of the national backlog, and a substantial portion (21 percent; 21,605 releases), have unknown media contamination. Additional releases impacting "Other" media (e.g., vapor or surface water) constitute the remaining four percent of the national backlog (Figure 10, to the left and below).

The November 2006 data suggest that among older releases, releases that impact groundwater are more common than releases that impact soil only (Figure 11, page 11). The larger number of older releases with groundwater impacts is expected because groundwater cleanups tend to be slower and more costly than soil-only cleanups.

As of November 2006, there were 62,149 releases impacting groundwater across the 45 states, constituting more than half of the national backlog (Figure 10). These releases with groundwater contamination tend to be older, with approximately 60 percent (37,642 releases) that are 10 years old or older (Figure 12, page 11). Because most national backlog releases affect groundwater and most groundwater cleanups are older, these releases are driving the age distribution pattern of the national backlog (Figures 9 and 12).

A relatively large number of releases contaminating groundwater resources are concentrated in a few states (Figure 13, page 11). In addition, seven of the 10 states with the largest backlogs have over 1,000 releases that impact groundwater and are 10 years old or older.

Figure 10. Percentage of National Backlog by Media Contaminated



4. This percentage is based on the classification of all releases with unknown impacts in Florida as releases with groundwater contamination. According to state staff, Florida has a shallow depth to groundwater and, therefore, those releases where it was not possible to identify the media contaminated based on available data are most likely releases with groundwater contamination. When calculated without this assumption, 46 percent of releases contaminate groundwater.

Figure 11. Age of Releases by Media Contaminated

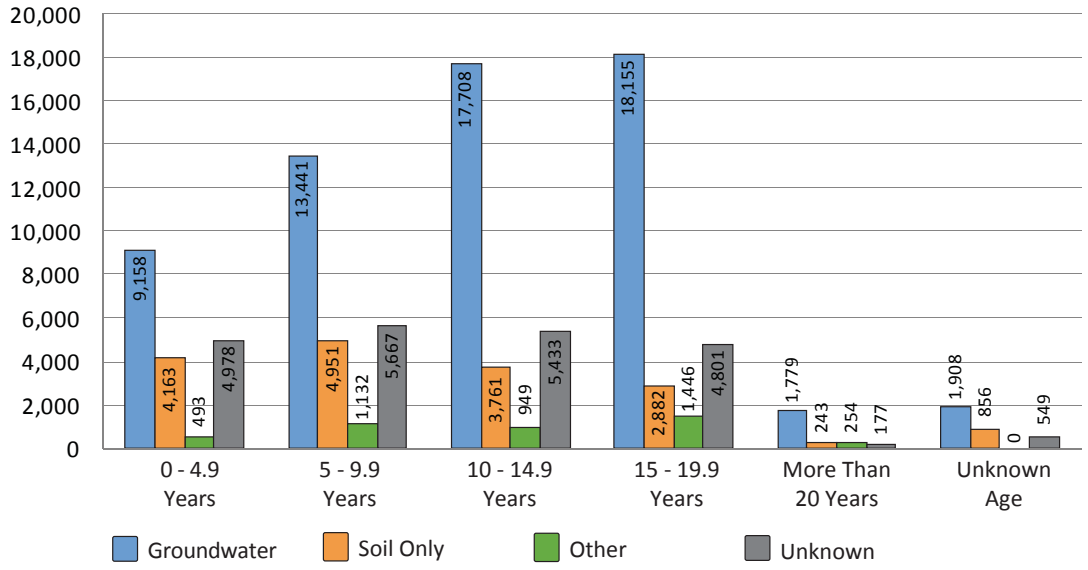


Figure 12. Age Distribution of Releases that Impact Groundwater

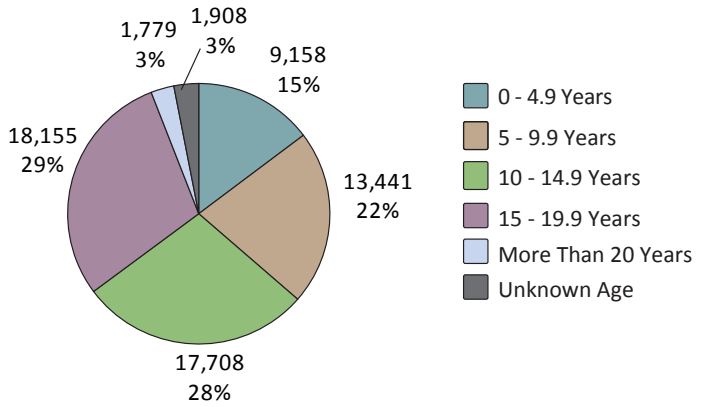
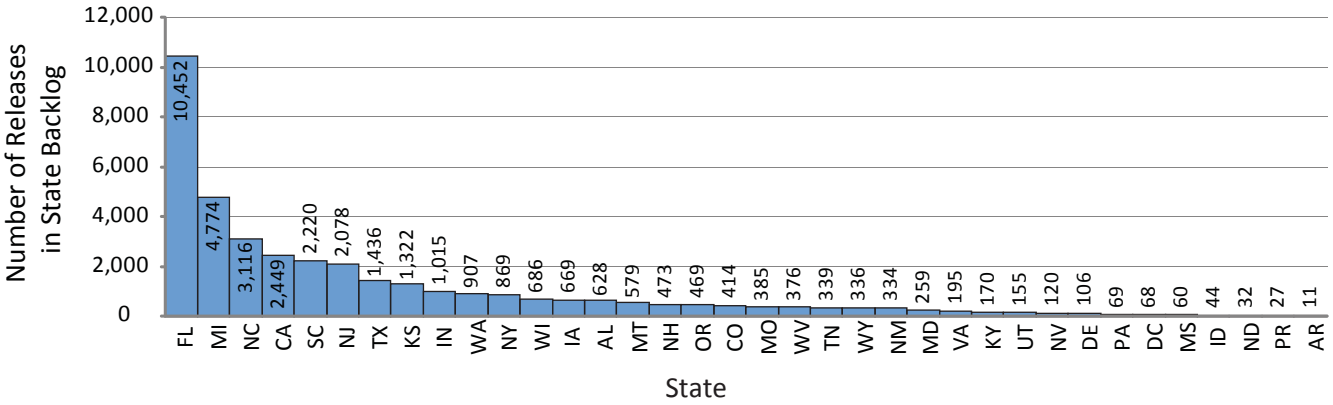


Figure 13. Releases 10 Years Old or Older that Impact Groundwater, by State



RELEASES THAT IMPACT SOIL ONLY CONSTITUTE 16 PERCENT OF THE BACKLOG

Although releases contaminating soil only would be expected to be cleaned up relatively quickly, many older releases that contaminate soil only remain in the backlog. Compared to releases that affect groundwater resources (Figure 12, page 11), releases that impact soil only were more concentrated in the age classes of zero to 10 years (Figure 14, to the right). However, there are still 6,886 releases impacting soil only that were 10 years old or older, consisting of nearly half (41 percent) of the soil-only cleanups.

The number of open releases that contaminate soil only that are at least 10 years old is shown in Figure 15 below. The largest numbers of older releases impacting soil only are found in Washington, California, and North Carolina.

Figure 14. Age Distribution of Releases that Impact Soil Only

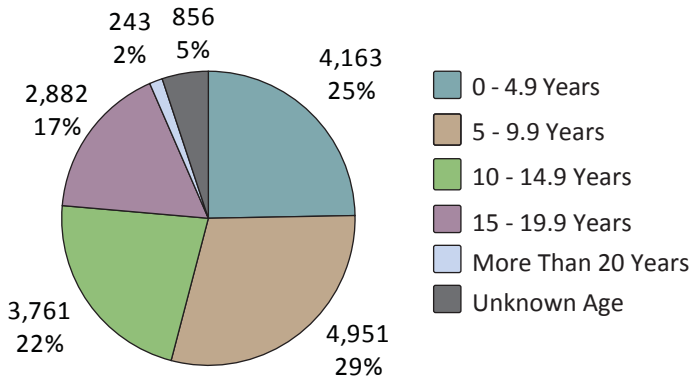
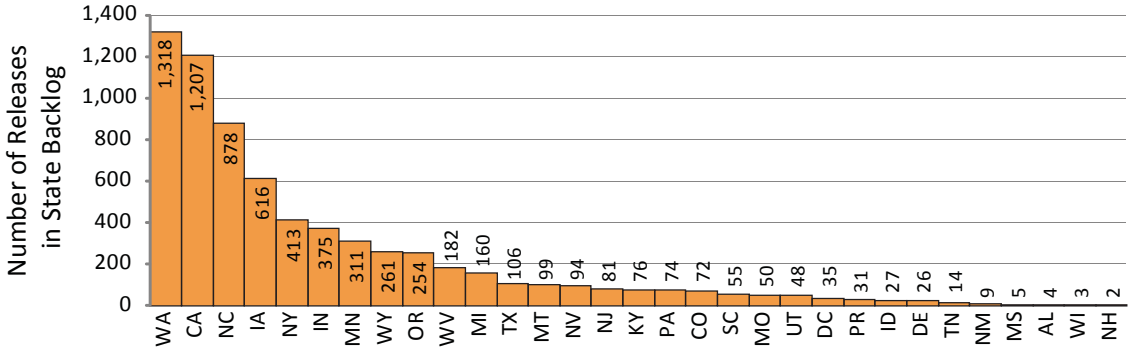


Figure 15. Releases 10 Years Old or Older that Impact Soil Only, by State



RELEASES WITH UNKNOWN MEDIA CONTAMINATION CONSTITUTE 21 PERCENT OF THE BACKLOG

In 2006, 21 percent (21,605 releases) of the cleanup backlog consisted of releases where the type of media contaminated was not specified in the states' data. Therefore, these releases are considered to have unknown media contamination.[5] The 21,605 releases with unknown media contamination are evenly distributed across the age classes between zero and 20 years (Figure 16, to the right).

The 10,411 releases with unknown-media impacts that were 10 years old or older are distributed evenly across many states, with the exception of Illinois (Figure 17 below). Illinois' data showed that the media contaminated was unknown for all of its large number of releases. Thus, Illinois' cleanup backlog contributed to the substantial portion of the releases with unknown-media impacts in the national backlog.

Figure 16. Age Distribution of Releases that Impact Unknown Media

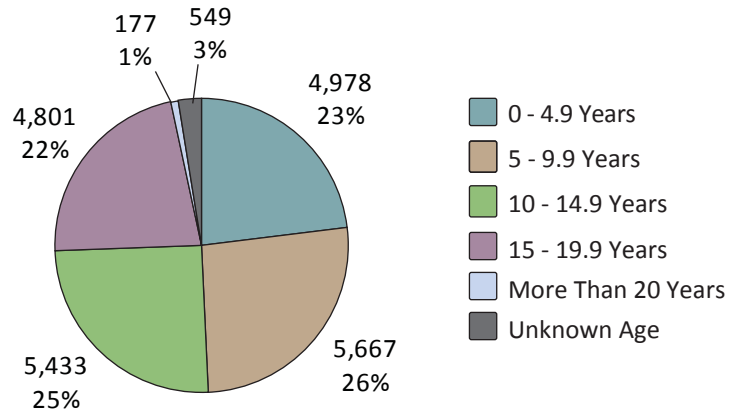
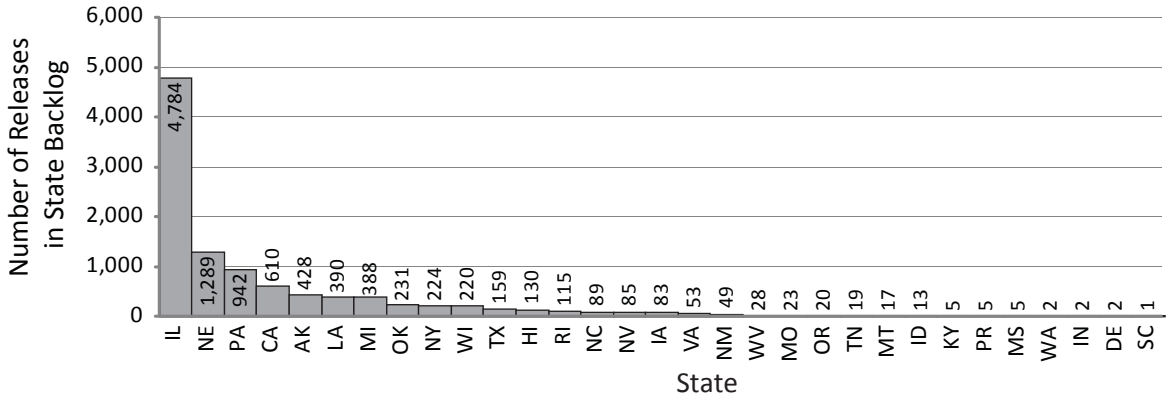


Figure 17. Releases 10 Years Old or Older that Impact Unknown Media, by State



5. This percentage is based on the classification of all releases with unknown media impacts in Florida as releases with groundwater contamination. When calculated without this assumption, 34 percent of releases contaminate unknown media.

A $2.3 BILLION BUDGET SHORTFALL FOR CLEANUPS MAY EXIST FOR THE 24 STATES ANALYZED

A gap in cleanup funding is indicated in data provided by 24 states that used state funds for 2006 cleanups. These 24 states reported 38,780 open LUST releases as of November 2006, of which only 13,254 cleanups were receiving state financing (Table 1). This left an estimated 25,526 remaining cleanups not financed by state LUST cleanup funds. Multiplying the number of unfinanced cleanups by each state's average cleanup cost at closure estimates that approximately $2.3 billion dollars would be needed to fund the unfinanced cleanups. Data from California were unavailable for this analysis, but if included would likely increase the estimated funding gap significantly.

Table 1. Estimated FY06 Funding Gap in 24 States[6]

State	Number of Backlogged Cleanups as of Nov 2006	Ongoing LUST Cleanups Receiving State Funding In FY06	Unfinanced Cleanups	Average Cleanup Cost At Closure (FY06)	Estimated Funding Gap
IL	8,734	1,047	7,687	$108,000	$830,196,000
OH	3,313	300	3,013	$62,346	$187,848,498
SC	3,284	1,111	2,173	$34,742	$75,494,366
PA	3,266	1,980	1,286	$162,743	$209,287,498
IN	2,811	782	2,029	$174,754	$354,575,866
KS	1,896	384	1,512	$42,000	$63,504,000
NE	1,856	215	1,641	$100,000	$164,100,000
KY	1,767	1,213	554	$51,786	$28,689,444
AL	1,534	964	570	$89,559	$51,048,630
MT	1,265	376	889	$63,756	$56,679,084
LA	1,227	575	652	$350,000	$228,200,000
CO	1,123	625	498	$92,698	$46,163,604
NV	984	220	764	$99,450	$75,979,800
MO	938	674	264	$89,000	$23,496,000
NH	791	719	72	$39,492	$2,843,424
TN	745	391	354	$93,141	$32,971,914
VA	724	443	281	$59,342	$16,675,102
OK	682	0	682	$90,431	$61,673,942
NM	643	560	83	$350,000	$29,050,000
UT	454	298	156	$19,711	$3,074,916
MS	315	246	69	$126,537	$8,731,053
RI	274	0	274	$125,572	$34,406,728
AR	117	115	2	$189,908	$379,816
ND	37	16	21	$27,852	$584,892
Total	**38,780**	**13,254**	**25,526**		**$2,300,169,469**

6. Compilation of State Fund Soundness Data forms returned to OUST for state fiscal year 2006.

POTENTIAL OPPORTUNITIES TO EXPEDITE REDUCTION OF THE CLEANUP BACKLOG

Based on the Phase 1 data, EPA identified three areas with potential opportunities to reduce the backlog of open releases. To further explore whether these and other areas of the backlog might benefit from backlog reduction strategies, EPA embarked on a rigorous Phase 2 study to obtain a greater level of detail about open releases in the backlog. EPA plans to work collaboratively with states to further characterize the backlog and explore the merits or disadvantages of potential opportunities and associated backlog reduction strategies.

CONCENTRATED DISTRIBUTION OF RELEASES

Approximately two-thirds (64 percent; 67,157 releases) of the releases in the national backlog are concentrated in 10 states. A large concentration in such a small number of states presents an opportunity to effectively reduce the national backlog by focusing resources and efforts on the few states with the largest share of the national backlog.

RELEASES WITH SOIL-ONLY CONTAMINATION

The November 2006 data show that many older releases with soil-only impacts remain in the backlog, including more than 6,800 releases that are at least 10 years old. Conventional wisdom holds that soil-only cleanups could be dealt with more expeditiously than groundwater cleanups. Therefore, these soil-only cleanups may present an opportunity to quickly reduce the national backlog.

RELEASES WITH UNKNOWN MEDIA CONTAMINATION

The high numbers of releases contaminating unknown media in every age group make it difficult to fully characterize the cleanup backlog. Specifying the media contaminated by these releases with unknown-media impacts could change the character of the November 2006 backlog and imply significantly different strategies to reduce the backlog.

For example, if a high percentage of releases with unknown-media contamination impact soil only, these releases could be targeted to accelerate reduction of the backlog. In contrast, if most of the releases where the contaminated media is unknown were releases where groundwater is contaminated, the backlog would likely take longer to reduce.

Regardless of their nature, the presence of large numbers of releases where the media contaminated is unknown indicates that many states' LUST data management can be improved in order to provide data for the media impacted for future backlog assessments and for developing strategies to reduce the cleanup backlog.

POTENTIAL CONSTRAINTS ON EXPEDITING BACKLOG REDUCTION

DATA MANAGEMENT

The fact that 21 percent (21,605 releases) of the backlog involves unknown media contamination suggests potential widespread information gaps in state cleanup data management systems. 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.

STATE FINANCING GAPS

Of states with available state funding data, the four with the largest backlogs accounted for more than $1.3 billion of the estimated $2.3 billion state funding gap (see Table 1). Because these four states (Illinois, Ohio, South Carolina, and Pennsylvania) rely primarily on state funds, their lack of adequate state funding could be contributing to the persistence of their backlogs.

TECHNOLOGICAL CONSTRAINTS OF GROUNDWATER CLEANUP

The longer timeframe needed to clean up a release affecting groundwater likely accounts for the continued persistence of releases that impact groundwater in the backlog. A systematic evaluation of cleanup progress and consideration of alternative cleanup technologies or other strategies might be necessary to reduce the time to closure for these releases. With 59 percent (62,149 releases) of the backlog consisting of releases where groundwater resources are impacted, it could be challenging to accelerate the reduction of the backlog.

CONCLUSION

The persistence of the cleanup backlog is likely the result of many factors, making it challenging to develop successful backlog reduction strategies. However, this snapshot of the November 2006 cleanups describes specific states, release age classes, and media impacted that constitute the majority of the national backlog and reveals potential opportunities to expedite cleanups. Use of these data will help EPA and the states work together to reduce the national backlog and to improve national and state LUST cleanup strategies.

METHODOLOGY AND DATA QUALITY

MISSING DATA

The majority of the records excluded from these analyses were removed due to invalid or missing confirmed release dates, without which release age could not be calculated. The frequency of these data gaps suggests that data entry errors and missing data might be a common issue in state LUST data management.

UNUSABLE RECORDS

Initial review of the data led to the exclusion of 5.4 percent of the records in the original state data files (5,765 records were excluded from the original 110,649 records). The majority of the records were excluded because they did not have a confirmed release date (4,734 records, or 4.4 percent of the total records). A smaller portion of the records were excluded because they are likely duplicates (1,031 records, or 1 percent of the total records).

Many of the records in states' data files shared the same identifier data fields, indicating potential duplicates. In addition, some of the records with the same identifier data fields also shared the same confirmed release dates and media impacted, further suggesting potential data management issues in these data files. In order to evaluate the magnitude of potential duplicates counted as separate records, records that shared the same identifier data fields and the same confirmed release dates were flagged and treated as separate data records. Records that shared the same identifier data fields, the same confirmed release dates, and the same media impacted were treated as the same record (one from each duplicate set was retained while others were excluded).

INTERPRETATIONS OF AMBIGUOUS FIELDS AND VALUES

In order to perform comparisons among states based on the media impacted, the contaminated media were categorized into one of the following four types: "Groundwater," "Soil Only," "Unknown," and "Other." Several states use more detailed category systems with media impacted that are not commonly tracked by most states, such as "Drinking Water," "Spring," "Free Product," "Air," and "Bedrock." These data entries were considered "Other" media. For example, California tracks additional media impacted other than those discussed in this report (i.e., "Drinking Water" and "Surface Water") in its LUST database. For this report, 3,929 releases in California that are listed as impacting "Drinking Water" or "Surface Water" are counted in the "Other" media category. In addition, there are high percentages of releases with unknown media impacts in the November 2006 data, some of which may actually contaminate a known media type that was not specified or pulled into the data files.

The reclassification of all releases with unknown-media impacts in Florida as releases contaminating groundwater was considered a safe assumption on the basis of conversation with state staff. Florida alone accounts for 13 percent of the national backlog, and this reclassification substantially alters the distribution of the type of media impacted, but the resulting data are likely a better representation of the national backlog.

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United States
Environmental
Protection Agency

Solid Waste And
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www.epa.gov/oust