OVERVIEW

Over 18,000 sites and an associated 22 million acres of land are related to the primary hazardous waste programs that comprise much of the nation's hazardous waste infrastructure, and more than half of the U.S. population lives within three miles of a hazardous waste site. The current capacity of the nation's hazardous waste infrastructure is generally adequate, owing in no small measure to significant improvements in managing materials through recycling and reuse, rather than disposal. There have also been significant improvements in remediation technologies, resulting in faster and less resource-intensive cleanup approaches.

CAPACITY & CONDITION

Three primary programs have shaped the nation's hazardous waste infrastructure: Superfund, RCRA, and Brownfields. Each of these three programs plays a distinct and important role in the overall infrastructure that manages hazardous waste. As evidence of the importance of maintaining and strengthening the nation's hazardous waste infrastructure, more than half of the U.S. population lives within three miles of a hazardous waste site. Over 18,000 sites and an associated 22 million acres of land are addressed through these three programs.

Recognizing that hazardous waste disposal without planning and management endangers the public health and environment, Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976 to manage hazardous waste from generation to disposal. The RCRA Corrective Action (CA) program drives the cleanup of legacy sites while the RCRA permitting program governs the generation and proper disposal of ongoing operations that result in hazardous waste.

To clean up hazardous waste produced and improperly disposed of prior to the enactment of RCRA, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act

(CERCLA) in 1980. CERCLA created the hazardous waste cleanup program most commonly referred to as "Superfund." The National Priorities List (NPL), maintained by EPA, contains the list of sites covered by Superfund. The NPL is routinely updated as sites are cleaned and removed from the list, and other sites are discovered, evaluated, and added. As of September 2016, there were 1,180 non-Federal sites, and 157 Federal Sites on the NPL (these numbers exclude sites proposed for the NPL, but not yet final). 392 had been deleted from the NPL.

The current capacity of the nation's hazardous waste infrastructure is generally adequate, owing in no small measure to significant improvements in managing materials through recycling and reuse, rather than disposal. As a result, the amount of hazardous material requiring long-term management has tended to decrease over time, even during times of economic expansion.

There have also been significant improvements in remediation technologies, resulting in faster and less resource-intensive cleanup approaches. While the impact of cleanup activities under Superfund and other programs is demonstrably significant, perhaps the most significant long-term impact is that the technical requirements and enforcement and liability provisions under these programs have led to a significant reduction in careless disposal of hazardous materials.

While Superfund is a mature program and technologies for cleanup are advancing, the capacity of the program (including funding) to take on very large and complex sites, including contaminated sediment sites and area-wide impacts from legacy mining sites, is inadequate. Contamination from more than 160,000 abandoned mines in the West poses costly and complex environmental and public health challenges.

SUPERFUND

The Superfund program addresses contamination from uncontrolled releases at Superfund hazardous waste sites that threaten human health and the environment. The overarching goals of the program are to ensure the protection of human health and the environment and to maximize the participation of potentially responsible parties (PRPs). EPA places some of the most seriously contaminated sites on the National Priorities List (NPL). By definition, Superfund sites are the sites on the NPL.

Superfund cleanups help convert vacant and underutilized land into productive resources, bring economic benefits to communities by facilitating job creation, increase property values, and enhance local tax bases. At 454 Superfund sites where cleanup activities enable beneficial reuse, operating businesses are employing over 108,000 people and generating annual revenue sales of $29 billion—almost four times EPA's cleanup expenditures at these sites.

Looking at Superfund actions and major milestones on a cumulative basis (Exhibits 3 and 4), shows that the Superfund program is essentially "steady state"—the rate of deletions from the NPL and construction completions has been very close to the rate at which new sites have been added to the NPL, and the size of the active NPL is essentially unchanged since 2003.

In FY 2014 and 2015, the Superfund program made significant progress in catching up on deferred projects. In FY 2015, 59 new remedial construction projects were started, including 33 government-led projects and 26 PRP-led projects, and oversight of cleanup was provided at more than 380 remedial

construction projects started in prior fiscal years. The backlog of deferred shovel ready projects has been substantially reduced—a very positive development. What is not clear is whether this represents an actual acceleration in the pace of cleanup, or if funding constraints for hazardous waste cleanup programs—at the federal (i.e., Superfund), state, and regional levels—are resulting in fewer sites being addressed through these cleanup programs. It is reasonable to assume that both factors may be contributing to a smaller backlog of deferred projects.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

While the RCRA waste management and cleanup program has established a solid foundation for protecting the nation's health and the environment, its mission continues to evolve to meet waste management and cleanup challenges and leverage opportunities to integrate resource conservation into economic productivity.

The impact of the RCRA program is significant. There are about 6,600 facilities, with over 20,000 process units, in the full RCRA permitting universe, and between approximately 350,000 and 550,000 facilities that generate hazardous waste. Approximately 2.5 billion tons of solid, industrial, and hazardous waste resulting from the manufacturing and use of goods are managed through the program, of which 30 to 40 million tons are classified as hazardous waste annually.

RCRA corrective actions are addressing more than 3,700 existing contaminated facilities needing cleanup. The program also provides grant funding to help states implement authorized hazardous waste programs. RCRA has built-in incentives for regulated facilities to reduce or avoid greenhouse gas emissions through materials and land management practices.

Some of the major challenges facing the RCRA program is the need to keep supporting the development of new manufacturing technologies and waste management methods, revisit regulatory frameworks, and make modifications that allow businesses, especially those in the manufacturing sector, to operate in accordance with the protection of human health and the environment, while streamlining the permitting process. The program's shift to an electronic permitting program is an important part of that effort. The program has been a catalyst for encouraging process substitution, materials and energy recovery, as well as properly conducted recycling, reuse, and treatment, with a meaningful evolution from a strictly "waste management" program to "sustainable materials management".

A key measure of how the RCRA program is performing is its effectiveness in protecting populations and preventing exposure to hazardous chemicals. Recent data shows that 87% of RCRA facilities have controls in place that prevent human exposure to toxic chemicals, and 77% of RCRA facilities are effectively preventing the migration of contaminated groundwater.

BROWNFIELDS

The Brownfields Program is principally supported through a variety of grants from EPA to support local execution of environmental assessments, cleanup, and job training activities. In addition to EPA funding, other agencies across the government provide funding in support of brownfields redevelopment. While there are many publicly-supported levels of brownfields redevelopment, cleanup is typically an initiator, and therefore the assessment and cleanup investment is critical to beneficial progress.

The impacts of Brownfields redevelopment have included economic and environmental benefits. Cleanup has led to improve home values and a greater tax base, with an economic benefit ratio of 18-to-1 for every federal dollar spent, including business expansion and job growth related to infrastructure improvements and improved business performance.

FUNDING & FUTURE NEED

Approximately 70% of Superfund cleanup activities historically have been paid for by parties responsible (PRPs) for the cleanup of contamination. Until the mid-1990s, most of the funding for clean-up activities led by the government (where there was no PRP to pay for cleanup) came from a tax on the petroleum and chemical industries. Currently, virtually all funding for government-led cleanup sites under Superfund comes from general revenues or special accounts funded through settlements with PRPs. The Superfund program has experienced flat or declining budgets since 2009. Drilling down in the FY 2016 and proposed 2017 budgets, there is a modest proposed increase in the Superfund budget, with largest increase for the remedial response program, which is used to fund long-term cleanup actions. The performance of the Superfund program can be evaluated in the pace at which NPL actions are taken and the key milestones are achieved. The pace of the program has been slowed by declining budgets. The number of construction completions has generally declined, as has the number of site deletions.

Operating costs of groundwater treatment systems represents a large and growing share of Superfund expenditures, and that cost impact is felt by EPA, states (which are responsible for long-term O&M costs at non-PRP lead sites), federal Superfund sites (e.g., Department of Defense and Department OE facilities), and of course, by the private sector at PRP-led sites. All of these parties are making targeted investments in technology to optimize both the characterization and cleanup process. This focus on optimization represents an important commitment to improve the program.

Over the past several years, EPA's workforce has declined by over 2,000 employees. With that reduction in force, the ranks of EPA Superfund project managers, scientists, and engineers has significantly declined, as has the Agency's staff of procurement professionals. As a result, EPA's ability to keep pace with program needs has been substantially impacted.

For Brownfields, current funding levels are less than what is needed to optimize the benefits of this successful program. That shortfall has an impact on both pre-construction and construction activities. While some projects are deferred altogether due to lack of available funds, other projects progress in series of small phases, adding time and cost for achieving cleanup. In a 2011 study of Superfund costs conducted by the Government Accountability Office, EPA Regional officials estimated that the costs to perform timely and cost-effective remedial construction on existing projects on an annual basis was $253 to $414 million more than the expected budget.

Approximately 30% of grant proposals submitted to EPA for brownfields cleanup are funded. Many deserving projects that could significantly benefit communities aren't getting funded. More funding would leverage more dollars and stimulate job growth and economic benefit, while improving the condition of the nation's infrastructure. While the benefits of the brownfield program are evident in

rural, suburban and urban settings, brownfields investment is particularly important for creating more economic opportunity and a positive impact on communities in the nation's urban centers.

For RCRA, with facilities constantly changing, it is critical that states and EPA maintain sufficient expertise and resources to process permits in a timely manner and allow businesses, especially those in the manufacturing sector, the opportunity to adjust to variable markets. The challenge for the future is to improve efficiency, develop better permit status tracking, enhance compliance reporting, expand technical assistance to manufacturing and other waste generators, and improve and streamline permitting processes.

PUBLIC SAFETY & RESILIENCE

Impacts of more intense storms, increased flooding, and rising sea levels may jeopardize a large number of constructed remedies at Superfund sites. EPA's inventory of Superfund sites shows that over 500 Superfund sites are within a 100-year floodplain or at an elevation less than 6 feet above mean sea level, and it is likely that a portion of the engineered systems in place at these sites are vulnerable.

While groundwater pump and treatment systems are essential to protecting drinking water supplies and other water resources, those systems consume and often make that water unavailable for other beneficial uses. That affects the resiliency of water supplies, primarily in drought-affected areas, especially in the western U.S. Many of these existing systems have not been optimized, and their performance can be significantly improved in terms of contamination removal efficiency, and reduced water and energy use.

Our hazardous waste infrastructure also has an impact on climate. It has been estimated that approximately 42% of U.S. greenhouse gas emissions are attributable to materials management activities, and approximately 16% are related to land management choices. An ongoing effort is needed to continue to reduce waste generation, develop treatment technologies that require less energy and chemicals and use less water, and make our hazardous waste infrastructure more resilient to extreme weather.

RECOMMENDATIONS TO RAISE THE GRADE

- Emphasize a robust technical focus and increased, stable, designated funding source for mining site cleanup, which already consumes a large percentage of the Superfund budget, and continue to be a major source of contamination and environmental degradation.
- Expand Brownfield grant programs to support investment in pre-development site characterization activities, increasing leverage and stimulating greater investment from state, regional, local, and private funding sources.
- Recognizing that an effective waste management system is a critical "enabler" of the manufacturing economy, the RCRA program should focus on better permit status tracking, reducing the paper burden on regulated facilities, improvements and greater reliance on electronic reporting, growing the technical assistance and accessibility of the permitting process, and accelerated permit reviews.
- Further research on more sustainable, cost effective remedial approaches for mining sites.

- Investment in technology to optimize and improve efficiency of groundwater treatment systems.
- Investment in technology and guidance to address threats from vapor intrusion at Superfund sites.
- Address staff shortages and training gaps in the Superfund program and procurement function.

DEFINTIONS

Brownfields – Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

National Priority List (NPL) – The list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.

Resource Conservation and Recovery Act (RCRA) – A 1976 law that gives EPA the authority to control hazardous waste from the cradle-to-grave including the generation, transportation, treatment, storage, and disposal of hazardous waste.

Superfund or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – The federal government's program to cleanup uncontrolled hazardous waste sites.

SOURCES

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