United States
Environmental Protection
Agency

Solid Waste and
Emergency Response
(5502G)

EPA 520-F-94-011
Summer 1994

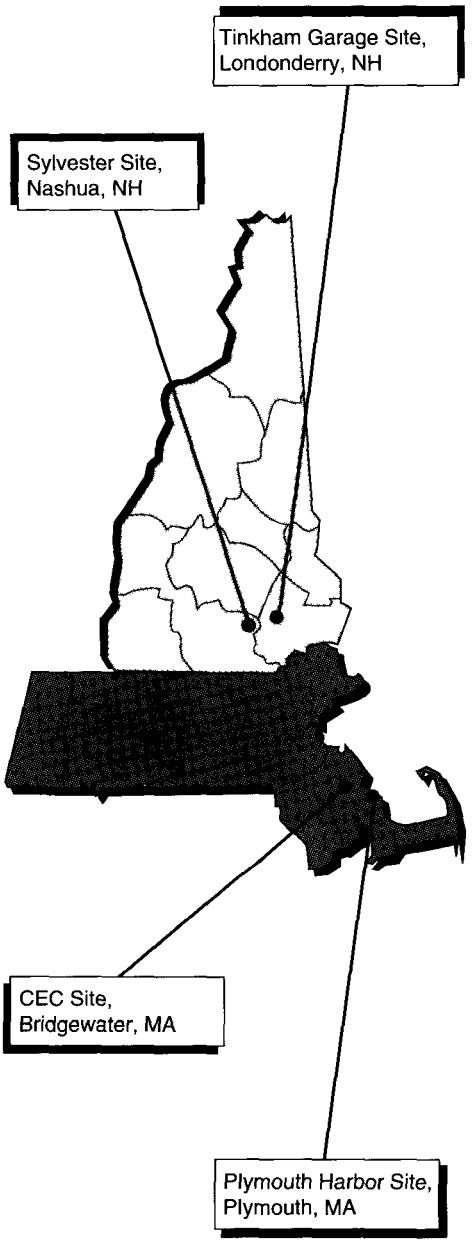
EPA

Superfund At Work

Hazardous Waste Cleanup Efforts Nationwide

Success in Brief

Superfund Tackles Operation That Spawned Four Waste Sites



Before passage of the Superfund law, companies like Cannon Engineering Corporation (CEC) operated with virtual impunity. Hazardous waste slated for treatment was stockpiled, held in leaking storage facilities, and dumped at four sites in Massachusetts and New Hampshire, causing extensive environmental contamination.

Innovative use of legal authority by the U.S. Environmental Protection Agency (EPA) resulted in firm but fair settlements that netted more than $50 million in work and cash payments. EPA effectively negotiated with literally hundreds of minor waste contributors to pay settlement amounts based on volumetric share and to exit the process without litigation. EPA also successfully reached a major $33 million settlement with 47 parties to perform cleanup work and reimburse a portion of EPA costs.

The following cases show how cooperative efforts by the states, private companies, and concerned citizens helped EPA make simultaneous progress at four very different locations. The Bridgewater and Plymouth Harbor sites are ready for industrial or commercial redevelopment. Long-term remedial work is under way at the two New Hampshire sites.

Regional Administrator Julie Belaga removed the final hazard warning sign from the Bridgewater, MA site to mark the first completion of a Superfund site cleanup in New England, October 22, 1991.

Hazardous Waste Inundates Bridgewater

In 1974, CEC began accepting industrial waste for storage and incineration at a six-acre site in Bridgewater, Massachusetts. The facility was distinguished by a row of hulking storage tanks flanking a taller incinerator stack. Ironically, the storage tanks were empty, but 21 other tanks around the site reached capacity with chemicals, paints, and oily waste.

The facility operated within a small industrial park bordered by a residential neighborhood, woods, and wetlands. The Commonwealth of Massachusetts licensed CEC to store and dispose of wastes such as motor oils, solvents, and pesticides. The operators, however, accepted industrial emulsions, lacquers, cyanide-laden electroplating waste, and other manufacturing residues. Storage practices were careless: incoming wastes were mixed together in holding tanks, wastes were stockpiled, and samples for testing were crammed onto overcrowded shelves. The incinerator soon was overburdened as the facility became inundated with waste shipments from hundreds of generators all over New England.

To handle the overflow, the owners leased additional storage space in above-ground tanks in Plymouth, Massachusetts. At the same time, truckers hauled and illegally dumped more chemical wastes at two sites in New Hampshire.

Following inspections of the Bridgewater facility prompted by citizen concern, state officials revoked CEC's license in 1980 for waste handling and reporting violations. Legal action taken against the owners included a $50,000 fine for discharging pollutants into the environment. The facility went into receivership soon after.

Operator Walks Away

The defunct operation left behind more than 700 drums and 155,000 gallons of liquid waste and sludge in bulk storage. The five storage tanks and incinerator tower made an ugly, rusting profile on the area skyline. Waste trailers were abandoned with doors standing ajar and swinging in the wind. Closed storage buildings concealed stacks of leaking drums with trails of brown chemicals running to floor drains.

Subsequent investigations revealed that soil, buildings, ground water, and the adjacent wetlands were contaminated with volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), pesticides, and metals. These contaminants can cause serious health effects.

State Reduces Immediate Risks

In 1982, state officials removed the drums and liquid wastes from CEC's base of operations in Bridgewater. Investigations revealed that more than 1 million gallons of hazardous liquids from the Bridgewater site had been disposed illegally at three other sites in Plymouth, Massachusetts and in Nashua and Londonderry, New Hampshire. In 1982, EPA proposed all four sites to the National Priorities List of abandoned or uncontrolled hazardous waste sites. In 1983, the sites were among the first officially listed as eligible for federal cleanup.

As EPA began the in-depth site investigations necessary to determine how to address the problems at the site, the Bridgewater site owners and a group of waste generators and transporters agreed to remove the bulk contents of some of the waste containers on site. These removal activities stabilized the site, but field investigations conducted by EPA showed that additional efforts were needed to reduce long-term risks and allow for future redevelopment.

Innovative Technology for Soil

In 1988, EPA completed site investigations and presented a comprehensive cleanup plan for community review. EPA and the state finalized the plan later that year. By the end of 1988, Potentially Responsible Parties (PRPs) fenced the site and during the summer of 1990, decontaminated and removed on-site buildings and began treating contaminated soil.

An innovative process called Low Temperature Thermal Desorption was used to treat soil. Rather than burning the hazardous material, the process roasted

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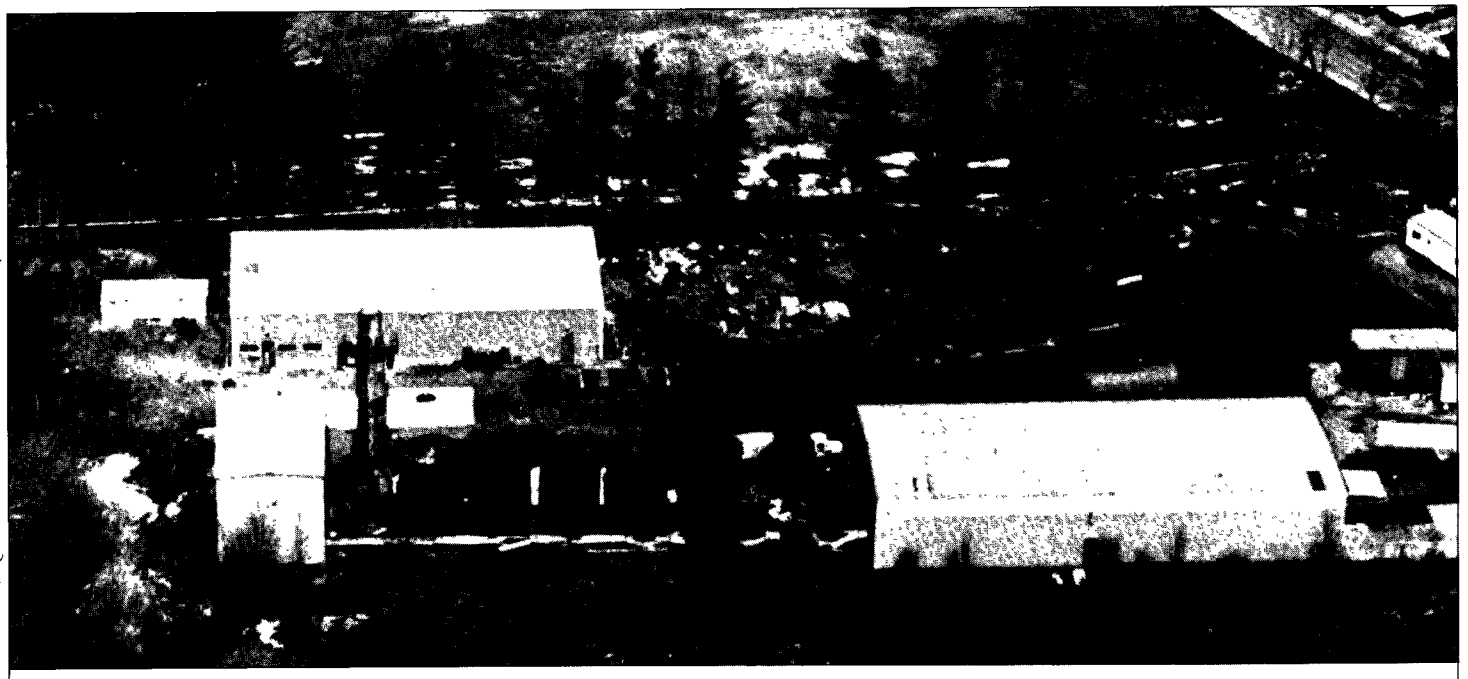


The Bridgewater, MA facility was distinguished by a row of hulking storage tanks flanking a taller incinerator stack.

the soil in a closed unit at temperatures between 300 and 500 degrees, driving off water and VOCs. These compounds, which are commonly used industrial solvents and degreasers, readily release into the air from soil or water. The treatment process removed 1,242 pounds of VOCs from 11,330 tons of contaminated soil. The associated gas released from the process was captured in filters called carbon adsorption beds and shipped to facilities for disposal and regeneration of the filter units.

This on-site treatment destroyed pollutants and reduced the risk of exposure that would have arisen from moving the soil off site for treatment or merely containing contaminants on site. Because of the success achieved at the Bridgewater site, this treatment technique has been approved for other Superfund sites in New England and other states.

In addition, 400 tons of PCB-contaminated soil that were not amenable to the thermal desorption treatment were excavated and incinerated off site. Workers then installed nine monitoring wells to detect any pollutants that could still be entering the ground water. The site was backfilled with clean soil and seeded for grass. The PRPs also reconstructed a wetland on the site. This effort was completed in September 1991, approximately a year from the time soil treatment began.

Bridgewater Cleanup Complete

In 1991, EPA returned the site to Bridgewater officials for commercial or industrial use, with the caveat that redevelopment could not involve digging below ground water level. Residual contamination of ground water beneath the site is expected to naturally dissipate since the source of contamination has been removed. Monitoring of ground water contamination will continue for 20 years or more.

Plymouth Harbor Site - An Explosion Waiting to Happen

In 1976, with the Bridgewater facility filled to capacity, CEC began sending hazardous waste shipments to Cordage Industrial Park near Massachusetts' Plymouth Harbor under an oral agreement between the owners. The Plymouth storage facility consisted of three above-ground storage tanks on 2.5 acres. Each tank was surrounded by a 6-foot earthen dike. Originally built in the 1920s to store fuel and oil unloaded from barges, the tanks stood 50 to 180 feet from the harbor. In 1979, Massachusetts authorities issued a license for CEC to use the tanks for liquid hazardous waste storage.

Hazardous Liquids Threaten Harbor

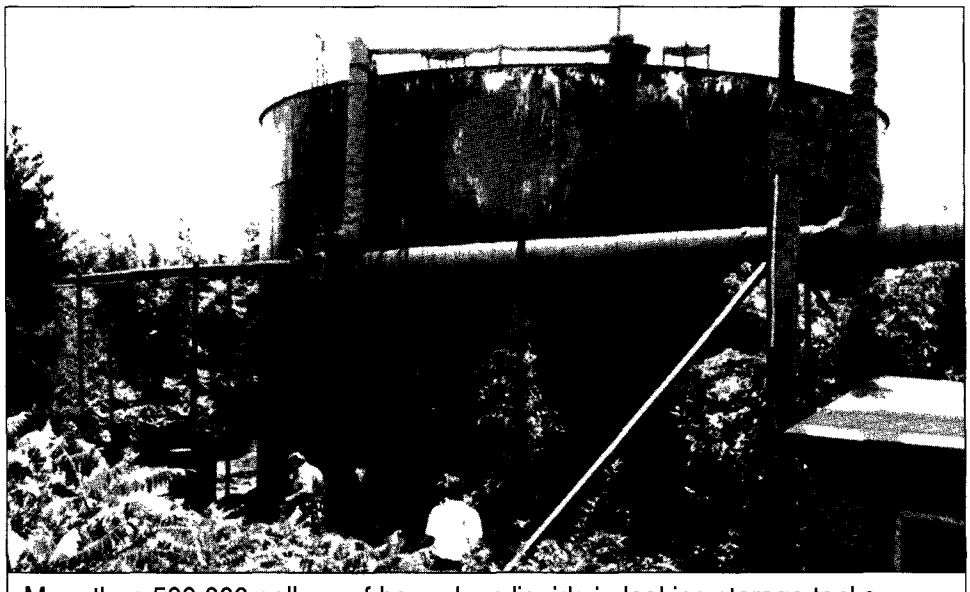
Beginning in 1980, adjacent property owners complained of foul odors coming from the tanks. The local fire marshall noted fire and explosion hazards, and inspections by EPA and the Massachusetts Department of Environmental Quality Engineering (DEQE) revealed leaks in the two tanks containing hazardous substances. In June 1980, DEQE officials ordered CEC to cease operations at Plymouth, alleging falsification of required reporting documents. Operators abandoned the site, threatening the harbor with 500,000 gallons of hazardous liquids in two leaking tanks.

The surrounding area encompasses a retail complex, several light industries, a sensitive marine environment, beaches, summer cottages, public recreation, and tourist areas. Polycyclic aromatic hydrocarbons (PAHs), pesticides, and lead were found in surface soil on site, with highest levels in the earthen dikes surrounding each of the tanks. Low levels of lead and heavy metals polluted surface water in a nearby tidal stream.

Property Owners Cooperate to Reduce Threat

Salt Water Trust, the owners of Cordage Industrial Park and the Plymouth site property, performed initial cleanup activities. In 1983, Salt Water Trust cleaned and decontaminated the first tank and EPA emptied the second. More than 240,000 gallons of hazardous liquids and sludges were sent to an approved facility for disposal. In early 1984, EPA began an extensive field investigation and by September 1985 chose a final remedy for the site. Public meetings were held with Plymouth residents and comments invited. In conjunction with citizen requests, an analysis was done in 1986 confirming that the site was within the 100-year floodplain. This analysis supported the need to remove contamination that could be spread through natural processes as well as human intervention.

In 1987, EPA workers fenced the site to restrict access and dismantled and disposed of the storage tanks and their associated piping. In 1988, under EPA supervision, the PRPs removed 250 tons of contaminated soil from the tank areas for shipment to a hazardous waste disposal facility in Indiana. The area was then filled with clean soil. EPA conducted a risk assessment following removal of the contaminated soil. This review indicated that residual on-site contamination was within safe levels and that the property could be redeveloped for industrial use. A second review conducted in 1992 confirmed these results.



More than 500,000 gallons of hazardous liquids in leaking storage tanks threatened Plymouth Harbor, MA.

First Site Removed from New England Superfund List

In September 1993, the Plymouth site was the first in New England to be deleted from the National Priorities List. Announcing the site's deletion, then acting Regional Administrator Paul Keough remarked that, "The deletion of the Plymouth Harbor site is part of a larger success story. Thorough investigations of contamination, and of who is liable for contamination, ensure that we have the knowledge of the problem and the money to do the right thing by the community. We can't afford the human and financial toll of doing anything less."

The Sylvester Site - An Illegal Operation Goes Underground

Before CEC illegally brought in hazardous wastes from Bridgewater, the Sylvester property in Nashua, New Hampshire was a sand and gravel pit. During the late 1960s, William Sylvester began an unlicensed waste disposal business, burying household refuse and demolition materials in the excavated pit. Chemical sludges and hazardous liquids were allowed to percolate into the ground or were stored in steel drums next to a 100-foot garage on the property. When the unlawful disposal was discovered in late 1970, several state court actions followed.

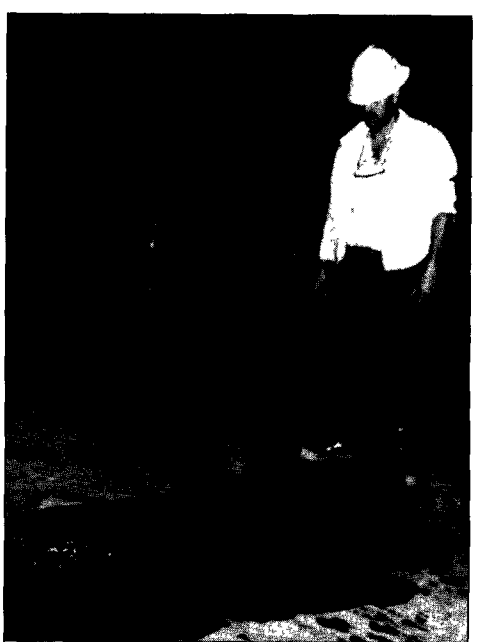
In 1976, Sylvester failed to comply with a court order to remove all waste from the site. Then in November 1978, the state cited Sylvester for storing hazardous waste drums behind the garage. None of these official actions, however, stopped Sylvester from degrading 20 acres of ground water.

Chemicals Injected Underground

From June 1978 through October 1979, a waste hauler named John Tinkham and others had been dumping liquid hazardous wastes from CEC's Bridgewater facility into the former sand and gravel pit. It was reported that, starting in 1979, Tinkham's drivers also would back their tanker trucks into the garage and pour bulk hazardous chemicals into a drain pipe that flowed under a field behind the garage. According to available records, more than 800,000 gallons of hazardous waste were disposed over a 10-month period. A 1979 court injunction finally prohibited all further disposal of hazardous wastes at the site.

The Sylvester property is on Gilson Road in Nashua, a residential area where approximately 1,000 people live in two trailer parks. Five private wells have been drilled within a quarter mile. A brook is about 700 feet away, flowing through one of the trailer parks and entering the Nashua River. Eleven miles downstream, the Nashua joins the Merrimack River, a source of drinking water for the city of Lowell, Massachusetts.

Area ground water and the brook were polluted with VOCs and heavy metals, including arsenic. Air and on-site soil also were contaminated with VOCs.



Operators at the Bridgewater facility sometimes poured chemicals down the drain. At the Sylvester site, a drainage system spread the chemicals out into the sandy soil and fractured bedrock.

State Takes Charge in Ground Water Cleanup

After the New Hampshire courts shut down the dump in 1979, Sylvester and Tinkham were arrested and convicted of illegal discharge of wastes. The courts fined each of them $25,000

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but the two served six months in jail instead. Left with a highly contaminated site, the New Hampshire Department of Environmental Services (DES) removed 1,000 drums of barrelled waste. Early in 1980, Nashua city officials fenced the site and DES removed another 1,300 surface drums. The state then began an intensive study of the site.

Working with federal funds made available through the Superfund program, DES officials installed a temporary ground water recirculation system in late 1981 to prevent contaminated ground water from reaching the Nashua River. This system operated effectively for about a year. In 1982, EPA and the state approved a long-term cleanup plan for the site. Under the plan, municipal water lines were extended in 1982 to serve affected residents. By 1986, an impermeable cap covered the sand pit to prevent rainwater from further spreading contamination, and a slurry wall contained a 20-acre pool of contaminated ground water and hazardous discharge. Also in 1986, DES began operating the treatment system for ground water contained by the slurry wall.

EPA Revisits Early Decision

A review of cleanup progress in 1989 prompted an investigation that found a previously undetected source of toluene contamination, requiring a change to the ground water recovery system. Technology to treat the source of contamination in-place has been operating for two years.

Tinkham Garage - End of the Road for CEC Waste

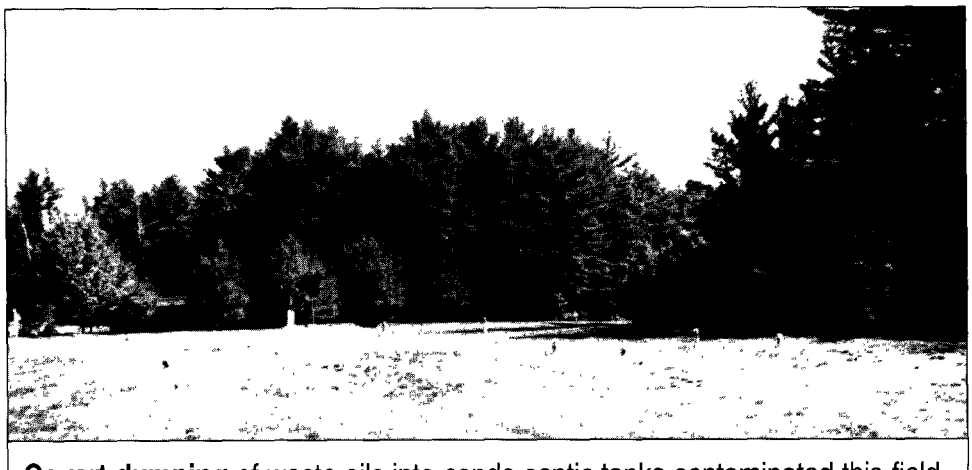
After John Tinkham's waste-hauling operation dumped oil and hazardous waste in Nashua at what became the Sylvester site, drivers reportedly often returned to Londonderry to service the trucks. Contaminated wash water from the emptied tankers was poured directly onto the ground in a field behind Tinkham's garage. The same trucks were then used in Tinkham's business of cleaning out septic tanks in a nearby condominium complex.

Private, single-family homes and agricultural properties border the garage. In 1978, residents complained of foam and odors in a nearby brook, prompting an investigation. The state issued a restraining order to Tinkham to prohibit any further discharge of wastes at the garage. Instead, covert dumping reportedly ensued. Tinkham had a contract with the Londonderry Green Apartments (now the Woodland Village Condominiums) to empty their septic tanks. Tinkham allegedly dumped the hazardous wastes from CEC into the septic tanks, contaminating the ground water.

In early 1983, the state closed neighboring private wells and those of the condominium complex due to contamination. EPA supplied bottled water to residents and funded an emergency water line, working with the state and the town to bring safe municipal water to Tinkham's neighbors.

Cleanup Pilots New Technology

In 1986, following a period of public comment, EPA selected a remedy that involved ground water treatment and pilot testing of a new technology, vacuum extraction, to treat soil in place. In 1988, the cleanup plan was amended to allow use of the pilot-tested process, which draws air through the soil, releasing volatile contamination from soil particles to the air stream, and then cap-



Covert dumping of waste oils into condo septic tanks contaminated this field. Dead grass gives only an inkling of the extent of environmental damage.

tures the contaminants on carbon filters as the clean air is released from the treatment system. Because of the success at the Tinkham site, this process has been commonly used at other Superfund sites.

Cleanup Ongoing

Efforts to coordinate ground water and soil cleanup have delayed the start of the cleanup. Contaminated ground water will be pumped and treated after a sewer line is constructed between the site and the wastewater treatment plant in the adjacent town of Derry. After careful evaluation, EPA concluded that discharge of treated ground water onto the site would not be feasible.

Connection to the treatment plant and completion of the soil vacuum extraction unit is expected in the summer of 1994. The contaminated condominium septic field will be excavated and rebuilt. Excavated soil will be added to the contaminated soil behind the garage for treatment by vacuum extraction. Soil treatment will require nine months to a year to complete. Ground water treatment should be complete within three years.

Precedent-Setting Enforcement Effort Nets Millions for Site Cleanups

Numerous significant successes mark the legal work performed in connection with the CEC site cleanups. In 1986, EPA and the states of Massachusetts and New Hampshire jointly notified hundreds of parties of their potential liability for the site remediations. Dealing fairly with such a large number of very different parties required some ingenuity. The CEC case was among the first instances in which EPA used the *de minimis* settlement tool to work with parties who had contributed relatively minor amounts to the site.

Those who contributed less than one percent of the volume of waste paid a proportional share of the cleanup costs plus a sum to cover the potential need to address risks unknown at the time of settlement. In return, parties agreeing to the settlement early were given protection from future site-related lawsuits. The protection extended not only to any future government action but also to suits other larger parties might launch to recoup some of their costs. Following negotiations, 300 parties agreed to settlement terms and contributed a total of $13.6 million to the cleanup effort.

The *de minimis* tool has since been used at other Superfund sites to end the involvement of smaller parties sooner and spare them transaction costs incurred during negotiations with major contributors.

Major Waste Contributors Sign Mega-Settlement

After dealing with the small parties, EPA reached an agreement with 47 major waste contributors. These large volume contributors agreed to perform cleanups worth almost $16 million at the Bridgewater, Plymouth, and Tinkham Garage sites. The parties also reimbursed EPA and the states approximately $18 million for work performed at the Plymouth and Sylvester sites, as well as future oversight costs.

Uncooperative Parties Go to Court

EPA offered another settlement to smaller parties who had rejected the first *de minimis* offer. But this time, each would have to pay 100% more than the share they would have paid had they joined the initial settlement. Twelve more parties agreed to "cash out" for a total of $792,000.

Seven parties who had held out for better terms balked at the penalty EPA was imposing on late settlors, contending they should be allowed to reach a separate agreement or join the larger one.

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Millions for Site Cleanups

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Two Courts Hand Holdouts Defeat

The District Court upheld EPA's position, noting that the law is designed to impose a greater burden of cleanup costs on those who delay. When six parties appealed the District Court ruling, a second court opinion from the Circuit Court more strongly endorsed EPA's position and made clear that CERCLA was not designed to allow parties to stall for a better deal.

EPA and the two states sued 25 remaining parties who had failed to settle during the first two rounds of negotiations. Ten separate consent decrees worth an additional $8.2 million were eventually lodged to end all CEC litigation in 1992.

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Success at CEC sites

At sites like CEC, the true cost of gross mismanagement of hazardous waste can be counted in time, money, and environmental degradation. Enforcement initiatives resulted in settlements worth more than $50 million in cleanup work and cash payments from waste contributors.

Court rulings upholding EPA in CEC litigation have made it harder for anyone to walk away from a toxic dump and have made waste generators think twice about who they choose to dispose of their hazardous wastes.

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