

Dover Municipal Landfill

Dover

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The Dover Municipal Landfill accepted municipal and industrial refuse for on-site disposal from approximately 1961 to 1979. The site occupies approximately 55 acres of land four miles to the southwest of the City of Dover in a generally rural setting. The site is approximately 2,100 feet south of the Calderwood municipal water supply well, 600 feet west of the Cocheco River, and 1,400 feet northeast of the Bellamy Reservoir. The Bellamy Reservoir, along with water from multiple municipal production wells located in the area, supplies drinking water to Portsmouth, Newington, Newcastle, Greenland, and parts of Rye, Madbury and Durham, New Hampshire.

The site was added to the National Priorities List in September 1983 after sampling of residential well water in the vicinity of the site revealed contamination had migrated approximately 200 feet to the east of the landfill. The city of Dover promptly installed a water main to service all affected and potentially affected homes in the area of the site. Studies undertaken by others at the Dover Municipal Landfill indicated that the Bellamy Reservoir and the Calderwood municipal supply well, as well as private residential wells located in the vicinity of the site, were potentially threatened by groundwater contamination emanating from the landfill.

The Remedial Investigation was completed in March 1989. In 1988, the Potentially Responsible Parties (PRPs) signed an Administrative Order with EPA and NHDES to conduct the Feasibility Study, which was completed in early 1991.

EPA issued the Record of Decision (ROD) formalizing the preferred remedy in September 1991. The source control component of the preferred remedy included capping the landfill, installing a leachate collection trench and/or groundwater extraction wells, and treating leachate on-site with discharge to the Cocheco River or pretreating leachate on-site with discharge to the Dover publicly owned treatment works (POTW). The management of migration portion of the remedy included monitored natural attenuation of the eastern plume and active extraction and treatment of groundwater for the southern plume.

In 1993 the PRPs proposed further study of the southern plume. They believed the contaminants to be naturally attenuating such that the plume would not impact the Bellamy Reservoir. The agencies agreed to allow the PRPs to conduct additional studies of the southern plume. The report findings were inconclusive and recent groundwater quality data suggest that a plume of groundwater containing elevated concentrations of contaminants of concern is present in the southern plume. Additional data is being collected to evaluate plume migration and will be used to assess the need for active containment of the Southern Plume.

Construction of the preferred remedial action, described in the 1991 ROD, was scheduled to begin in June 1997. However, the agencies agreed to postpone implementation of the remedy to allow the PRPs to explore an alternative remedy at the site. Specifically, the PRPs constructed a pilot-scale treatment zone demonstration (TZD) to evaluate the site-specific viability of augmenting naturally occurring biodegradation of contaminated groundwater by injecting sodium benzoate and oxygen into the subsurface soils and groundwater.

The TZD operations began in December 1997 and continued through November 2001. In November 2001, the PRPs proposed to abandon enhanced bioremediation as the preferred remedy and introduced an alternate remedy that included a permeable vertical barrier along the down-gradient landfill toe to facilitate the injection of air and stripping of contaminants (alternate remedy). The agencies agreed to proceed with the alternate remedy by amending the 1991 ROD.

In September 2004, EPA signed an Amended Record of Decision (AROD) that changed the preferred source control remedy from impermeable cap with extraction and treatment of groundwater to an air sparge trench that would remove, destroy, or immobilize contaminants in-situ. The amended consent decree/statement of work included the 1991 remedy (cap, groundwater pump and treat) as the contingent remedy, should the sparge trench fail. The remedy for the extended plumes remained unchanged from the 1991 ROD; that is, an active pump and treat system in the Southern Plume and monitored natural attenuation of the Eastern Plume.

In 2008, the PRPs finalized and implemented the remedial design of groundwater extraction system in the Southern Plume and implemented a full-scale air sparge/soil vapor extraction remedy in the northwest portion of the landfill.

The PRPs prepared a source-control focused feasibility study (SC-FFS) in 2007 as the result of new information that had been collected from the work carried out for the Source-Control Pre-Design Investigations required by the Amended ROD. The SC-FFS concluded that modifying the source control remedy from an air sparging trench to an extraction well system with offsite treatment at the Dover POTW would be a more robust remedy. Modifying the remedy to an extraction system has several significant advantages over air sparging, which include utilization of a proven technology, eliminating uncertainties associated with implementation of the sparge trench, and avoiding potential adverse interaction between the Southern Plume extraction and Northwest Landfill remedies and the sparge trench remedy. The extraction and conveyance system could also be implemented much more quickly and at a significant cost savings. The agencies reviewed and approved this remedy change in a June 30, 2009, Explanation of Significant Differences.

The preferred remedy (extraction and conveyance system) design was completed in 2010 and has been fully operational since 2012. The City of Dover also extended the sewer main to the site in 2011, as the component of the remedy that conveys extracted groundwater to the POTW. Monitoring the effectiveness of the containment remedy is

on-going. To date, the extraction system has removed over 157 million gallons of impacted groundwater and transported that water to the Dover POTW for treatment.

The ditch surrounding the landfill was closed as the preferred remedy was constructed, eliminating the off-site migration of landfill-impacted surface waters. The majority of shallow groundwater that previously discharged to surface waters is now being captured by the extraction system and conveyed off-site for treatment at the POTW. Further response actions may be necessary in the northwest landfill area to mitigate seasonal migration of impacted shallow groundwater.

The air sparge and soil vapor extraction remedy installed in 2008 to treat the northwest landfill hot-spot area was shut down in 2011 to monitor for VOC rebound following substantial mass removal and subsequent decreases in groundwater concentrations. The system removed over 43,000 pounds of VOCs in its three years of operation. Additional monitoring confirmed that the system had met the intended remedial goals. Subsequently, EPA issued a letter in October 2014 acknowledging completion of this portion of the remedy and approved the system for dismantling. However, EPA's letter also acknowledged that significant contaminant mass remains in the northwest landfill area and if future sampling indicates that the remaining contamination will not degrade within a reasonable time or be captured by the current pump-and-treat system, additional remedial measures in this area may be required.

The first [Five-Year Review \(FYR\)](#) for this Site was completed in September 2017, an EPA report that evaluates the protectiveness of the implemented remedy. Five-Year Reviews are required under the Federal Superfund Program upon completion of the source control remedy at a site (2012 at Dover Landfill) and are repeated every five years as long as future uses remain restricted.

The FYR for the Site found the remedy protective of human health and the environment in the short-term, but not the long-term. A number of actions are required in order to ensure long-term protectiveness, including, but not limited to, the following:

- Delineation of the extent of contaminant migration in the Southern Plume;
- Delineation of the extent of the plume along the southwestern boundary of the Landfill to assess plume capture by the groundwater extraction system;
- Sampling of representative site monitoring wells for the presence of per- and polyfluoroalkyl substances (PFAS).

Based on the recommendations of the FYR, the PRPs undertook additional investigation at the site in 2018. The investigation included sampling for PFAS from select site monitoring wells and further characterization into the nature and extent of groundwater impacts to the south and southwest of the landfill. NHDES and EPA are currently awaiting the results of the 2018 investigation, which will determine if additional remedial measures will be required to ensure long-term protectiveness at the site.