

## P&T Optimization

Site Name: Lipari Landfill,  
Gloucester County, NJ  
Dates: 1982–2016  
Regulatory Framework:  
Superfund Site/NPL



P&T Objectives: Isolate and  
remove contaminated  
groundwater from drinking  
water supply

The initial on-site remediation systems consisted of the landfill containment system (soil-bentonite cut-off wall and cap), groundwater extraction and reinjection system, and the wastewater treatment plant. Each of these components was a key element of the batch flushing process, which removed groundwater-dissolved contaminants from the landfill. DPE and SVE systems were added to enhance contaminant removal. The batch flushing was terminated in May 2008, and the on-site treatment plant was shut down in July 2008. The off-site remediation system originally included the French Drain, Rabbit Run Drain, Seep Collection Trench, Interceptor Trench, Shallow Backfill Drains, and the C-29 Area Drains; the latter two components were taken out of operation prior to 2008 after successful attainment of their performance goals.

After the on-site aqueous treatment system was shut down in July 2008, SVE became the exclusive on-site remedial path for landfill contaminant removal.

Lines of evidence used to support the changes:

1. BCEE, benzene, and 1,2-DCA are considered the primary COCs because of their low cleanup levels relative to the contaminant concentrations. Remediation system effectiveness is tracked through the monitoring of groundwater and surface water outside of the containment system, the water phase discharged to the Gloucester County Utilities Authority, and the vapor phase discharged to the atmosphere.
2. Extraction of landfill vapor continued throughout 2016. The SVE system also triggered influx of a monthly average of 460 cfm of atmospheric air into the landfill, which promotes aerobic bioremediation of BCEE and other organic COCs.
3. The off-site collection systems continue to capture and control contaminated groundwater.
4. With the continued decrease in the concentrations of organic compounds in the SVE stream, a lower cost VPGAC system was brought online in 2015 as the method to remove organic compounds from the SVE stream prior to release to the environment.
5. Additional modifications to the SVE system included replacement of the 1,000 cfm blower unit with a new 250 cfm blower unit (brought online 12 May 2016) and the automation of the heat exchange system (automated system brought online 21 June 2016) to attempt to achieve optimum humidity in the air stream prior to the VPGAC units.

Decision codified in RODs for OUs 1-3 and 2017 ESD.

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■ Initial Condition  
■ Optimization Review  
■ Outcome

Operation of the system was shut down for the first two months of 2012 as seven new SVE wells were installed and connected to the system. Similarly, the system was shut down for the months of September and October of 2015 to complete work to bring the GAC units online. Results for most VOCs exhibited a marked increase with the first influent samples collected after each of these shutdown events due to temporary accumulation of VOCs around the SVE wells when the system was not in operation.

As monitoring continued after both shutdown events, results for all compounds but benzene stabilized or decreased moderately. Benzene results showed a higher rate of concentration reduction after the first sample collected in 2012, and this trend has continued throughout subsequent years into 2016.

The SVE system has performed as expected, with a gradual decline in removal efficiency after startup through 2007, as the VOC mass was depleted. Moderate increases were observed in 2008, 2009, and 2011, but overall removal rates have decreased steadily since 2012.

Future areas of community concern include ongoing development of the area. When the landfill closed in 1971 and up through the mid-1980s, the area was largely rural and agricultural. The area is now undergoing rapid development with residential, educational (a nearby university is expanding closer to the site), and healthcare (a major hospital complex was built near the site) development pressures. These and future development projects, including proposals for the landfill property itself, add to the ecological and social changes to the local environment. Continuing communication with local communities and their representatives will be important during this period of rapid change.

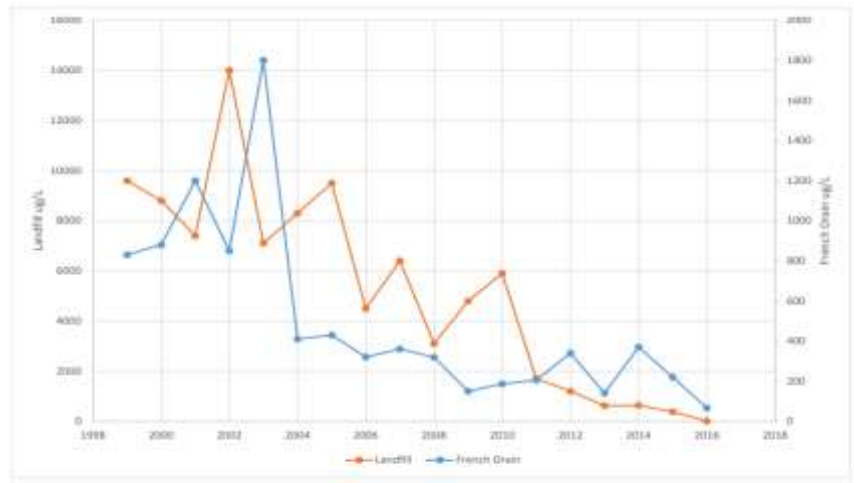


Figure 2-7  
Landfill and French Drain bis(2-Chloroethyl)ether Concentrations  
Lipari Landfill Superfund Site  
Gloucester County, New Jersey

### P&T Actions Conclusion

P&T replaced with DPE/SVE and GAC

Time Span: 34 years

Remedy effectiveness and/or risk reduction improvement: All contaminants except BCEE have achieved RAOs

Sustainability/resiliency benefits: transition to greener and less expensive VPGAC and bioremediation

General Conclusions/Observations: NJDEP practices continuous remediation process optimization to ensure that the remediation systems remain effective without wasting resources in the process.