

Project Name

Landfill Remedial Investigation

Client

Borough of Middlesex

Services Provided

- Prepared Environmental Evaluation Report (EER)
- Developed approach to performing remedial investigation of chemical and radiological contamination
- Prepared Remedial Investigation Workplan
- Prepared Wetlands Permits, Landfill Disruption Permit, and Health & Safety Plan
- Coordinated and Performed Remedial Investigation
- Evaluation of analytical data and determination of potential remedial activities
- Coordinated investigation into radiological contamination
- Conducting vapor intrusion sampling & investigation



Project Description

The Middlesex Municipal Landfill is a 28-acre former municipal landfill that operated from 1945 to 1974. The landfill is immediately adjacent to the municipal complex, church, and a residential neighborhood. The landfill received municipal wastes, but also received 6,200 tons of hazardous substances 1956 to 1971 from the former Borden Chemical and radiologically-contaminated materials from the former Manhattan Project era Middlesex Sampling Plant.

The landfill has been the subject of ongoing investigations and remediation since 1960, when elevated levels of radioactivity were detected during a routine civil defense exercise. It was determined that in 1948, the U.S. Department of Energy (“DOE”) deposited approximately 6,000 cubic yards of low-level radioactive soil containing pitchblende (a naturally occurring uranium ore) from the former Middlesex Sampling Plant into the landfill. Radium-226, thorium-232, and uranium-238 were identified as the radionuclides of primary concern. From October 1984 to April 1986, approximately 15,000 cubic yards of impacted soil was excavated and temporarily stored at the former Middlesex Sampling Plant site until a permanent storage facility was decided upon.

The landfill has been the subject of ongoing investigations and remediation since 1960, when elevated levels of radioactivity were detected during a routine civil defense exercise. It was determined that in 1948, the U.S. Department of Energy (“DOE”) deposited approximately 6,000 cubic yards of low-level radioactive soil containing pitchblende (a naturally occurring uranium ore) from the former Middlesex Sampling Plant into the landfill. Radium-226, thorium-232, and uranium-238 were identified as the radionuclides of primary concern. From October 1984 to April 1986, approximately 15,000 cubic yards of impacted soil was excavated and temporarily stored at the former Middlesex Sampling Plant site until a permanent storage facility was decided upon.

The Borough of Middlesex (Borough) engaged SAI in 1999 to complete a Remedial Investigation (RI) to identify potential impacts of the landfill and to identify remedial actions necessary for closure approval from the NJDEP. SAI also interfaces with the Department of Energy (DOE) and US Army Corps of Engineers (ACOE) for the radiological impacts under the Formerly Utilized Sites Remedial Action Program (FUSRAP) program.



Potential needs for remediation include the waste itself, the cover soils, groundwater (primarily benzene, chlorobenzene, and trichloroethylene), and landfill gas. At present, the site has been proposed for redevelopment as recreational space to meet the Borough's needs.

### [Approach](#)

SAI designed the RI to be organized into three parallel tracks, including a radiological track, an upland soil/waste track, and a sensitive receptor track. SAI completed an extensive effort to assess and delineate the extent of chemical and radiological contamination at the landfill and nearby receptors, including Bound Brook.

The initial RI/RAWP (Remedial Action Work Plan) was submitted to the NJDEP in 2003. There have been several rounds of comments and revisions to the RAW. In addition to the RI/RAW, SAI also designed a landfill gas venting system, limited removal of oily waste, and a capping plan using the existing soils, which were tested to indicate that most of the existing cover is clean. The RAWP was amended in 2006 to resolve some concerns expressed by NJDEP. The plan is currently awaiting NJDEP approval; however, the project will be opting into the LSRP program.

Based on the RI data collected by SAI, it was determined that the levels of radiological contamination at the site were more extensive than initially thought. As a result the DOE and ACOE has become re-involved in order to investigate the radiological impacts according to current standards as part of the Middlesex Sampling Plant project. DOE and ACOE's have reported that surficial gamma radiation scans have identified additional radiological hot spots. A copy of the ACOE 2010 data has not been received.

In addition, it was determined that there was a potential sensitive receptor in the child care facility operated by the church adjacent to the landfill. On behalf of the Borough, SAI implemented a soil gas and indoor air vapor intrusion investigation for both the childcare facility and the municipal building complex. The results of the investigation indicated that trichloroethylene and benzene were detected in the soil gas and indoor air above the respective criteria, and that an Immediate Environmental Concern existed in the childcare center (NJDEP has since relaxed the criteria for an IEC). Further investigation culminated in the design and installation of an active sub-slab depressurization system that was installed in March 2010. Sampling events conducted after the installation confirmed the protectiveness of the remedy, including the children attending the preschool, the congregants, and the church employees.

SAI is currently addressing the landfill gas receptor pathway. Although the 2003 and 2006 RAWPs both included the construction of a subsurface barrier and collection system, the recent information from ACOE indicates that the presence of radiologically impacted material in the subsurface along the 1,300 linear foot section of landfill perimeter with landfill gas impacts. Because the excavation of impacted soils to install a subsurface barrier would result in the need to dispose radiologically impacted waste, SAI has developed a pilot test based on an innovative and minimally intrusive to actively remove the landfill gas and determine the radius of influence of each extraction point prior to a final design.

### [Public Communication](#)

Throughout the remedial process, SAI has assisted the Borough in affecting a successful public communications effort. By appearing at routine Borough Council meetings, SAI's project managers have gained the trust of the municipality and the community by listening to their concerns and explaining the complex issues in as simple of terms as possible without appearing to be condescending. SAI's project manager for the Borough has twenty-five years of professional experience in the remediation of complex multi-media project sites,

brownfield redevelopment projects, and environmental justice-related matters.

When the potential for off-site vapor intrusion impacts to the child care center became evident, SAI met with the Mayor, Council, and the Solicitor to discuss and implement an action plan that included the immediate discussion of the findings with the pastor of the church adjoining the landfill. At that time, the Borough committed to do whatever was appropriate and keep the church and day care center included as stakeholders every step of the way. SAI developed the presentation material in-house to routinely report the progress of the investigation and the recommendations for additional action.

A series of public meetings were held in the church that housed the childcare center. These were hosted jointly by the pastor and SAI's senior project manager and attended by the Mayor and a Borough Council representative. NJDEP and NJDHSS were invited but declined to attend. After a brief explanation of the most recent data and the proposed next steps, the floor was opened to questions and answers. The technical facts of the case and the overly conservative nature of NJDEP's criteria were explained: SAI and NJDHSS had reported separately that the levels detected would not result in an adverse impact to the children attending the child care center, the church congregants, or the employees working in the building.

The congregation and the parents of the children attending the childcare center were satisfied that the Borough and SAI had done everything in their powers to investigate and remediate the potential vapor intrusion issues responsibly and professionally. Because of the prompt and earnest actions undertaken by the Borough and SAI, the church and childcare center remained open without adverse impact to the operations.

### [Cost Recovery](#)

Since the inception of the project, SAI has been actively involved supporting the litigation and cost recovery efforts to successfully recover costs related to the landfill remedial investigation and its eventual remedy. SAI assisted the Borough's counsel in developing the Spill Act claim, litigation, and settlement negotiations against Borden Chemical (the responsible party) as well as two insurance carriers. SAI prepared expert reports related to the history of the discharges and concluded that there had been a nexus of cause and responsibility. The case was settled successfully, and resulted in a complex agreement whereby the responsible party contributed to 50% of the non-landfill related groundwater remediation related costs and the insurance carriers contributed 50% of the remaining costs, including the landfill closure, not reimbursed by the responsible party. All ongoing efforts are routinely summarized and submitted to the responsible party and insurance carriers through the Borough's counsel. For example, approximately \$90,000 has been recovered in this manner in the past year alone, and over \$1,500,000 has been recovered in total.

Efforts related to the landfill closure and gas collection system have been financed through a low interest loan obtained from the NJ Economic Development Authority. SAI has also prepared an application for the Borough to receive an additional \$186,000 in grant monies from the NJDEP's Hazardous Discharge Site Remediation Fund to recover the costs of the remediation already performed and as well as those proposed in the near future, including vapor intrusion, but not reimbursed by either the responsible party or the insurance carrier. This grant application is currently pending, and should be received from NJDEP upon authorization of the FY 2011 funding cycle.

### [Permitting](#)

Permits and Approvals required for the project include:

- Major Landfill Disruption
- Wetlands/TWA/Stream Encroachment
- Remedial Action Workplan
- Monitoring Well/Piezometer Permits

**Project Impacts**

The proposed end use for this site is for a municipal recreation facility, likely to include walking and biking trails, sports fields, and picnic areas. This project, when completed, will transform the downtown area of Middlesex Borough, making it a more welcoming and picturesque spot in the local landscape.