Geophex Ltd.
42 years of excellence in EM instrumentation
info@geophex.com
+1 (919) 839-8515

Newsletter – March 2025

GEM-2 - Delineating Orphan Landfills Across North Carolina

Unregulated and abandoned landfills, commonly known as orphan landfills or pre-1983 landfills, pose significant environmental and public health risks. These sites often contain unknown quantities of buried waste, making accurate delineation essential for remediation and land-use planning. This year, Geophex highlights the use of the GEM-2 Electromagnetic Profiler in efficiently mapping the extents of orphan landfills in North Carolina.

The North Carolina Department of Environmental Quality (NCDEQ) specifies that electromagnetic (EM) evaluations are one of the first steps in orphan landfill investigations. These assessments provide an initial understanding of subsurface conditions before conducting more invasive testing such as soil borings or groundwater monitoring.

A case study is shown in Figure 1 where the GEM-2 EM sensor was used to clearly delineate the boundary of a 25-acre orphan landfill in Rowan County, NC. Here, EM data were collected along a 100 ft x 100 ft grid in a single day. This example highlights the exceptional practical use of the GEM-2 to differentiate an area of buried waste from background site conditions with incredible efficiency.

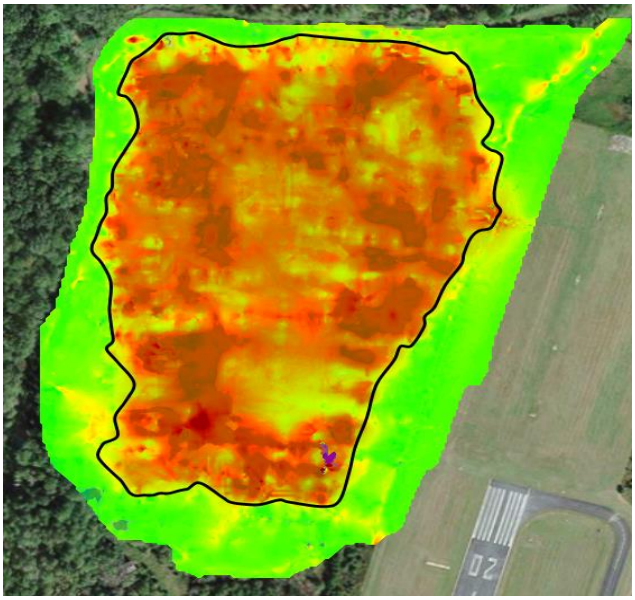

Figure 1. EM Results Map of the Orphan Rowan County Landfill

This case study confirms that maps of apparent electrical conductivity (EC) are very useful in identifying areas of buried solid waste. Moreover, the GEM-2 can also detect contaminated leachate plumes emanating from these landfills. More generally, any type of contaminant whose EC contrasts with the environment can be delineated.

Because of its sensitivity and ease of use by a single person in difficult terrain, the GEM-2 can greatly reduce project costs by quickly producing useful data and provide a more surgical approach to planning further invasive investigations.

For more information, please contact us at info@geophex.com