



SIMULATION FACILITY FOR LANDFILL EMISSION EXPERIMENTS

Site Overview: St. Francis Xavier University's FluxLab designed and operates SIMFLEX, a controlled release test site established to advance methane measurement technologies in landfill environments. Located on a closed landfill near Sarnia, Ontario, the 60 acres facility provides a realistic setting for evaluating various detection and quantification methods. The site, which used to be an active landfill, features complex topography with a 30-meter elevation variation and a highly efficient gas collection system, ensuring minimal baseline emissions.

Experimental Objectives: Landfills present unique challenges for methane measurement due to their large size, mixed emission sources, and topographical complexity. SIMFLEX was developed to support rigorous testing of methane detection and quantification technologies, enabling technology developers and researchers to refine their methodologies. Controlled releases from a combination of 11 remote-controlled point and area sources allow for evaluation under realistic landfill conditions, with emission rates reaching up to 800 kg/hr. Experiments are designed to assess the accuracy, reliability, and environmental adaptability of various monitoring approaches ranging from walking surveys to satellites.

Site Ownership and Operation: The test site is owned by Waste Management. SIMFLEX is funded through the Environmental Research and Education Foundation (EREF), and technical leadership is provided by Drs. David Risk (FluxLab) and Tarek Abichou (Florida State University), who collaborate with EREF to ensure scientific rigor and industry relevance in experimental designs.

Capabilities and Testing Campaigns: SIMFLEX hosts large-scale controlled release experiments to test a variety of methane measurement technologies, including satellites, aircraft, drones, vehicle-based sensors, and ground-based monitoring systems. To date, campaigns have evaluated performance across different meteorological conditions, emission source types, and measurement methodologies.