



# SIMFLEX

## SIMULATION FACILITY FOR LANDFILL EMISSION EXPERIMENTS Frequently Asked Questions (FAQs) for study participants

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### Study Overview

FluxLab will validate the accuracy of landfill methane direct measurement technologies under a variety of operating conditions using controlled releases of methane at a closed landfill. We will use multiple release rates and configurations to test the technologies, representing point and non-point emission sources across different meteorological conditions. The controlled release will be performed 'blind' meaning the measurement technology providers will not know the release rate. Participating technology users will measure the methane emissions using their established methods and submit collected data and estimates of the emissions rate for each measured release to FluxLab. FluxLab will perform a quality review of the data to verify acceptability for the study and will compile the data received from all technology providers to conduct a comparative analysis relative to the known release rates. Meteorological data will also be collected via an on-site weather station. FluxLab will evaluate the accuracy of the technologies with respect to different treatment conditions (e.g., wind speed, release rate, etc.) and submit a final report to Environmental Research and Education Fund (EREF), which will be published.

#### 1. **What is a controlled release study?**

A controlled release study involves the intentional release of methane in a controlled manner at a known rate to evaluate the performance of various methane measurement technologies. These studies help validate and improve detection and quantification methods under realistic conditions.

2. **Why is controlled release testing at SIMFLEX important for landfill emissions measurement?**

Landfills emit methane from a combination of point and area sources and are different than oil and gas sources. Controlled releases at SIMFLEX allow researchers to test technologies in an environment that mimics real landfill emissions while providing known release rates for accurate assessment.

3. **Where is the SIMFLEX test site located?**

The SIMFLEX facility is situated on a closed landfill in Petrolia, Ontario, Canada (Longitude: -82.121258° Latitude: 42.871952°). The 60-acre site is operated by Waste Management and has an LFG collections system and LFG utilization. The site offers a realistic setting with varied topography and minimal baseline emissions.

### Participation & Logistics

4. **Who can participate in a controlled release study and what types of technologies can be tested?**

Technology developers, academic researchers, consulting firms, regulatory agencies, and other stakeholders interested in methane measurement technologies are welcome to participate. We accommodate a wide range of methane measurement technologies, including Satellite-based sensors, Aircraft and drone-based detectors, Vehicle-mounted measurement systems, Ground-based continuous monitoring and mobile sensors and Surface emissions monitoring techniques.

5. **How do I apply to participate?**

Interested participants should contact Khalil El Hachem at [kelhache@stfx.ca](mailto:kelhache@stfx.ca) and Anna Chepkova at [achepkov@stfx.ca](mailto:achepkov@stfx.ca) for more details.

6. **Are there fees associated with participation?**

Currently, there are no registration fees for study participation. Participants must self-fund their involvement and these costs vary depending on the scope of their involvement. Some costs may be covered through research collaborations or funding opportunities sought by the participant.

7. **When are the next controlled release campaigns occurring?**

**May 12-18, 2025** - Focus on quantification methodologies for UAVs, vehicles, and ground sensors.

**June 2-15, 2025** - Designed to improve satellite and aircraft-based methane detection capabilities.

**8. How can I move equipment and personnel across the border?**

To cross the border into Canada you will need:

1. Either a valid passport OR both your birth certificate and a form of government issued photo ID.
2. An official Letter of Invitation from FluxLab. Please contact Anna Chepkova at [achepkov@stfx.ca](mailto:achepkov@stfx.ca) to request a letter.
3. An official Letter of Intent from your employer with full personnel and equipment details.

**9. Will I need a work visa?**

No, since you will be in Canada for less than 15 days. If you are a US citizen, you are classified as a short-term high-skill worker and will only need the documents listed in Question 7. EU citizens must apply for an Electronic Travel Authorization (eTA), which typically gets approved within minutes after submission. The cost is \$7 CAD.

**10. When am I needed onsite?**

Your time onsite will depend on your technology. You will be assigned a participation block ranging from **5 to 14 days** onsite, and this will be provided at least 2 weeks prior.

**11. What does my participation entail?**

Your participation will vary depending on the stream you are in.

**12. What are the site's baseline emissions?**

Measurements in 2021 estimated site emissions rates via Mobile Gaussian Inversion at 18.75 kg/hr. In 2022, FluxLab estimated site emission rates at 20 kg/hr. In 2023, background emissions was estimated to be 24.44 kg/hr using mobile tracer correlation.

**13. What is being tested?**

- I. Find-and-fix: Testing detection estimates to assess localization accuracy of participating methodologies. Probability of detection curves will be generated to determined minimum detection thresholds. Primary detection metrics such as false positive and negative fractions will be assessed to determine sensitivity levels for methodologies.
- II. Quantification: Using ground truth values, rate estimates provided by participants will be used to determine quantification error percentages. Error percentages will also be compared against various meteorological factors such as site wind speed and barometric pressure.

**14. How will I know onsite conditions during the experiment?**

There will be 6 weather stations onsite. Weather data will be shared after initial submissions from participants are received.

**15. Where can I stay?**

The closest accommodations are in Sarnia, ON (~27km away).

Recommended hotels:

- Days Inn by Wyndham Sarnia Harbourfront
- Comfort Inn Sarnia
- Super 8 by Wyndham Sarnia

**Experiment Details**

**16. What are the methane release rates during testing?**

SIMFLEX can release methane from 11 remote-controlled point and area sources, with emission rates ranging from 5 up to 800 kg/hr.

**17. How are controlled releases conducted?**

Releases are executed using a combination of pre-planned point and area sources, with emissions controlled via computer systems. Participants are given blind test conditions to assess real-world performance.

**18. What environmental factors are considered during testing?**

Studies consider wind speed, atmospheric conditions, and site topography to assess their effects on methane detection accuracy.

**19. How are test results validated?**

Each release is logged, and the performance of detection technologies is compared against known release rates.

**Data & Results**

**20. Will participants receive access to test results?**

Yes, participants will receive a comprehensive dataset and analysis of their technology's performance. Aggregated results may be shared at conferences or in research publications.

**21. Can results from the study be used for regulatory validation?**

While SIMFLEX results provide scientifically robust validation, regulatory acceptance

depends on individual jurisdictions. Participants may use findings to support technology validation efforts with relevant agencies.

**22. When and where will the results be presented?**

Results may be presented at EREF summits including Global Waste Management Symposium (GWMS); Industrial Methane Measurements conference; Air and Waste Management Association Air Measurements conferences; International Symposium on Waste Management, Resource Recovery and Sustainable Landfilling; Association for the Study of Solid Waste (ARS) ISWA World Congress; European Geophysical Union meeting; CanCH4, and possibly other venues.

**Future Collaboration**

**23. How can I contribute to future studies at SIMFLEX?**

We welcome collaborations on research and funding opportunities. If you have ideas for experimental design or are interested in sponsoring studies, please reach out.