SIMFLEX

SIMULATION FACILITY FOR LANDFILL EMISSION EXPERIMENTS

Frequently Asked Questions (FAQs) for study participants

Study Overview

FluxLab will validate the accuracy of landfill methane direct measurement technologies under a variety of operating conditions using controlled methane releases 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 conducted 'blind', meaning that participating measurement technology providers will not know the release rate. However, in some cases, there will also be an opportunity for non-blind testing, allowing participants to further evaluate and calibrate their systems under known conditions.

Participating technology users will measure methane emissions using their established methods and submit collected data and emission rate estimates for each controlled release to FluxLab. FluxLab will perform a quality review of the data to verify its suitability for the study and will compile all datasets from participating technology providers to conduct a comparative analysis against the known release rates. Meteorological data will be collected through on-site weather stations and shared with participants, allowing them to refine and, if needed, revise their emission estimates. Following this, FluxLab will evaluate the accuracy of the technologies under various treatment conditions (e.g., wind speed, release rate) and prepare a final report for publication.

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. 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 Anna Chepkova at 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 participation. Some expenses may be covered through research collaborations or funding opportunities pursued by the participants.
   As there is strong interest in participating and significant logistical planning involved, we kindly ask participants to confirm their commitment by providing proof of paid transportation and accommodation. This documentation helps us finalize scheduling and site logistics and must be submitted along with the other participation materials before the specified deadline.

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

   The next campaign is tentatively scheduled to take place in late January to early February 2026. The exact dates will be announced shortly.

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 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 participation in the study requires you to be in Canada for less than 15 days.

   - If you are a U.S. citizen, you are classified as a short-term high-skilled worker and will only need the documents listed in Question 8.
   - EU citizens must apply for an Electronic Travel Authorization (eTA), which is typically approved within minutes of submission. The cost is $7 CAD.

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

    Your time on-site will depend on your technology. You will be assigned a participation block starting from 3 days on-site, which will be confirmed at least two weeks in advance.

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 were estimated to be 24.44 kg/hr and In Spring 2025, it was 8.89 kg/hr using mobile tracer correlation method.

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 determine 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.

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

    There will be 7 weather stations on-site (6 at 2 m in height and one at 7 m). 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 Harbourfron
    - Comfort Inn Sarnia
    - Super 8 by Wyndham Sarnia

Experiment Details

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

    SIMFLEX can release methane through up to ten remote-controlled point and area sources, with total emission rates ranging from 0 to 860 kg/hr in 0.2 kg/hr increments and an accuracy of ±0.3%. The total emission rate can be distributed among the ten release orifices to simulate a variety of leak scenarios.

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 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 the 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 to Dave Risk (drisk@stfx.ca), Nadia Tarakki (ntarakki@stfx.ca), or Anna Chepkova (achepkov@stfx.ca).