



2026 January SIMFLEX Controlled Release Testing Program

Overview and Useful Information

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SIMULATION FACILITY FOR LANDFILL EMISSION EXPERIMENTS

Evaluation of Measurement Technologies for Landfill Emissions Detection and Quantification

1. Background

This study aims to evaluate the accuracy and reliability of various methane measurement methodologies for leak detection and emission rate quantification at landfill sites. This study builds on the findings from similar studies conducted in 2023, 2024, and 2025. Key elements of the Winter 2026 research program will include:

- Technology uptime and robustness under cold-season conditions
- Quantification accuracy across steady, variable, and low-emission scenarios
- Assessments of measurement repeatability
- Performance methods for Leak-Detection and Surface Emission Monitoring (SEM)
- Varied approaches to Tracer Correlation Methodology (TCM) data processing

2. Location, Timing, and Funding

Location. The 2026 experiments will be carried out in Petrolia, Canada, about 30 km from the US border and 150 km from Detroit. The site is a closed landfill owned and operated by WM.

Address. 4052 Oil Heritage Rd, Petrolia, ON N0N 1R0

Funding comes from the Environmental Research and Education Foundation (EREF) representing North American waste industry, Natural Resources Canada, and the Natural Sciences and Engineering Research Council of Canada. Participants are expected to self-fund their participation in this study.

Timing. January 25-31, 2026.

3. Controlled Release System Design

The controlled-release system consists of eleven release nodes distributed across roughly 20 acres of closed landfill, simulating both point and dispersed emissions. Total release capacity is high enough for satellite detection, although very high-rate releases are not expected during these winter release trials. Dispersed emissions are generated using perforated tubing to create area-based sources. All nodes are computer-controlled and fully logged, and the system releases industrial natural gas rather than landfill gas. Installed in 2024 as a permanent buried network, the system reduces preparation time and supports repeated winter and summer testing campaigns.

4. Why Participate?

Measurement teams and technology vendors should participate in SIMFLEX studies because:

1. **Uniqueness.** SIMFLEX is the world's only controlled-release testbed for *Area-Based* methane sources. Most controlled-release facilities worldwide simulate point sources whereas SIMFLEX reproduces *real landfill-like, spatially distributed emissions* across tens of release nodes. Vendors get to validate performance in conditions that actually mirror landfills, coal mines, and agricultural operations.
- **Realism.** For teams developing satellites, aircraft, drones, or trucks, this is an unmatched opportunity to measure known emission rates under controlled but realistic atmospheric conditions, which can help drive research and development including algorithm validation, detection threshold determination, and quantification accuracy testing.
- **Direct Evidence for Regulators, Customers, and Investors.** Participation produces independent, science-grade validation that can be shared with national regulators (Canada, US, EU, Australia, UK and other governments receive regular

updates), operators and service clients, and funders, boards, and investors. As regulations tighten vendors need validated performance claims. SIMFLEX is increasingly being viewed as the reference site.

- **Ability to Benchmark Against Other Technologies.** Because >40 companies from eight countries have already participated, vendors gain competitive benchmarking, insight into strengths and weaknesses of their system, and will obtain feedback from our team to help improve operational protocols, survey design, and algorithms.
- **Faster Product Development and Algorithm Refinement.** SIMFLEX campaigns produce high-density reference data across multiple release sizes, atmospheric conditions, and spatial patterns. This accelerates R&D timelines by months or years compared to waiting for real-field opportunities with unknown ground truth.
- **Unique Networking and Partnerships.** SIMFLEX brings together industry research groups, government agencies, utilities, waste and oil & gas operators, international measurement teams, academia, government measurement teams, and satellite and aircraft companies. Vendors often leave with new clients, collaborators, and co-development opportunities.
- **Increased Visibility and Credibility.** The site has been featured in peer-reviewed studies, national policy consultations, international methane workshops, popular and industry media, and at industry conferences. Participation boosts credibility and market visibility.
- **Direct Contribution to Global Methane Reduction.** Beyond commercial benefits, SIMFLEX participation advances the global understanding of area-source methane, will help countries meet 2030 targets.

5. Experimental Design for Winter 2026

The winter campaign will include a set of focused modules to evaluate technology performance under cold-season conditions:

- **Winter Uptime:** Track overall measurement success rates and robustness.
- **General Quantification:** Test multiple emission rates, tracking missed and non-reporting events in scoring and assessing the impact of weather conditions.
- **Reproducibility:** We will conduct trials to assess quantification reproducibility under the more unforgiving conditions.
- **Time-Varying Releases:** Some technologies will be exposed to slowly-changing conditions, with a requirement to totalize emissions.
- **SEM Alternatives:** Evaluate leak-finding tools as potential replacements or complements to traditional Surface Emission Monitoring (walking) surveys.
- **Tracer Correlation Measurement (TCM) Winter and Processing Tests:** Assess how TCM-based approaches perform in winter and compare outcomes when different teams worldwide process the same raw data.
- **Results Turnaround:** Score technologies on how quickly they deliver processed results after trials.

4. Participation Requirements

4.1. Methodology Questionnaire

The methodology questionnaire asks participants for detailed information about their emission detection systems, including system configuration, safety measures, and operational details like setup time, survey duration, and weather limitations. It also covers personnel requirements, cost estimates, and the system's ability to operate near high-concentration leak points safely. Participants need to provide specifics on their equipment, including model numbers and software revisions, and explain their data confidence levels. This helps assess the system's reliability, efficiency, and suitability for the project, and helps us program appropriate release experiments. The questionnaire can be found [here](#).

4.2. Health and Safety

At FluxLab, **Safety Comes First!** It's the solid base that supports all our work. You can learn more about what is expected and required on our [website](#) if you scroll down to **Safety Training & Documents**.

4.3. Agreements

All project participants are required to sign a participation agreement and provide proof of required insurance. On our website scroll down to [Research Participation Agreements](#).

4.4. Experimental Protocol

We should all align on the science we're developing! To ensure this, we'll provide you with detailed information in our [Experimental Protocol](#). The protocol described the terms and timelines related to results submission and scoring. The protocol is being updated for the upcoming winter experiments. The final updated version will be available by mid-January.

5. Electronic Resources

Information for 2026 Participants (Link: <https://fluxlab.ca/simflex/>)

- **Overview:** Includes documents with General description and Frequently Asked Questions.
- **Participation documents:** Offers Participant-Questionnaire and Experimental Protocol, Overview and Methodology Framework, Submission Templates.
- **Participation agreements:** Agreements for various participants.

- **Safety Training and Documents:** Includes WM training information, Fire Safety and Emergency Preparedness and Response Plan, Petrolia Landfill safety briefing, and additional safety documents provided by FluxLab and EREF.
- **Geometry Files & Maps:** Provides visual references of the project site for planning and documentation; Contains wind data analyses, wind roses and dominant wind directions and possible downwind sides.

6. Contact Information

Role	Name	Email	Tel
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