Earthworks' Optical Gas Imaging (OGI) Policy

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Background

Earthworks is a nonprofit organization dedicated to working alongside communities to protect people and the environment from the adverse impacts of oil and gas development. We expose the harms of the oil and gas supply chain and gaps in regulation, compliance and enforcement through applied technologies including but not limited to optical gas imaging (OGI) cameras.

OGI cameras are a remote sensing technology that allows for the detection of 20 different hydrocarbon compounds including methane (CH4) and other volatile organic compounds (VOCs) and are deployed by the oil and gas industry, regulators, and an increasing number of NGOs.

Earthworks owns a number of handheld FLIR GF320 OGI cameras that are deployed across the U.S. and internationally. These cameras use an onboard filter that only allows infrared energy of specific wavelengths between 3.2-3.4 micrometers to pass through to the camera's detector. Hydrocarbon compounds absorb infrared energy at these wavelengths, so these cameras are specifically designed to visualize these compounds.

Only Earthworks' thermographers who retain OGI Thermography training certification through the Infrared Training Center (ITC) operate our OGI cameras in the field. Our thermographers use OGI cameras to survey a variety of emission sources associated with oil and gas facilities and related activities, petrochemical facilities, and other industrial processes including but not limited to: fracking and drilling equipment, well heads, storage tanks, vents, flares, separators, dehydrators, fittings/unions/connections/valves, compressors, pipelines, and activities such as blowdowns and loading and unloading activities. These surveys provide real-time, on-the-ground evidence on emissions events and allow Earthworks to document critical, source-specific information about the possible cause and duration of these events. Since 2014, Earthworks has demonstrated success in using OGI evidence to identify both fugitive and intentional oil and gas air pollution from equipment across the supply chain, including malfunctions that require repairs, violations of air quality and methane regulations, and emissions events that are in the public interest.

Earthworks' Use of OGI Cameras

<u>For Surveys of Facilities for Hydrocarbon Emissions, Earthworks may:</u>

1. Survey facilities that are associated with environmental or odor complaints from affected parties to identify sources of hydrocarbon emissions.
2. Conduct repeat surveys of facilities associated with complaints from affected parties and/or previously documented hydrocarbon emissions.
3. Identify specific sources of emissions at facilities that are associated with monitored concentrations of hydrocarbon compounds.
4. Survey facilities associated with specific sectors, operators, and/or activities to identify common sources of hydrocarbon emissions.

5. Survey facilities to identify leaks, malfunctions, and/or unreported or underreported hydrocarbon emissions.
6. Survey sources from a distance to identify hydrocarbon emission plume locations in an effort to minimize staff and/or public chemical exposures.
7. Survey sources to identify potential air quality sampling locations (e.g. for data collection with a handheld PID monitor or whole air canister).

Measuring Temperature

1. While FLIR G-series cameras can measure temperature, Earthworks' thermographers **DO NOT** use OGI cameras to measure temperature for the following reasons:
    a. Temperature measurement is not necessary for positive identification of hydrocarbon emissions.
    b. Earthworks' FLIR GF320 OGI cameras are not routinely calibrated by the manufacturer to ensure accurate temperature measurement readings.
    c. Earthworks' thermographers retain OGI Thermography training certification through ITC in the use of OGI cameras specifically but not Level I-III Thermography training certification in the use of infrared cameras for temperature reading generally

Quantification

1. While quantitative measurement is possible with FLIR G-series cameras, Earthworks' thermographers **DO NOT** use OGI cameras to quantify emissions for the following reasons:
    a. There is limited peer-reviewed research that supports the use of OGI cameras to quantify emissions in a field setting.
    b. Accurate quantification requires:
        i. Access to technical data including the gas composition of a plume that is often impractical or infeasible for Earthworks to obtain.
        ii. Ideal conditions for data collection including the ability to record OGI video for a prolonged duration in a location affording both close proximity to and unobstructed views of a source and associated emissions.
    c. In most cases, OGI videos can be used as evidence of possible noncompliance of air quality regulations (e.g. most leaks and malfunctions can be identified merely by identifying source-specific emissions) and/or evidence of emissions that are in the public interest without the need for quantification.

Earthworks' Use of OGI Data

Earthworks maintains documents that describe technical details and outline the usage of OGI cameras such as our FLIR GF320 Factsheet (en Español) and OGI Best Practices Guide. Interested parties may be referred to these documents and to the Earthworks Energy Field Investigations and Earthworks International OGI webpages for more information about our work.

For Regulators and/or Operators

1. If emissions and/or other notable observations are made that indicate perceived compliance and/or permitting issues, relevant regulatory authorities will be notified as soon as it is feasible to prepare the OGI and/or other evidence for submission.
    a. Depending on type of emissions and/or perceived issue, a priority will be for evidence to be submitted within a timeframe that is not prohibitive of an efficient regulatory response.
2. In some circumstances, such as for international OGI surveys or for surveys conducted on private land on behalf of a private landowner, evidence of perceived issues may only be submitted to relevant regulatory authorities after consultation with partners and/or the private landowner.
3. If relevant operator representatives approach Earthworks' thermographers during a survey, staff may share information pertaining to observations made during that survey but never raw data.
    a. Once OGI and other evidence has been prepared for submission to relevant regulatory authorities, it may also be shared with relevant operators.

For Media and/or Elected Officials

When OGI surveys and/or field observations document issues relevant to an Earthworks campaign or project and/or that are in the public interest, in consultation with the relevant team/campaign/project lead, staff may notify media and/or relevant elected officials.

Such issues include:

1. Issues related to public health
2. Issues related to the climate crisis
3. Issues related to noncompliance with and/or violations of air quality regulations and/or permits

For Members of the Public

Earthworks routinely uses evidence obtained through OGI surveys for campaigns and projects and makes most video evidence available to members of the public via our channel on Youtube or by request.