



EARTHWORKS

Earthworks' Optical Gas Imaging (OGI) Policy **May 15, 2020**

Background

Earthworks is a nonprofit organization that is dedicated to protecting communities and the environment from the adverse impacts of energy development by using various technologies including but not limited to optical gas imaging (OGI) infrared cameras. This passive remote sensing technology allows for the detection of thermal differences, volatile organic compounds (VOCs), and methane emissions for industry, regulators, and the Earthworks organization. Earthworks owns three handheld FLIR GF320 OGI's that use onboard filters to visually detect constituents with an infrared absorption in the 3.2 – 3.4 micrometer range.

We document a variety of emission sources associated with chemical plants, refineries, industrial processes, and oil and natural gas-related activities and emission sources including but not limited to: fracking and drilling operations, well heads, processing towers, storage tanks, pipelines, dehydrators, loading and unloading activities, fittings/unions/connections, vents, and flares. OGI cameras are useful to Earthworks, as they provide a real-time perspective of the apparent expanse and duration of the emissions that can then be verified (or not) by industry and/or regulators. Through the years, Earthworks has documented many success stories when findings were shared and then followed up on by relevant parties including elected officials and the general public.

Standard Earthworks' OGI Use

1. Off-Site Surveillance
 - 1.1. Survey areas from a distance to identify emission plume locations in an effort to minimize staff and/or public chemical exposures.
 - 1.2. Identify sources of emissions that are associated with monitored concentrations of ambient air constituents.
 - 1.3. Screen specific industrial processing sectors to identify sources of emissions.
 - 1.4. Screen areas and/or industrial processes that are associated with environmental or odor complaints from affected parties.
 - 1.5. Screen industrial processes and equipment for thermal patterns to identify green solutions and malfunctioning infrastructure.
 - 1.6. Survey areas to identify potential sampling locations.
 - 1.7. Screen sources to identify unreported or potentially underreported emissions.
 - 1.8. Survey emission and industrial sources to identify emissions that are associated with climate change.
2. On-Site Support and Studies
 - 2.1. With approval from cooperating parties, screen industrial processing equipment to identify emission sources and pollutants.
 - 2.2. Screen industrial processes and equipment for thermal patterns to identify green solutions and malfunctioning infrastructure for cooperating parties.

Dedicated to protecting communities and the environment from the adverse impacts of mineral and energy development while promoting sustainable solutions.

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- 2.3. Perform quantitative optical gas imaging using technically correct inputs provided and verified by the cooperating industry.

Emergency Situations Identified with OGI Cameras

3. If an emergency situation is identified with an OGI, Earthworks' staff will do the following.
 - 3.1. When a perceived safety and/or unsafe possible chemical exposure is identified, staff shall withdraw to a safe distance.
 - 3.2. Field staff shall contact the appropriate company when a perceived emergency response level safety issue is identified.
 - 3.3. Staff shall contact the appropriate regulators when perceived industrial safety issues are identified.
 - 3.4. When potential serious safety and chemical exposure issues are identified that may affect the general public, staff should contact relevant affected parties.

Notifying Interested Parties

4. An Earthworks' OGI Informational Handout was developed to describe the use of the technology and provides contact information for obtaining more technical information about field usage. Relevant Earthworks' OGI-related documents are available to interested parties.
 - 4.1. Companies and/or Regulators
 - 4.1.1. If field staff identify perceived problems via OGI, they may share information with relevant company representation if approached outside the fence line.
 - 4.1.2. If emissions and/or other notable observations are made, relevant regulators will be notified if there are perceived compliance and/or permitting issues.
 - 4.2. Media and/or Elected Officials
 - 4.2.1. When field observations and/or measurements document perceived public health issues, staff may notify media and/or elected officials to leverage potential resolution.
 - 4.2.2. When field observations and/or measurements document climate change associated issues, staff may notify media and/or elected officials to leverage potential resolution.
 - 4.2.3. When field observations and/or measurements document issues not perceived to be in the public interest, staff may notify media and/or elected officials to leverage potential resolution.
 - 4.3. General Public
 - 4.3.1. Notify members of the public when field observations and/or associated measurements include, more likely than not, possible public health concerns including possible chemical exposure.
 - 4.3.2. Staff may notify members of the public when field observations and findings likely include regulatory compliance and/or permitting irregularities.
 - 4.3.3. Staff may notify members of the public when field observations and emissions are perceived to significantly contribute to climate change.

Sharing OGI Images

5. Types of OGI Assessments
 - 5.1. Off-Site Surveillance
 - 5.1.1. If approached by affected companies, OGI videos may be shared if it is within the best interest of Earthworks to do so.
 - 5.1.2. If it is within the public's best interest, OGI videos can be shared with members of the public.
 - 5.2. On-Site Support
 - 5.2.1. OGI videos from on-site support assessments, will not be shared with outside parties unless first approved by the affected cooperating company.
 - 5.3. Research/Training
 - 5.3.1. OGI videos that are recorded during research and/or training events shall only be shared with outside parties if it is within the best interests of Earthworks.

Image Verification

6. Requirements
 - 6.1. Specific emission sources that are documented by OGI's must be thoroughly documented including but not limited to the company name, physical location, and narrative descriptions.
 - 6.2. If OGI videos or thermograms are shared with the media or elected officials, interpretive findings must be confirmed by an independent second OGI/Level I Thermography certified operator.
 - 6.3. If OGI quantitation videos and data are to be shared, all manufacturer inputs must be provided by the company of interest before sharing the data with other affected parties.