

Recommendations for Fenceline Monitoring Requirements at Petrochemical Facilities

Designing regulation for transparent, reliable public access

[The Fair Tech Collective](#)

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Introduction

Requirements for ambient air monitoring at petrochemical facility fencelines are increasingly prevalent as part of regulatory statutes, land use permits, and consent decrees. Communities have fought for these requirements as a means of securing their right to know what is in the air they are breathing. Fenceline monitoring requirements help create transparency about industrial emissions and have the potential to further scientific knowledge of the impacts of emissions on human health and the environment.

Achieving these goals requires easy, consistent public access to the datasets produced by air monitoring. Fenceline monitoring requirements therefore need to do more than specify the data to be collected. They need also to offer guidelines for how those data are stored, maintained, and made available to potential users.

Background

The [Fair Tech Collective](#), an interdisciplinary research group based at Drexel University in Philadelphia, PA, has been working with fenceline monitoring data since 2015. Our goal has been to [make monitoring data more meaningful](#) for communities near oil refinery fencelines. To this end, we have [developed web-based tools](#) to enhance communities' ability to access and interact with monitoring data, in collaboration with refinery-adjacent communities in the San Francisco Bay Area. We have also created [innovative techniques for analyzing data](#).

Our success has been constrained by two key factors: (1) data are not available in standardized, interoperable formats, and (2) data quality is difficult to assess. Both of these constraints on meaningful public access could be addressed by requirements for fenceline monitoring that specify how data are to be provided to the public.

Recommendations

Based on our experiences, we recommend that the following provisions be included in all requirements, new and existing, for fenceline monitoring.

To ensure data quality

- Raw spectral data from open-path sensing and gas chromatography should be made publicly available. This allows for the auditing of monitoring results and the identification of monitors that are not operating properly.
- Time and date values should be expressed in Coordinated Universal Time (UTC), using ISO-8601 standard formatting.



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- Metadata should accompany pollution measurements to allow data users to assess the contexts and quality of data collection. Relevant metadata include but are not limited to locations of monitors (latitude and longitude), detection limits, signal strength (for open path monitors), documentation of calibration and other quality control checks, and QA/QC plans.
- Data quality audits should be conducted routinely by trusted third parties. Funds for this work should be provided as part of the monitoring plan.

To ensure public access to data

- REST APIs (application programming interfaces) should be provided for all data endpoints.
- APIs should be documented using a widely recognized standard such as OpenAPI.
- APIs should be public and open. Any measures instituted to prevent inauthentic requests should be designed in such a way that users need not ask permission of monitor operators or other entities to be able to access the data.
- APIs should be versioned, with ample notification provided to users when new versions are available or old versions phased out.
- Databases and their APIs should be optimized to minimize API latency when executing requests for data. Under most circumstances, users should not have to wait more than a few seconds for requested data to be delivered.
- Intuitive, ADA-compliant user interfaces should be created to enable individuals with no programming background to select and download data in .csv format.

To ensure long-term resilience of monitoring systems

- Monitoring plans should specify measures for routine maintenance and periodic upgrades to monitoring systems.
- Monitoring plans should specify measures for maintenance and periodic upgrades to APIs and user interfaces.
- Monitoring data should be stored on a hosted cloud service (rather than local servers) to provide redundancy and protection against loss.
- Adequate resources should be allocated for maintenance and upgrades. These include not only funding but also appropriate expertise (e.g., experts in database and user interface design as well as experts in monitoring techniques).

To foster community understanding and engagement

- Funding should be made available for affected communities and professional researchers to explore and analyze fenceline monitoring data, using methods that can shed light on community concerns.
- Regulators should facilitate discussions with affected communities about fenceline monitoring results. The purpose of these discussions should be to mobilize local knowledge to give context to data, collaboratively formulate questions for further investigation, and identify priorities for immediate action—not merely to instruct or reassure communities.

