

REGULATORY ASSISTANCE

Real-Time Fenceline Monitoring Services with Open Path Technologies

Founded in 1974, Trinity Consultants helps organizations overcome complex, mission-critical challenges in EHS, engineering, and science through consulting, technology, training, and staffing expertise. We support clients in geographies worldwide and across various sectors, including industrial, energy, manufacturing, mining, life sciences, and commercial/institutional.

Trinity offers comprehensive fenceline monitoring services that can help you comply with real-time monitoring requirements. These services can be used for required regulatory monitoring, defensive monitoring, or both. We have a collaborative team of experts, including engineers, scientists, and other professionals within various environmental fields, to help you select and implement the best approaches to achieve your monitoring objectives.

Changing Landscapes of Fenceline Monitoring Requirements

In recent years, several state-level Environmental Justice (EJ) driven legislatures have been promulgated to address the exposure of marginalized communities to hazardous air pollutants (HAPs) and air toxics by requiring fenceline air monitoring systems. While some of these programs have used conventional or low-cost monitoring methods, many have required real-time fenceline monitoring with advanced optical and remote sensor (ORS) measurement techniques for real-time



emissions measurements. The ORS measurement devices are considered emerging technologies. The devices are equipped with state-of-the-science techniques with real-time results, which require well-trained technicians and scientists to collect, understand, and use the data and information generated by ORS technologies.

Application of Optical and Remote Sensor (ORS) Measurement Technologies

Our ORS fenceline monitoring services can deliver accurate and defensible fenceline air quality and meteorological data that can be used in support of environmental assessments, compliance, and permitting. We use state-of-the-science ORS measurement technologies, including but not limited to: Fourier Transform Infrared Spectroscopy (FTIR), Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS), and Tunable Diode Laser (TDL), as well as conventional point monitoring methods.

The ORS measurement technologies operate based on the following principles and background:

Fourier Transform Infrared Spectroscopy (FTIR)

- ▶ FTIR spectroscopy is an optical technology used for real-time monitoring of gaseous and volatile organic compounds in the air.
- ▶ The FTIR instrument transmits an IR beam of light through a region (closed-cell or open-path) containing the compounds of interest and captures the resulting IR spectra from the sample.

Ultraviolet Differential Optical Absorption Spectroscopy (UV-DOAS)

- ▶ The UV-DOAS is an optical remote sensing technology that measures concentrations of gaseous compounds by analyzing the absorption of UV light by chemical compounds in the air and applying the Beer-Lambert law.
- ▶ The UV-DOAS typically operates within a wavelength range of 245 to 380 nanometers.
- ▶ Compounds with specific chemical structure characteristics that allow for unique absorption bands can be accurately detected and measured using the UV-DOAS, limiting the number of compounds that can be monitored.

Tunable Diode Laser (TDL)

- ▶ TDL Absorption Spectroscopy instruments utilize spectroscopic principles and sensitive detection techniques coupled with advanced diode lasers and optical fibers developed by the telecommunications industry.



- ▶ Light amplification by stimulated emission of radiation (LASER) generates a narrow wavelength of light with a small cross-sectional area. Diode lasers generate this light beam using a semiconductor material that emits light when an electrical current is “injected” into the semiconductor junction.
- ▶ The relative strengths of offline to online transmission are measured by TDL Absorption Spectroscopy instruments, providing a precise and highly sensitive measure of the target gas concentration along the path transited by the laser beam.

Site-Specific Customization of Comprehensive Fenceline Monitoring Network

Each Trinity fenceline monitoring project is custom-designed by our experts to ensure your monitoring technologies and networks meet your regulatory requirements and support back-trajectory analysis to determine the origin of detected plumes, whether from an on-property or off-property source. Upon request, Trinity can provide complete turnkey fenceline monitoring services, including monitoring plan development, site selection, equipment procurement and acceptance testing, equipment installation and integration, routine field operations, training, calibration and maintenance, quality control checks, data management, data validation, data formatting and reporting, quality assurance performance and systems audits, and emergency trips.

Additionally, our web development team can tailor websites to effectively display monitoring network results to the public in real-time, as necessary. Our team also implements and operates notification systems to ensure you meet your regulatory and public notification requirements.

Why Choose Trinity

Trust Trinity’s multidisciplinary staff with over 150 years of combined experience and approximately 1,000 meteorological and air quality sites installed and operated nationwide. Leveraging Trinity’s nearly 50-year history of addressing air quality regulatory issues and deep and broad expertise in monitoring, Trinity is uniquely qualified to provide a fenceline monitoring solution that is robust, accurate, and appropriate for specific client needs.

Contact us at 800.229.6655 to learn more about our ORS fenceline monitoring services and how we can help you achieve your monitoring objectives.

ISO 9001:2015 certified at our corporate office in Dallas, Texas

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