ES ENGINEERING
S E R V I C E S

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Air Dispersion Modeling Services

The Dispersion modeling uses mathematical formulations to characterize the atmospheric processes that disperse a pollutant emitted by a source. Based on emissions and meteorological inputs, a dispersion model can predict concentrations at selected downwind receptor locations. These air quality models are used to determine compliance with National Ambient Air Quality Standards (NAAQS), and other regulatory requirements such as New Source Review (NSR) and Prevention of Significant Deterioration (PSD) regulations. These models are addressed in Appendix A of EPA's Guideline on Air Quality Models (Appendix W of 40 CFR Part 51).

Use Air Dispersion Modeling During Your Permitting Process:

- To verify that emissions from a new source will not exceed ambient air quality standards, or maximum ground level, fence line concentrations (Air Toxics requirements)
- To determine appropriate stack configuration
- To predict future pollutant concentrations from multiple sources.
- To evaluate the effect of building downwash

Air Dispersion Modeling Can Save Money:

- When preliminary calculations indicate the need for excessively high stack heights that would be expensive to install
- When multiple discharges from stacks and vents are present
- When a better understanding of the impact of discharges is required
- When management controls are needed to minimize odor impacts. Dispersion Modeling can determine the conditions under which odor complaints are likely to occur, which can be used to plan a mitigation strategy
- When the impact of changes in emissions, emission controls or stack heights are being assessed. Potential changes can be input into the model to see the effect on the dispersion pattern

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Additional Services

Accidental Release Modeling

Accidental releases include toxic gas or liquid spills, or overpressure explosions. The nature of the release, including the substance and the emission rate, and the type of release dictate the most appropriate model for calculating downwind concentrations.

Engineering/Business Assessments

Dispersion modeling is ideal for performing "what-if" analyses to determine the effects of potential operational changes. By performing a series of model runs, Air Compliance Testing can help you with plant and equipment siting, stack height design, and evaluation of control equipment options.

A Few of Our Modeling Tools:

Toxics Screening Model (TSCREEN) is a Gaussian model that implements the procedures to correctly analyze toxic emissions and their subsequent dispersion from one of many different types of possible releases for superfund sites. It contains three models: SCREEN3, PUFF, and RVD (Relief Valve Discharge).

AERMOD Modeling System - A steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.

CALPUFF Modeling System - A non-steady-state puff dispersion model that simulates the effects of time- and space-varying meteorological conditions on pollution transport, transformation, and removal. CALPUFF can be applied for long-range transport and for complex terrain.

The SLAB model treats denser-than-air releases by solving the one-dimensional equations of momentum, conservation of mass, species, and energy, and the equation of state. SLAB handles release scenarios including ground level and elevated jets, liquid pool evaporation, and instantaneous volume sources.

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