

Dispersion Modeling

INTERA uses air dispersion models to demonstrate the potential impacts of air emissions on surrounding properties. These tools

integrate atmospheric processes and terrain to develop a mathematical representation of how pollutants will concentrate at ground level. We apply various regulatorily-approved modeling applications, including AERMOD, ISC3, CAP88, and CALPUFF, to work in the chemical, oil and gas, manufacturing, and nuclear industries.

Some of our typical air dispersion model applications include demonstrating and/or evaluating:

- Compliance with NAAQS
 - Health and Environmental Effects of Pollutants on Nearby Humans, Animals, and Vegetation
 - Impacts of Accidental Releases to the Environment for Emergency Preparedness
 - Offsite Consequence Analyses for Risk Management Planning under 40 CFR Part 68
 - Indoor Air Quality Fate and Inhalation Exposure Assessments
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- Analysis of Toxicological Inhalation Impacts on Nearby Receptors, Texas, USA

Challenge: To address potential offsite toxicological ambient air inhalation impacts from volatile aqueous substances in a densely populated urban area with complex atmospheric and terrain features.

Solution: INTERA prepared evaporative emissions calculations for the subject substances at several locations at the site. These estimations were based on the storage volume of the containers and respective containment areas. Using these emissions estimates, refined air dispersion modeling was conducted to determine offsite impacts within the vicinity of the site, which was located in a highly developed and densely populated urban area. A contour graphic with an aerial overlay was developed to demonstrate the potential impacts relative to the release location. Due to the absence of inhalation toxicological data and peer reviewed studies, we conducted a toxicological bridging analysis to develop toxicity endpoints for the subject chemicals based on chemically similar substances where health effects standards and peer-reviewed data has been established. These toxicity endpoints were established to serve the same function as the No Observed Adverse Effect Level (NOAEL) exposure level.

Results: Our analyses provided a better understanding of the potential offsite impacts of the client's emissions on neighboring properties, allowing them to be better stewards of the surrounding environment.

INTERA develops air dispersion models using traditional command-line coding. This provides greater control over input parameters, enabling us to develop refined models that produce more accurate results.

