



## Who Knows Which Way the Wind Blows?

By Thomas G. Echikson,  
Karen K. Mongoven  
and Ashley C. Brown

**Work with your expert to identify the flaws in the opposing party's modeling testimony and to ensure that your own testimony is not vulnerable to attack.**

# The Use of Air Quality Models in Toxic Tort Litigation

In tort cases involving the emission of substances from facilities or resulting from an accident or fire, it is common for parties to present air quality modeling testimony. Such testimony, using air quality models initially

developed primarily for regulatory purposes, has grown in importance in toxic tort litigation. These models provide complex computer simulations of the fate and transport of air emissions in the environment. They can be used to support (or oppose) class certification, to support (or oppose) standing, to prove causation (or its absence), and ultimately in support of (or in opposition to) proof of liability. Given their central role in such litigation, it is important for the defense litigator to understand how these models work, the

key inputs to the models, and where the models are vulnerable to attack.

In this article, we review the types of air models that are typically used in tort litigation, as well as their important inputs. We then review how courts have considered and accepted or rejected modeling in toxic tort cases. We conclude with a discussion of tactical and legal considerations in the use of air quality models.

### Types of Air Quality Models

Choosing an air model that fits the situation at hand, and an expert who is well-versed in that model, is key to its successful application. If an otherwise good model is a poor fit for a particular case, the modeling results can be highly uncertain. In determining the appropriate model to use, a modeling expert has an ever-increasing array of models to choose from, including pre-packaged modeling programs and modified versions of those programs. The expert might also create an entirely new model to address a unique situation, although a special litigation-driven model would clearly be more vulnerable to exclusion as being unreliable and unproven.

The U.S. Environmental Protection Agency (EPA) *Guideline on Air Quality Models*, codified at 40 C.F.R. Part 51, Appendix W

■ Thomas G. Echikson is a partner and Karen K. Mongoven and Ashley C. Brown are associates in Sidley Austin's Washington, D.C., office. Mr. Echikson's practice focuses on complex environmental and toxic tort litigation. He is member of DRI's Toxic Torts and Environmental Law, Trial Tactics, and Government Enforcement and Corporate Compliance Committees. Ms. Mongoven's practice focuses on complex civil and criminal environmental litigation and regulatory compliance counseling, with particular focus on the Clean Air Act, and RCRA. Ms. Brown's practice focuses on Clean Water Act and Clean Air Act litigation.



(commonly referred to as “Appendix W”), provides guidance on the use of models for Clean Air Act regulatory purposes. Appendix W is an authoritative source of information about air models, and it can be used to assess the validity of air model choice and application. While the models discussed in Appendix W can apply to many substances, their focus is on “criteria” air pollutants such as ozone, nitrogen oxides, sulfur dioxide, particulates, lead, and carbon monoxide.

While not an exhaustive survey of all models and modeling techniques, Appendix W serves as a measure of what EPA considers to be “acceptable” modeling techniques. Using an EPA-recommended model described in Appendix W, therefore, carries strong weight when a court or jury is considering an expert’s testimony. Appendix W contains an overview of model use and information to assist in choosing a suitable model. It describes the parameters and qualities of the recommended models and preferred modeling techniques, and guidance for use of alternative models. It also makes recommendations on model inputs, such as meteorological data from the National Weather Service, and includes an extensive discussion on how to evaluate models and the uncertainties associated with modeling.

### Types and Uses of Air Quality Models

EPA divides air models into two general types: “screening models” and “refined models.” Screening models use worst-case meteorological conditions to give a conservative estimate of air quality impacts of a source. Refined models perform a more sophisticated analysis of atmospheric processes. Refined models require more detailed and precise data input, and, as a result, they yield more refined estimates of emissions impacts. In toxic tort litigation, it is more typical to use refined models, particularly in more advanced stages of a case. A screening model that shows no elevated risk (even with its conservative assumption), however, can be an effective tool early on, including in support of summary judgment motions or in class certification proceedings.

The number and type of “refined” air models in existence and used for regulation and toxic tort litigation are numerous, and can range in scale from models used to predict indoor air quality, to mod-

els that address global fate and transport of substances such as carbon dioxide. Refined models can be divided into two general categories: (1) models that examine the impact of emissions from one or more source on air quality at a regional scale (*i.e.*, over large distances), and (2) models that focus on the fate and transport of emissions resulting from a single source or group of sources in a smaller setting (*i.e.*, within a few miles of the source). The first category of models, known as “photochemical grid models,” are not typically used in toxic tort litigation, although they may come into play in cases that deal with long range transport of emissions crossing state lines. These models can account for multiple sources and the chemical transformation of pollutants, such as sulfur dioxide to sulfate particulate matter. The second category of models, “source models,” are more often used in tort litigation, as they examine the fate and transport of emissions from a single source or group of sources. The most commonly used source model is AERMOD. AERMOD is a so-called “Gaussian” model because it assumes the emissions are distributed in a Gaussian, or normal probability. Other “puff” models, such as CALPUFF, can be used for longer distances or in complex wind conditions. Given their different configurations and uses, proper selection of the model is best left for an air quality modeling expert.

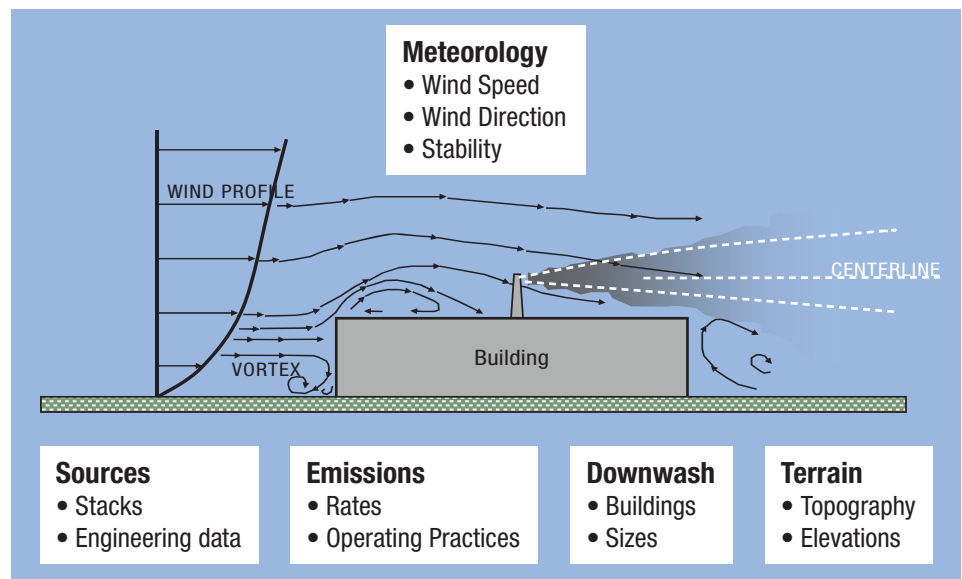
The models described in Appendix W are primarily applied in situations where

the emission plume is “buoyant,” meaning lighter than air. Dense gas models can be used to model substances that are denser than air and are often used to model accidental releases of substances, such as from a spill or accident. While not discussed in Appendix W, other EPA documents (such as the EPA’s Air Quality Modeling Group website) and literature on modeling regarding dense gas models can help an attorney evaluate the usefulness of such a model in litigation. Examples of models with dense gas capabilities include SLAB, SCIPUFF, and DEGADIS. Dense gas models often possess certain qualities undesirable to defense lawyers for use in toxic tort litigation, such as a tendency to yield overly conservative estimates.

### Key Elements of Air Quality Models

Although there are a variety of different models available, they all depend on a common set of inputs. Assuming the model being used is generally accepted and applied in the field and that the proper model for the issue has been selected, model inputs become the critical battle points in litigation. The inputs consist of (1) a characterization of the source of the emissions, (2) an estimate of the quantity and type of materials emitted, (3) the meteorology data used in the model, and (4) information about the terrain surrounding the source that can affect how the emissions disperse over land. Figure 1, below, illustrates the multi-

Figure 1





ple types of inputs to an air model, each of which can significantly affect the modeling results.

The first input is information that describes the “source” of an emission or release. This information is important to the quality of modeling, and can significantly increase uncertainty in a model if not described as accurately and precisely

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as possible. Key information includes an accurate description of the release point (is it a stack at elevation or an area at ground level?). The location, height and size of the release point, as well as the velocity and temperature at which the material is emitted all affect how the material will be dispersed. In addition, height and size of nearby buildings can also affect results. Results can vary significantly depending on where the modeler locates the release point inside a facility or source.

Estimating emissions is the next critical element. What are the characteristics of the substance(s) being modeled? Is it a particulate, gas, liquid, aerosol, or some combination of all these? Are the materials reactive or unstable? The chemical properties of a substance and possible reactions or interactions with water or other atmospheric elements are parameters that may need to be taken into account. The amount of a substance emitted and the rate at which it is emitted are obviously important factors that can influence the results of modeling. Also, the timing of the emission—did it occur at night or during the day—can affect the results.

While information about the source and emissions is often known or measurable when dealing with standard operations at a

facility, it is not always known where there is an accidental release. In such situations, the amount of material released, the form of release (gas, liquid, aerosol, or some mixture thereof), and the rate of release are often unknown factors that likely have a significant impact on the dispersion and ultimate effects of a release. These factors are often left to the expert judgment of a modeler or engineers who are providing information to the modeler. As a result, issues surrounding the proper accounting of accidental or unrecorded releases can become important battle points in litigation.

Proper meteorological data are also key to obtaining the best possible modeling results. Meteorological data used in modeling often come from National Weather Service stations at commercial airports, but can also be obtained from other sources, such as on-site monitors, educational institutions or the military. Meteorological data are usually entered into a preprocessor program, which manipulates the data and either reformulates them for input into the dispersion model, or calculates inputs for the dispersion model. Often, a dispersion model will have an accompanying preprocessor program. For instance, AERMET is used with AERMOD. Key meteorological data parameters include temperature, winds and wind fields, turbulence, pressure, and humidity. Appendix W recommends that meteorological data be chosen based on proximity of the meteorological monitoring site to the area being considered, the complexity of the terrain, exposure of the meteorological monitoring site, and the time period during which the data are collected.

The final input is information about the terrain in the area to be modeled. Land use and topography can affect the meteorological conditions and the pattern and path that gas plumes take. The type of terrain, land use (wooded, urban, etc.), and “surface roughness” are factors that further describe the impacts terrain will have on the winds or on the model. For dense gas models, surface terrain can often be an especially important aspect of the modeling.

### **Review of Judicial Acceptance of Air Models**

In the prototypical toxic tort case involving air modeling, multiple plaintiffs living in the vicinity of a manufacturing facil-

ity bring suit over injuries to their health or property that were allegedly caused by emissions from the facility. The case might include claims such as nuisance, trespass, property damage, personal injury and mental anguish, and may very likely be pursued as a class action. The plaintiffs’ alleged injuries may have been caused by a one-time release event, such as an accidental spill or a fire, or they may be the result of long-term exposure to the facility’s operations over a period of many years. In either scenario, air modeling may be used to support (or oppose) class certification, standing, causation and/or liability.

The body of case law in which courts have considered the admissibility of air modeling evidence is relatively small. It includes opinions on motions for class certification, motions to exclude expert testimony (*i.e.*, *Daubert* motions), and motions for summary judgment on liability issues. Most opinions involving the evaluation of modeling evidence occur on motions to exclude expert testimony, to which federal courts apply the criteria set forth in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), to determine whether the proffered evidence is both reliable and relevant and therefore admissible under Federal Rule of Evidence 702. The “reliability” prong of the *Daubert* analysis requires the court to ascertain that a modeling expert “employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.” *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 152 (1999). Thus, motions to exclude may incorporate supporting declarations from air modeling experts retained by opposing counsel, opining as to ways in which the challenged modeling fails to comply with the standards of the air modeling field. Where courts are presented with conflicting testimony from air modelers who are both ostensibly qualified to offer expert testimony, there may be a strong inclination to declare a “battle of the experts” that is best resolved by the jury. *Cf. O’Connor v. Boeing N. Am., Inc.*, Nos. CV 97-1554 DT (RCx) *et al.*, 2004 WL 5532396 (C.D. Cal. June 7, 2004) (defendants’ attacks on declarations of plaintiffs’ modeling experts with their own experts, documents and conclusions do not warrant dismissal under Federal Rule of Civil

Procedure 16(f); “deciding which scientific theory or opinion is correct is a triable issue for the jury to decide.”).

In class actions, air modeling is often used to set class boundaries. The modeler produces a map showing the targeted facility surrounded by “isopleths,” which are rings on which modeled concentrations of the substance released are predicted by the model to be equal. The isopleths define areas in which airborne concentrations of the modeled substance—and by extension, exposure of people and property to the substance—is predicted to be at or above a certain level, usually a level deemed by another expert to be significant, medically or otherwise. While these types of maps are generally intended to convey the modeling results in a way that is easy for the court to understand, the underlying information is usually more complicated than appearances suggest, and it is important for the litigator to understand exactly what the map does and does not show.

This point was well-illustrated in *Wall v. Sunoco, Inc.*, 211 F.R.D. 272 (M.D. Pa. 2002). In that case, residents in an area affected by a pipeline spill proffered an expert’s air modeling map of the area in which plaintiffs were allegedly exposed to a threshold level of MTBE in support of their motion for class certification. The plaintiffs, however, failed to provide the court with expert testimony on how to read the map—specifically, what was meant by a caption stating that circles depicted on the map corresponded to “95 percent concentration confidence limits based on the fluctuations... of wind direction.” Defendants, in contrast, presented expert testimony that directly contradicted the plaintiffs’ explanation of the “95 percent” figure at oral argument. The court found it was left with “serious questions regarding the number of people exposed to what plaintiff contends is a medically significant amount of MTBE.” 211 F.R.D. at 275.

Plaintiffs moving for class certification in federal district court, as in *Wall*, are required to demonstrate that the requirements of Federal Rule of Civil Procedure 23(a) are met: (1) the class is so numerous that joinder of all members is impracticable (“numerosity”); (2) there are questions of law or fact common to the class (“commonality”); the claims or defenses of

the class representatives are typical of the claims or defenses of the class (“typicality”); and (4) the class representatives will fairly and adequately protect the interests of the class (“adequacy of representation”). Modeling reports and accompanying modeling maps may be found by the court to have bearing on each of these factors. Some courts employ a less-rigorous standard than *Daubert* in determining whether the testimony should be excluded at the class certification stage. See, e.g., *Ancar v. Murphy Oil, U.S.A., Inc.*, Nos. 06-3246 *et al.*, 2007 WL 3270763, at \*4 (E.D. La. Nov. 2, 2007) (at class certification, expert testimony undergoes “limited *Daubert*” review; defendant’s arguments that underlying data used by plaintiffs’ air modeler are inaccurate and unreliable can only be addressed at merits stage of proceedings and are not appropriately considered in class certification stage). A recent trend toward requiring class action plaintiffs to demonstrate all elements of Rule 23(a) by a preponderance of the evidence will likely result in more rigorous review of expert testimony at the class certification stage. See, e.g., *In re Initial Pub. Offerings Sec. Litig.*, 471 F.3d 24, 40 (2d Cir. 2006) (district courts can no longer find that an expert’s report will sustain a plaintiff’s burden at class certification so long as it is not “fatally flawed”), and additional cases discussed therein.

Whether or not the court employs a full *Daubert* examination of proposed modeling testimony, published decisions in which courts actually exclude modeling testimony are quite rare. The inherent complexity of modeling testimony may make courts reluctant to exclude modeling testimony. But whether or not the court ultimately grants or denies a motion to exclude, such a motion presents a good opportunity to educate the court about the shortcomings of an opponent’s modeling testimony.

One type of challenge is to attack the opponent’s choice of model—for example, arguing that a deposition model should have been used in place of a dispersion model, e.g., *H.E. Stevenson v. E.I. DuPont de Nemours & Co.*, 327 F.3d 400 (5th Cir. 2003), or that terrain considerations indicate that a “puff” model should have been used instead of a steady-state Gaussian plume model, e.g., *Adams v. Cooper Indus., Inc.*, No. 03-476-JBC, 2007 WL 1805586 (E.D. Ky. June 21,

2007). In assessing the choice of the model, courts will look for objective validation of the expert’s modeling methodology. Approval of a model for a particular application in Appendix W or other authoritative guidance is generally viewed as strong indication that the modeling methodology is reliable. See, e.g., *Adams*, 2007 WL 1805586 at \*10 (court considers AERMOD a reliable methodology for the modeling application at issue because it is designated by EPA in Appendix W as “preferred” and has previously been approved for use in mountainous terrain).

Another category of cases comprises attacks on the accuracy of the inputs and assumptions used in opponents’ air modeling. These cases present the classic problem of “garbage in, garbage out.” Air models can be highly susceptible to changes in the data input to the model, such that even small errors in the inputs can significantly affect the modeling results. An argument that the opposing modeler used underlying inputs and assumptions that are skewed toward a particular result is likely to be construed by the court as implicating the weight, rather than the admissibility, of the modeling testimony. See, e.g., *Avance v. Kerr-McGee Chem. LLC*, No. 5:04CV209, 2006 WL 3912471, at \*4–5 (E.D. Tex. Dec. 6, 2006) (arguments that expert’s air modeling inputs were arbitrary and biased toward plaintiffs do not warrant exclusion of the testimony and should be considered by the fact finder with all factors that weigh on credibility). However, a serious error in the modeling inputs may be sufficient to demonstrate that the expert’s methodology is unreliable. For example, in *B.H. ex rel. Holder v. Gold Fields Mining Corp.*, No. 04-CV-0564-CVE-PJC, 2007 WL 188130 (N.D. Okla. Jan 22, 2007), the defendant showed that the opposing air modeler misapplied an EPA equation used to calculate an emission rate that was input to the model, such that the model results were 100 times higher than they otherwise would have been, all other factors being equal. The court held that testimony based on the flawed application of the equation should be excluded as unreliable, finding that plaintiffs’ post-hoc attempts to validate the modeling results could not overcome the underlying flaw in their expert’s methodology. 2007 WL 188130 at \*3.

A related problem involving modeling inputs can occur when a modeler relies on the work of other experts, which frequently can occur in complex cases with many variables requiring expert analysis. For example, one expert may be charged with calculating an emission rate associated with the release(s) being modeled, while another expert performs modeling using that rate as an input

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to the model; still another expert may calculate predicted health effects based on the modeling results. In such cases, there will be a “domino” exclusion effect if the underlying testimony regarding the emission rate is found to be unreliable. *See, e.g., Ponca Tribe of Indians of Oklahoma v. Continental Carbon Co.*, No. CIV-05-445-C, slip op. at 8–9 (W.D. Okla. Jan. 16, 2009) (air modeling testimony excluded as unreliable where the modeler relied on another expert’s emissions estimate without performing independent testing or analysis, and emissions estimate testimony was subsequently withdrawn by plaintiffs).

The importance of modeling inputs is exemplified in *Henley v. FMC Corp.*, 189 F.R.D. 340 (S.D. W. Va. 1999), a case in which the defendant’s air modeler relied heavily on data from a weather and wind monitoring station located near the site of the chemical leak modeled. A last-minute rebuttal witness for the plaintiffs testified that the wind direction data from the station was unreliable due to a broken wind vane. In the court’s estimation, this testimony effectively “dismantled” the entire defense, because the air modeling was central to the case, and at least one other defense witness testified that if the modeling conclusions were incorrect, his testimony would also be erroneous. 189 F.R.D. at 381–82. When new evidence surfaced

that contradicted the rebuttal testimony regarding the wind vane, the court set aside the plaintiffs’ verdict and granted the defendant’s motion for a new trial, concluding that to ignore it would amount to a miscarriage of justice. *Id.* at 350.

In addition to cases involving the threshold question of whether modeling testimony is admissible, another category of cases concerns the appropriate use of such testimony—in other words, what the air modeling does and does not “prove.” Mass torts can involve difficult issues of both general and specific causation. For example, while an expert’s air modeling map may suffice to show that a group of plaintiffs have sufficiently similar claims for purposes of class certification, that same modeling may not be adequate to prove that a particular individual was or was not harmed. *Cf. In re 1994 Exxon Chem. Plant Fire*, No. 94-MS-3-C-M1, 2004 WL 5670389, at \*7 (M.D. La. Sept. 27, 2004) (defendant’s modeling was not competent summary judgment evidence that no person in area affected by plume could have sustained an actual physical injury from exposure, even though modeled level of exposure is below that at which adverse health effects would be seen in the population generally).

In *South Camden Citizens in Action v. New Jersey Department of Environmental Protection*, No. Civ.A. 01-702 (FLW), 2006 WL 1097498 (D.N.J. Mar. 31, 2006), the court granted summary judgment for defendants on the plaintiffs’ nuisance claim due to plaintiffs’ failure to prove the causation element of that claim, where plaintiffs’ expert modeled the effect of a facility’s emissions on a neighborhood as a whole but did not tie the facility’s operations to three particular plaintiffs’ homes. 2006 WL 1097498 at \*21. He also failed to address the issue of what level of particulate matter on plaintiffs’ properties were attributable to the facility at issue versus other sources, leading the court to find his report useless for apportioning the share of liability attributable to the facility versus other industries, or for ascertaining the increased health risk to plaintiffs caused by the facility. *Id.* In contrast, the plaintiffs’ modeler in *O’Connor v. Boeing North American, Inc.*, Nos. CV 97-1554 DT (RCx) *et al.*, 2004 WL 5519343 (C.D. Cal. Sept. 13, 2004), used the street addresses of each individual plain-

tiff and the chemical cloud volume calculated by another expert to determine each plaintiff’s level of exposure to the modeled substances; the court found that this evidence was sufficient to overcome defendants’ motion to dismiss plaintiffs’ fear of cancer claims. 2004 WL 5519343 at \*8.

### Tactics and Legal Considerations in the Use of Air Models in Toxic Tort Litigation

The case law discussed above hints at some of the issues that typically arise when air quality modeling testimony is presented to the court or a jury. In our experience working with air quality modelers in toxic tort litigation, several common themes emerge when either considering whether to offer modeling testimony in support of one’s case, or to challenge and respond to modeling offered by the opposing side. These issues can be raised to the court in the context of class certification motions, motions for summary judgment or in motions *in limine* to exclude expert testimony. They also can be used to cross-examine air quality modeling testimony offered by plaintiffs. This experience also identifies the key items that should be considered when developing air quality modeling testimony on behalf of one’s client. What follows is compendium of issues to consider with your modeling expert and when critiquing and attacking the opposing party’s modeling testimony.

#### Was the Correct Model Selected?

Given the variety of different models available, the first issue that must be resolved is the selection of the proper model. In many cases, there may be no dispute about which model to use. For example, in cases involving particulate or gas emissions from an operating facility, most modelers would agree that AERMOD is the proper model. In accident release cases, however, there may very well be disputes over model selection.

#### Is the Source Characterized Correctly?

Common errors in modeling arise when information about the source is input incorrectly or poor or unsupported assumptions are made about the source. Indeed, it is not uncommon for a facility to have inconsistent information about source characteristics, such as stack height or diameter,

or temperature or velocity of the emissions. The modeler is thus left to choose among different source information using expert judgment. This can often lead to disputes among experts as to the proper information. Moreover, defense modelers are often in a better position than plaintiff modelers to gather information about source characteristics because of access to plant personnel. This can be a decided advantage. Nevertheless, because small changes in these characteristics can affect how the emissions disperse in the environment, careful attention and examination of source characteristics is warranted. "Fugitive" (*i.e.*, non-point) sources are often modeled as "area sources," but a modeler has great discretion on where to place the fugitive source within a facility. Placing that source at the edge of a facility where no buildings are present will lead to a greater estimate of impacts than if the source were placed in the center of the facility. Careful examination of source assumptions is critical.

#### **Are Emissions Estimated Correctly?**

In many cases, there are significant disputes over how much of a substance was emitted and over what time period. For many emissions, there are direct measurements, but issues arise when engineering estimates have to be made (and issues can even arise if there are disputes about the quality and completeness of the measured data). This provides great latitude to the engineer or modeler and can significantly skew results. Mistakes in calculations, if identified, provide a strong basis to exclude or cross-examine the modeler. In one case we worked on, the engineer prepared a "mass balance" estimate, which assumed that unaccounted for materials had to be emitted. The engineer, however, completely missed a critical aspect of the problem, leading to an emission estimate that was proven to be implausible. In another case, the modeler simply failed to input the information in the manner described in his expert report, leading to significant overestimates of emission impacts. Carefully review your own modeler's estimates and inputs to ensure that the assumptions made are supportable.

#### **Is Terrain Characterized Correctly?**

While not as significant as source charac-

terization or emissions estimation, selection of the wrong terrain characteristics can provide a basis for challenging a modeler's testimony. This issue can arise where nearby meteorological data is not available, so that data from a more distant location needs to be used. The modeler must determine whether the terrain where the data were collected is sufficiently similar to the terrain near the source so as to permit its use in the modeling. Methods exist for preparing such a comparison, but the comparison is often made using modeler judgment, as there are no defined standards for acceptable terrain "comparability." Again, careful review of a modeler's assumptions should be conducted.

#### **Are Meteorological Data Input Correctly?**

Meteorological data are often incomplete. Methods exist for "substituting" data, but these methods can often lead to disputes among the modelers.

#### **How Do the Modeling Results Compare to Monitoring Data?**

Like any model, air quality models are simplifications of the real world. Their results can and should be compared with monitoring data, if available, to determine whether the model results comport with those measured values. In one case we worked on, the modeling analyses prepared by the plaintiffs' experts estimated pollutant concentrations many times in excess of those measured at nearby monitors. This provided a strong basis to argue for exclusion. Ensure that your modeler verifies model results through comparison with monitoring data.

#### **What Assumptions Were Made When No Data Exist?**

Modelers often have to make assumptions that are not supported by data. Moreover, models are inherently uncertain. It is good modeling practice to disclose assumptions made and the uncertainties of the model. Failure to do so provides a basis to move for exclusion of the modeling testimony. These are issues to be explored both with your own modeler, as well as when deposing the plaintiffs' modeler.

While the above list identifies some common issues that arise with air quality modeling testimony, a more critical tactical

decision faces a defense lawyer. Although not unique to modeling testimony, a defense lawyer often has to choose between limiting the defense effort to attacking the plaintiffs' air modeling or preparing and presenting an alternative air modeling analysis on behalf of the defense. While no set rules apply, the decision will turn on a variety of considerations, including the

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strength of the plaintiffs' modeling and its vulnerability to exclusion or effective cross-examination. Because of the nature of the dispersion of substances in air, modeling, even that prepared on behalf of the defense, will typically show that some concentration of the substances at issue could reach the location of the plaintiffs. If concentration is a critical aspect of causation, then presentation of a defense model might assist in showing that the concentrations were not sufficient to result in a particular injury or effect. On the other hand, if the mere presence of the substance would be sufficient for liability, a defense model may do nothing more than assist the plaintiff in proving its case.

#### **Conclusion**

Air quality models, if applied correctly, provide a scientific method of estimating the fate and transport of air emissions. Their acceptance will depend not only on the proper selection of the model, but careful development of model inputs. No matter how good a model is, if the inputs are flawed, the output is meaningless. As a result, it is important to work with your modeling expert to help you identify the flaws in the opposing party's modeling testimony and to ensure that your own modeling testimony is not vulnerable to attack.

