

STATEMENT OF DR. H. ANDREW GRAY REGARDING THE DISSEMINATION OF AIR DISPERSION MODELING FILES

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I am an environmental engineer and atmospheric scientist with 40 years' experience performing air quality dispersion modeling. I have developed, evaluated, and applied air pollution dispersion models in academic, regulatory and consulting environments. I developed and applied the methodologies for assessing particulate matter and visibility that were used by the South Coast Air Quality Management District (Southern California) for their air quality management plans during the 1980s and 1990s. I managed a team of researchers that evaluated the MESOPUFF model (the precursor to CALPUFF) for the US Interagency Workgroup on Air Quality Modeling (IWAQM). As a consultant, I have modeled the air quality impacts of thousands of emission sources, including power plants and many other source types, using a variety of air quality models (including AERMOD, CALPUFF, CAMx, CMB, etc.) for various clients, including industry (e.g., diesel engine manufacturers and the off-shore container shipping industry), government (e.g., US EPA and US Dept. of Justice), and environmental organizations (including Sierra Club and National Parks Conservancy Association). I have written and reviewed numerous modeling reports that describe the protocols and results of air dispersion modeling assessments. My qualifications are further detailed in my CV, which is attached.

Air dispersion modeling can be performed for a variety of reasons, including academic or industry research, regulatory (e.g., when permitting a new or modified source), regional planning (e.g., for attribution analyses, control strategy assessments, etc.), or as support during litigation (evaluating individual source impacts, harm, exposure, added risk, etc.).

It is usually the practice (and often required) of the air quality modeler(s) to prepare a **written report** with documentation of the modeling process, including:

1. a description of the data used;
2. a description of the modeled source(s);
3. the models (and modeling options) that were employed;
4. emission summaries;
5. meteorological summaries (e.g., windroses);
6. the results of the modeling exercise; and
7. a summary and interpretation of the model results.

Although a well-documented modeling report will normally contain all these important details, even the most comprehensive report will not contain sufficient information for another modeler to adequately review and evaluate the modeling exercise.

Accordingly, it is also common practice for the US EPA, state and local public agencies in the US, and independent experts, to make available to any interested stakeholder

(i.e., the public), all of the **computer modeling files** that were used to support the report. A careful review of the modelling files is necessary to ensure that all modeling protocols and appropriate modeling options (including applicable regulatory guidelines) have been followed and that no material errors have been made.

In addition, the modeling files are also critical for interested parties to evaluate the air quality impacts of alternative emission scenarios, and/or to perform sensitivity analyses on various modeling inputs (including source and other data) in order to better understand the relationships between those data and the resulting modeled concentration impacts.

The types of computer files that are typically shared are listed in **Table 1** below, and include the meteorological and source data used, and all the input, output and control files created during the modeling process. File transfer is usually accomplished between the modeler(s) and interested parties either via email transfer (using ZIP archive files), FTP transfer sites, or mailed computer storage media, such as USB flash drives, or larger external hard drives (when necessary).

In conclusion, it is not sufficient to merely prepare a written modeling report – it is incumbent upon a responsible air modeler, especially from a public agency, to make the supporting computer files available to all interested parties.

Table 1. Types of information required for public evaluation of air quality dispersion modeling reports. The required data and associated files will depend on the specific application and which dispersion model is used.

Category	Types of Data/Information
Modeling Domain Definition	Maps Terrain Coordinate System
Meteorological Data	Surface Data Locations Tower Heights Raw Data wind speed, direction, temperature, pressure, etc. Upper Air Data Locations Raw Data Prognostic Modeling Data (MM5, WRF, TAPM output) On-site Data (if used)
Geophysical Data	Land Use Surface Roughness Other Micrometeorological Data

Monitoring Data	Ambient Concentration Data if used for model verification Ozone Concentration Data required for chemistry module
Source Data	Source Locations Source Characteristics stack heights, diameters, temperatures, exit velocities Pollutant Emission Rates
Receptor Data	Locations gridded receptors, sensitive receptors Receptor Elevations
Model Control Files	Meteorological Modeling modeling options (wet dry, etc.) Surface Modeling (geophysical) Dispersion Modeling model options (chemistry, urban/rural, etc.)
Post-Processing	Post-processing programs Input data (demographic data, risk factors, etc.)
Model Results	Model Output Files Spreadsheets (summaries) Tables (summaries) Contour Plots