My name is Joseph Scire. I am a meteorologist and the head of the Atmospheric Studies Group of TRC Environmental Corporation, I have a Bachelor of Science degree and a Master of Science degree from the Massachusetts Institute of Technology (MIT).

I've contributed to the development of several U.S. EPA Guideline Models recommended for regulatory use, including as a principal author of the CALPUFF model. I'm also a co-author of the building downwash module called PRIME, that is used in AERMOD, CALPUFF and several other models.

My role in this project was to assist Dr. Porter in the application of CALPUFF in the modeling of the proposed Dublin waste-to-energy facility and background sources. CALPUFF was used to address complex flow situations present in the coastal Dublin environment, including specifically the potential for coastal fumigation, stagnation and recirculation associated with the land-sea breeze circulation.

The assistance provided to Dr. Porter involved conducting CALPUFF modeling in parallel with Dr. Porter with frequent interaction and exchange of data and information. The modeling was conducted for the worst case year (2004) identified in the previous AERMOD simulations conducted by Dr. Porter.

A comparison of the final TRC and AWN CALPUFF simulations showed a high level of agreement, with results matching for all pollutants and averaging time within a few percent.

The results of the CALPUFF modeling confirmed the conclusions reached in the AERMOD study, that is compliance with the relevant ambient air quality standards would be achieved.

There were some differences between the CALPUFF and AERMOD results, reflecting the different model formulations. CALPUFF results were generally somewhat higher, especially for the annual average concentrations, but the conclusions reached in the AERMOD study were confirmed in the CALPUFF modeling.

CALPUFF is a more complex model than AERMOD. AERMOD is a steady-state model that uses a single set of meteorological measurements of wind, temperature and other meteorological parameters at one location (in this case from Dublin Airport or the onsite station).

CALPUFF is a non-steady-state model that allows the spatial variability of the winds to be accounted for in the modeling. It uses meteorological data from many locations to develop a three-dimensional wind field (in this case, Dublin Airport, Casement Aerodrome and the onsite station and gridded data from the MM5 model at a 4 km resolution).

CALPUFF contains explicit parameterizations to represent coastal effects such as plume fumigation that was identified as a potential issue of concern by a commenter on the EIS. In addition, it treats low wind speed and calm wind conditions as well as plume recirculation within a land-sea breeze.

The CALPUFF modeling results were presented in Section 5.3 of Dr. Porter's brief. As I indicated earlier, the more comprehensive CALPUFF modeling confirmed the conclusions of the AERMOD simulations regarding compliance with the relevant air quality standards.

Regarding particulate matter (PM), the CALPUFF modeling includes emissions in the fine and ultra-fine particle size range. In modeling PM10 and PM2.5, the simulations particulate matter simulations were based on a distribution of mass with a geometric mass-mean diameter of 0.48 um and a geometric standard deviation of 2 um. CALPUFF resolves the distribution into nine particle sizes ranging from 0.04 um up to 5.64 um.

The treatment of small particulate matter was done in a manner consistent with U.S. EPA recommendations using mass-based PM2.5 as an indicator of fine particulate matter. The U.S. EPA provides a rationale for using PM2.5 as the basis for its new PM ambient air quality standard in its promulgation of its new PM standard (Federal Register, Vol 71, No. 200, October 17, 2006, Page 61163):

"...it remains appropriate to control fine particles as a group; i.e., that total mass of fine particles is the most appropriate indicator for fine particle standards"

"With regard to an appropriate size cut for a size-based indicator of total fine particle mass, the Criteria Document concluded that advances in our understanding of the characteristics of fine particles continue to support the use of particle size as an appropriate basis for distinguishing between these subclasses and that a nominal size cut of 2.5 um remains appropriate"

"Further, the Administrator provisionally concluded that currently available studies do not provide a sufficient basis for supplementing mass-based fine particle standards with standards for any specific fine particle component or subset of fine particles, or for eliminating any individual component or subset of components from the fine particle mass standards."

"Public comments from all major public and private sector groups received on the proposal were overwhelmingly in favor of EPA's proposal to retain PM2.5 as an indicator for fine particles. Commenters who supported retaining PM2.5 as an indicator argued that current scientific evidence does not identify specific components or sources of concern and therefore, a mass-based indicator remains the most appropriate indicator for fine particles (Engine Manufacturers Association; American Lung Association]"

In terms of the modeling of the facility, the CALPUFF results indicate a minor impact on PM2.5 and PM10. The facility impacts (0.41 ug/m3) are predicted to be well below the proposed EU PM2.5 standard of 25 ug/m3, or less than 2% of the standard. With background PM2.5 concentrations considered, the cumulative impact was predicted to be 10.3 ug/m3.