Meteorological Considerations for Nuclear Power Plant Siting and Licensing

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Despite the exceptional performance record of current nuclear plants, no new nuclear plant has been licensed in the United States in over 25 years. Recent initiatives, such as DOE's *Nuclear Power 2010 Program,* and projections that the U.S. will need at least 350,000 megawatts of new generating capacity by the year 2030 (a 40 percent increase), have resulted in a flurry of activity to site and license new plants. More than 15 companies are in the process of preparing Combined License Applications (COLAs) for over 30 new reactors at 25 proposed new plant locations. One of the primary elements of a new plant license application is the characterization of site-specific meteorology and a demonstration that plant operation can meet rigid limitations for airborne radiological impacts. A cornerstone of the demonstration of compliance with these requirements is the use of multiple years of onsite meteorological data when predicting relative concentration and deposition impacts of radionuclide emissions during plant operation and hypothetical accident scenarios.

Based on recent experience obtained during the siting and licensing process for three recently proposed nuclear power generating facilities, this paper describes some of the meteorological and other related considerations that should be taken into account, including the following:

- Lead time to obtain valid onsite data
- Designing an onsite meteorological monitoring system
- Data recovery and quality
- Physical influences on wind measurements (sea breeze, stagnation, water bodies, terrain, predominant air masses)
- Effects of time and spatial averaging protocols on meteorological parameters
- Calm/light winds
- Statistical characterization of regional data and extrapolation to 100-year recurrence
- Extreme temperature conditions and the potential impact on plant cooling
- Proximity to "sensitive receptors" and the demonstration of compliance with exposure/dose limits
- Other meteorological conditions that can adversely influence dispersion modeling of radionuclide emissions

The consideration of these and other factors during the nuclear power plant siting and licensing process can play an important role in the early stages of the plant development process.