

Meteorological Data Processing for Commercial Nuclear Power Plants

Theodore A Messier

R Brad Harvey

Framatome ANP DE&S

400 Donald Lynch Boulevard
Marlboro, Massachusetts 01752
978-568-2378
tamessie@dukeengineering.com

Meteorological data measurements are required at all operating commercial nuclear power plants. These data are used to:

- Assess the maximum potential annual radiation dose to the public resulting from the routine release of radioactive materials;
- Assess the potential dispersion of radioactive materials from design-basis accidents at the plant;
- Assess the potential radiological consequences of an actual accidental release of radioactive material to the atmosphere;
- Assess the non-radiological environmental impact of the plant;
- Identify local climatic normal and extreme data for the design of plant systems.

Guidance regarding onsite meteorological monitoring programs may be found in Safety Guide 23 (Regulatory Guide 1.23), *Onsite Meteorological Programs*, and in ANSI/ANS-3.11-2000, *Determining Meteorological Information at Nuclear Facilities*. This presentation discusses the processing of meteorological data collected at domestic nuclear power plant onsite monitoring programs.

The validation of the meteorological data should begin with a review of the data by personnel knowledgeable of local weather conditions and the plant's monitoring program. This review should be done on a daily basis (the sooner a problem is found and corrected, the less extra data handling is necessary). The review should consist of:

- Comparison of measured values with known weather (e.g., no rain recorded but it rained the previous night);
- Comparison of measured values at one tower level with those from another tower level or those from redundant sensors;
- Comparison of measured values with range of values typical for plant location (e.g., abnormally high or low temperatures);

- Check of data to determine if values do not change over time (e.g., sensor frozen due to icing);
- Check of the maintenance and calibration records;
- Where possible, comparison of onsite measurements with offsite measurements if it has been determined that data from both sites compare favorably;
- If available, comparison of digital readings with analog readings from a strip chart recorder.

The goal of this review process is to achieve meteorological data recovery rates of at least 90% annually as specified in Regulatory Guide 1.23.

If suspect data are found, a decision must be made as to how to handle the data. It is recommended that the original data be archived and that any changes are made on a copy of that data. Changes to the data may include:

- Substitution of missing data with data from a co-located (redundant) sensor;
- Substitution of missing data with data from another level of the same tower (may require corrections if the measurement heights are significantly different);
- Linear interpolation for short periods of missing data (say one to two hours) where practicable (i.e., not during day/night transition or severe weather);
- Substitution of missing data from a representative alternate source (it is not recommended that such data be included in the site data base unless it originated from the vicinity of the plant's primary tower);
- Linear changes to the data due to instrument drift discovered in the calibration process.
- Classifying the data as “bad” or “missing”

Calibration of the meteorological instrumentation should be performed at least every six months. They should be performed more frequently if unacceptable performance occurs. These calibration activities help ensure proper operation of the instrumentation as well as help derive potential adjustments to the data if any instrumentation drift is found to have occurred between calibrations.