

**PRECIPITATION ESTIMATES USING NEXRAD
DURING BERTHA AND FRAN**

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During the 1996 hurricane season, two hurricanes (Bertha and Fran) came ashore on the North Carolina Coast. Carolina Power and Light's Brunswick Nuclear Power Station saw Bertha's eye move just 30 miles to the east while Fran's eye moved directly over the plant.

During both hurricanes, the rain gauge at the Brunswick plant became inoperable. Carolina Power and Light requested Murray and Trettel to estimate precipitation values at the plant based upon available data.

To enhance the estimation process, in addition to using precipitation values available from National Weather Service recording stations and cooperative observers, Murray and Trettel purchased hourly and storm total precipitation images taken at the Wilmington and Morehead City, North Carolina NEXRAD Radar sites. Due to the lack of hourly precipitation measurements close to the sites, most of the precipitation estimates were based on data from the radar sites.

The hourly and storm total precipitation images gave at best "estimates" of precipitation amounts for specific time frames at the plant site. Murray and Trettel acquired the Digital Precipitation Array data from the National Climatic Data Center. The Digital Precipitation Array data (which is normally updated each six minutes), provides a digital rainfall estimate for each of the radar's two square kilometer grid points.

Using longitude and latitude coordinates for the Brunswick plant, the correct precipitation grid points for the Wilmington and Morehead City radars were determined.

An algorithm was used to determine estimated one minute rainfall rates. From this information, 15 minute rates were calculated and compared to rain gauge data that was available. From this, a correction factor was calculated and then applied to the Digital Precipitation Array data for the missing hours (due to equipment failure) of data to estimate 15 minute averages.