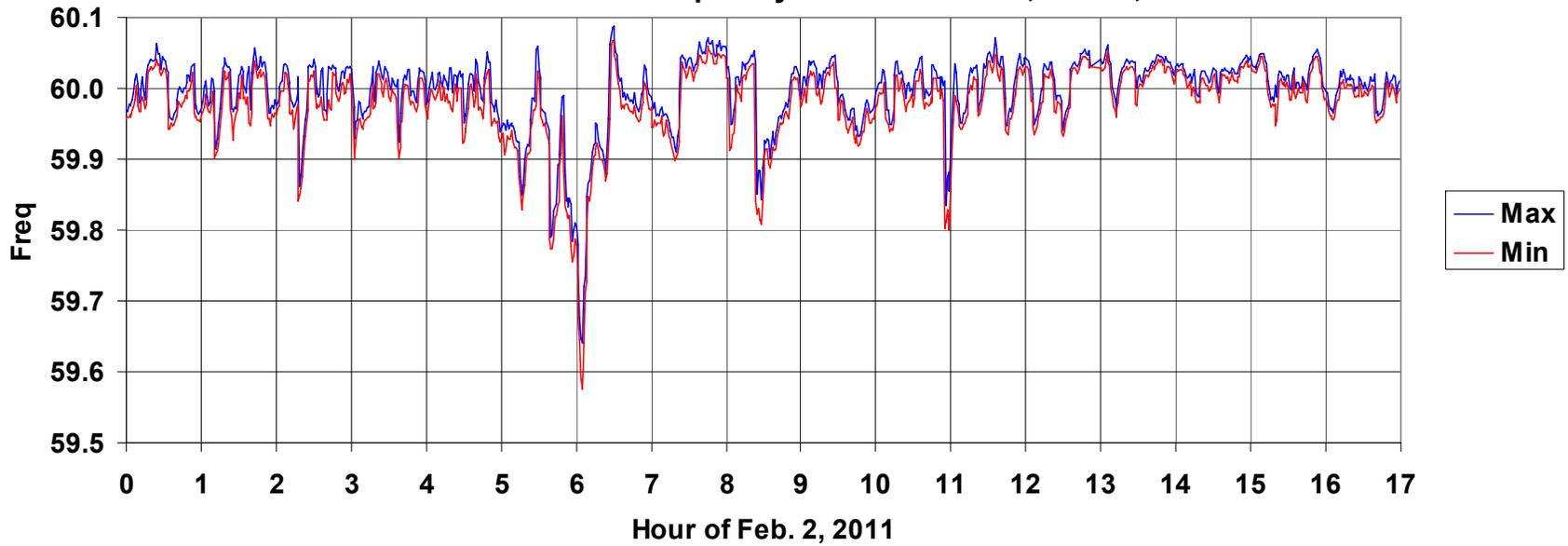


# **The ERCOT Rolling Blackout**

**Wednesday, Feb. 2, 2011**

- **This new winter peak of 53334 MW was only 500 MW greater than the 2010 winter peak**
- **BUT, 5000 MW of generation was out of service due to the effect of extreme cold**

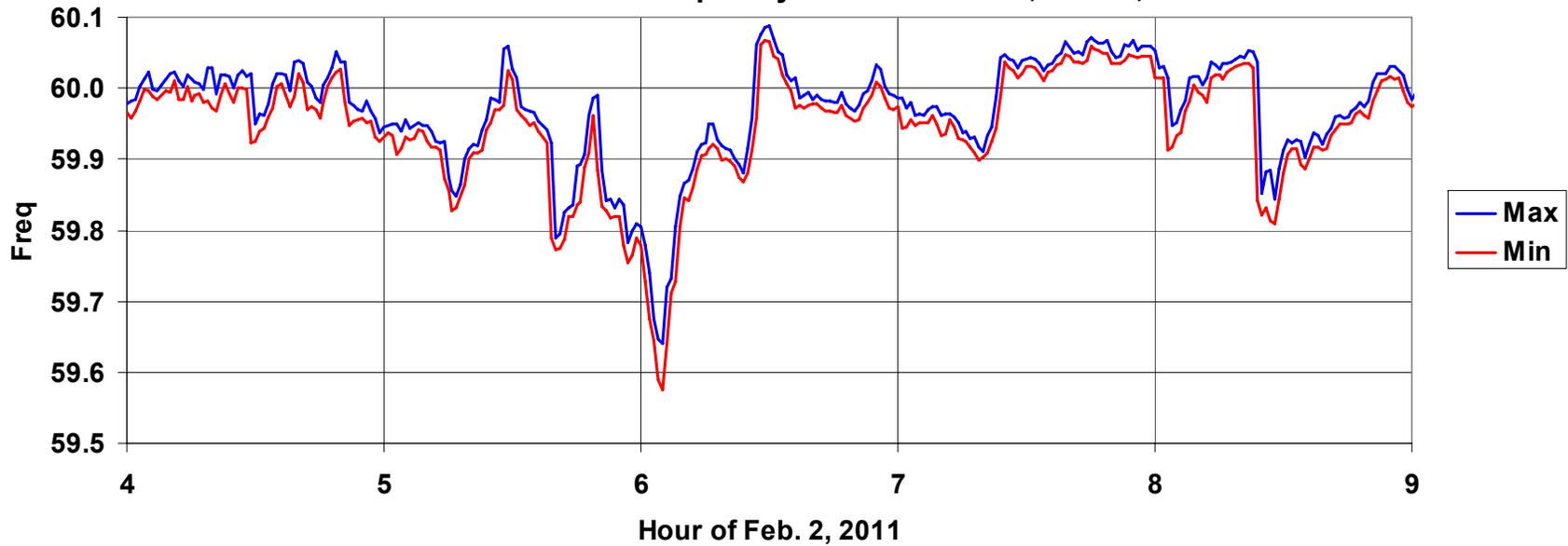
### ERCOT Min and Max Frequency for Each Minute, Feb. 2, 2011



### West Texas Voltage Phase Angle wrt Central ERCOT for Each Minute, Feb. 2, 2011



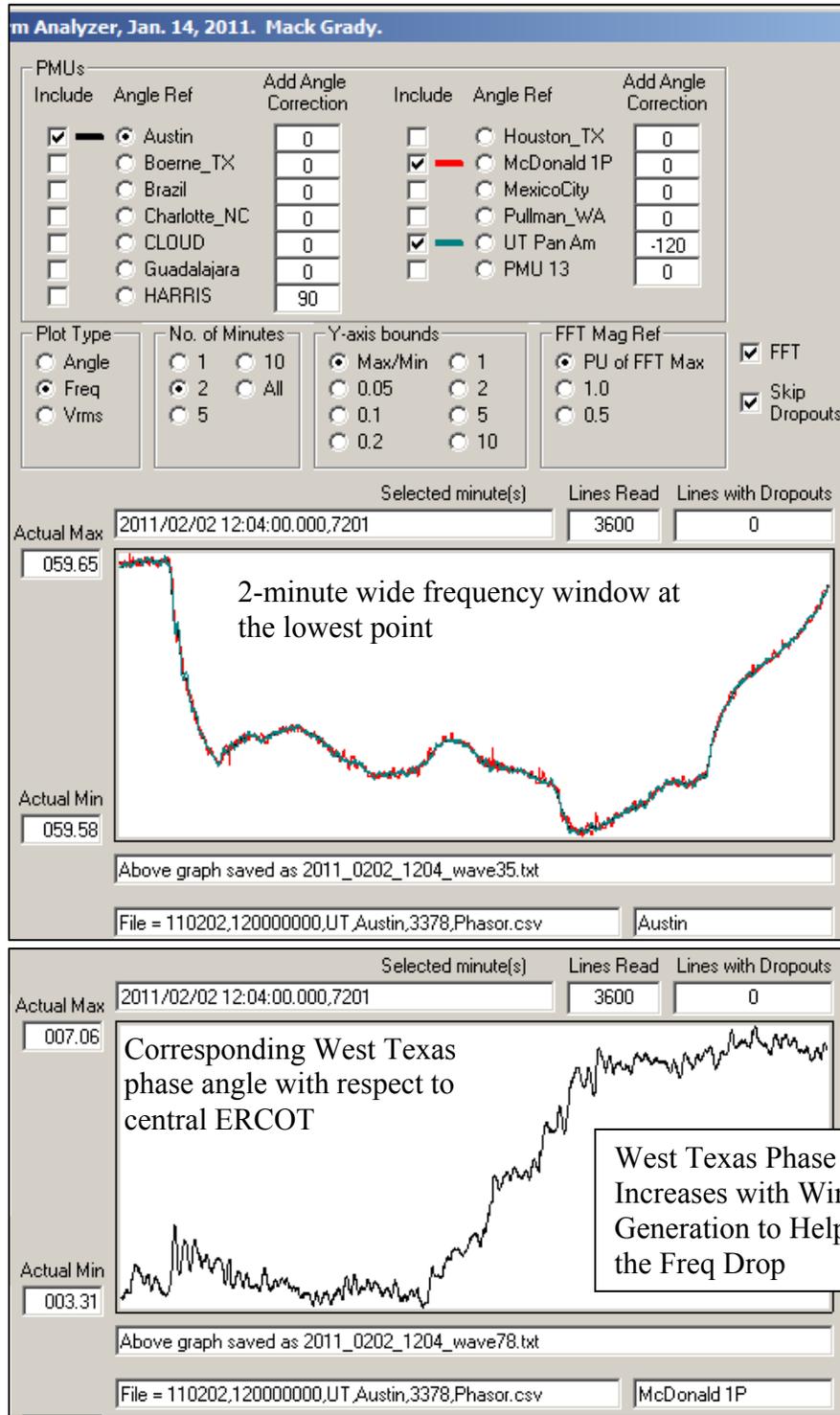
### ERCOT Min and Max Frequency for Each Minute, Feb. 2, 2011

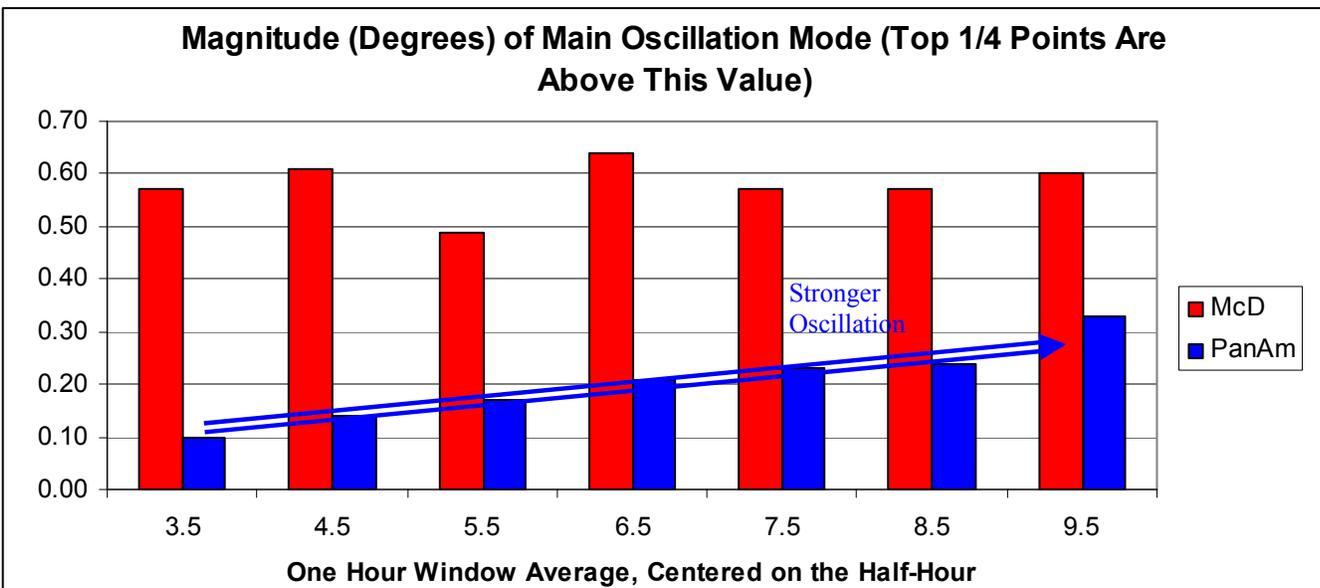
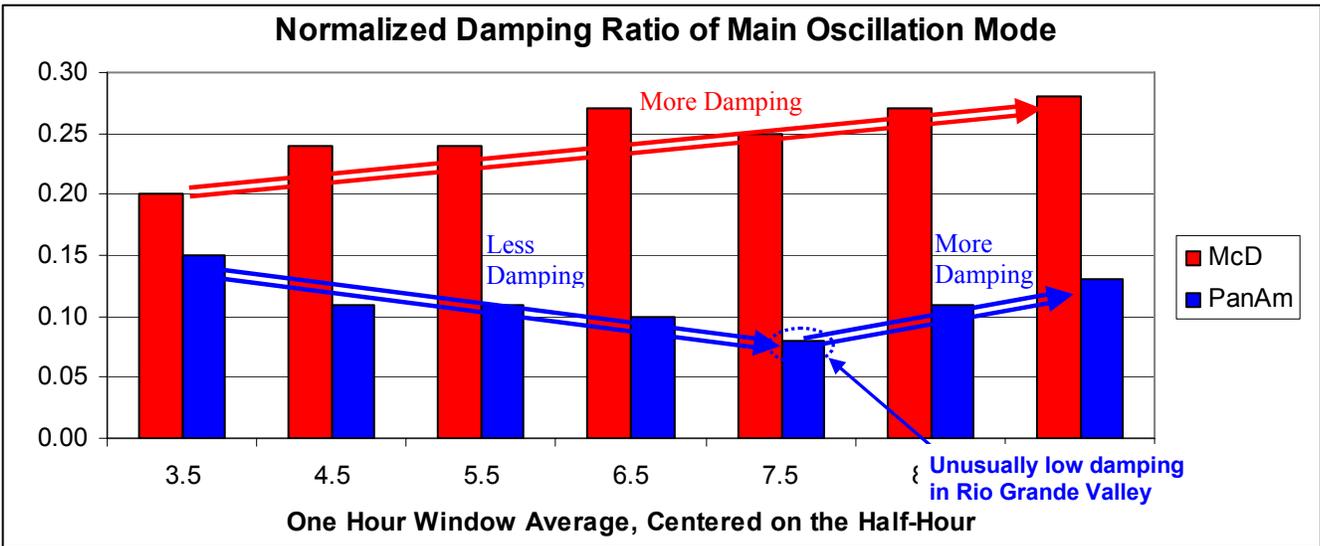
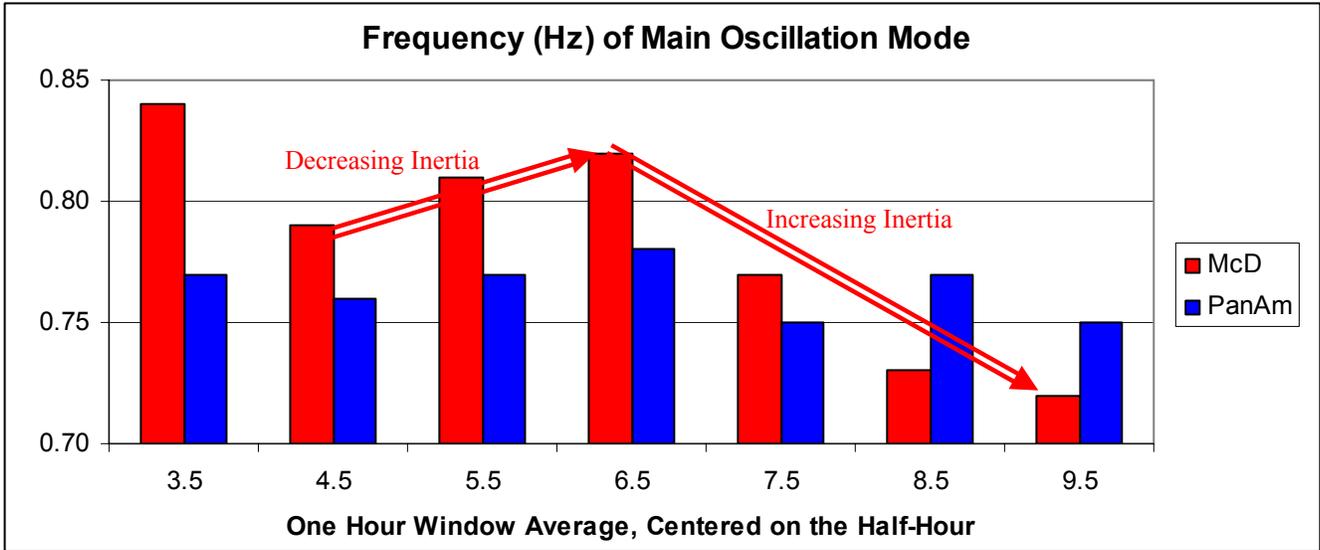


### West Texas Voltage Phase Angle wrt Central ERCOT for Each Minute, Feb. 2, 2011



Wind MW generation is not presently available on ERCOT's public web site. However, by observing the voltage phase angle of West Texas with respect to U.T. Austin (i.e., central ERCOT), we believe that wind MW generation was low but on the rise at 5am when grid problems began, and that wind MW generation rose to moderate levels (approx. 10% of total generation) through the troubled 5am – 10am generation shortage period.





## Progression of Ringdowns, 5 am to 6 am West Texas Voltage Phase Angle with respect to Central Texas

