

***Consortium for
Electric
Reliability
Technology
Solutions***

**CERTS Research
Supporting
Reliability
Performance
Standards**

NERC Interconnections Frequency Control Performance and Timeline for Frequency Response Standard

For: NERC Operating Reliability Subcommittee

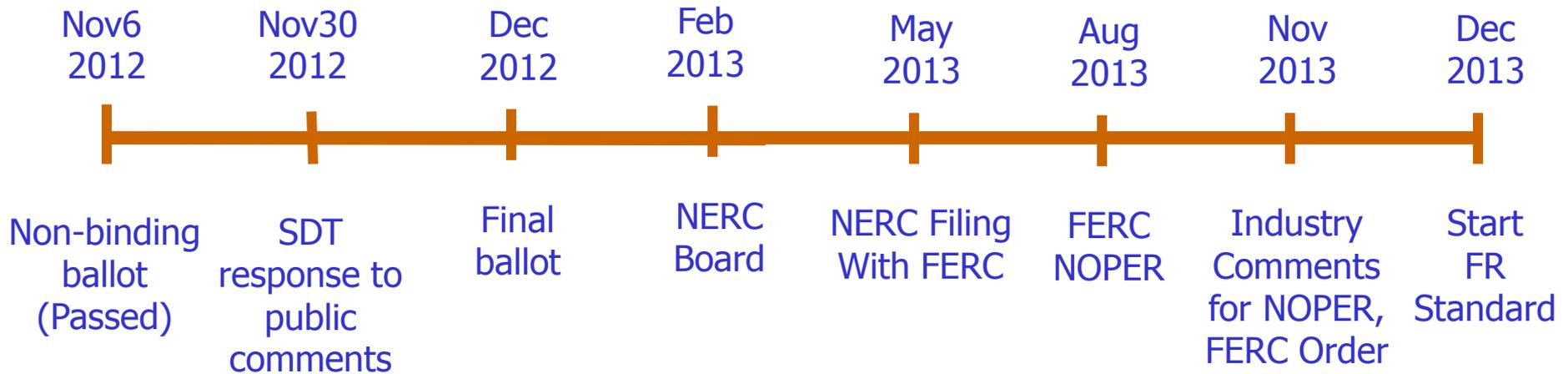
**By: Carlos Martinez – CERTS/ASR
Little Rock, Arkansas, November 13, 2012**

Presentation Outline

- *Timeline for the NERC Frequency Response standard*
- *Overview of Interconnections 2008-2012 Frequency Control performance assessment and datasets*
- *Eastern interconnection 2012 Frequency Regulation metrics identification and quantification*
- *Interconnections 2008-2012 Events Frequency Response metrics statistics*

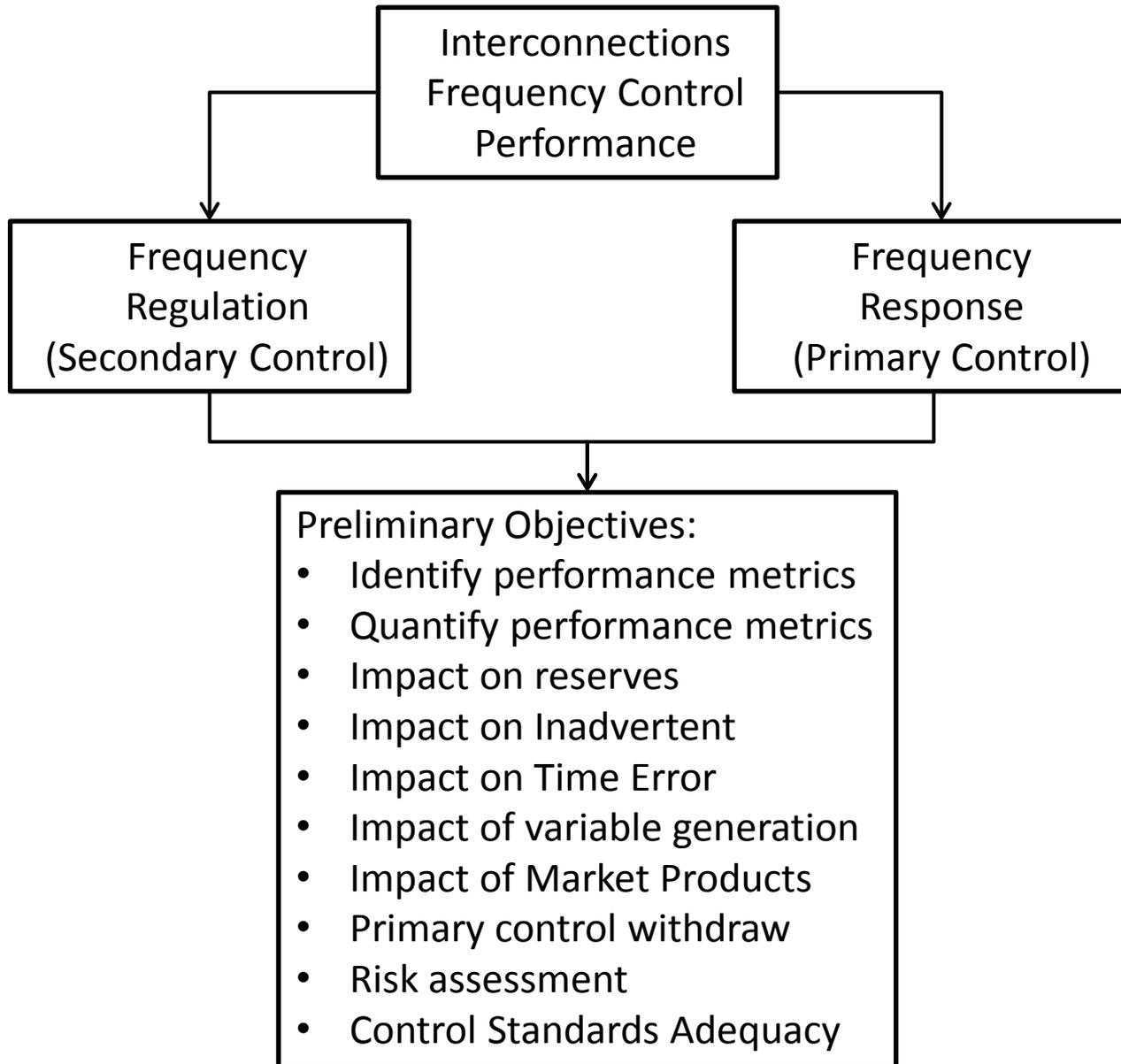
*Estimated Timeline for
NERC Frequency Response Standard*

Estimated Timeline for NERC Frequency Response Standard



*Interconnections 2008-2012 Frequency
Control Performance Assessment Study*

NERC Interconnections 2008-2012 Frequency Control Performance – Assessment

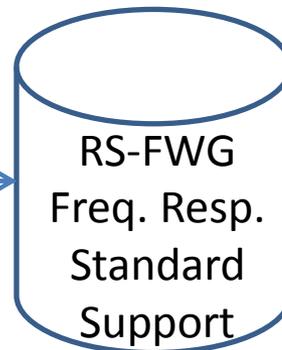
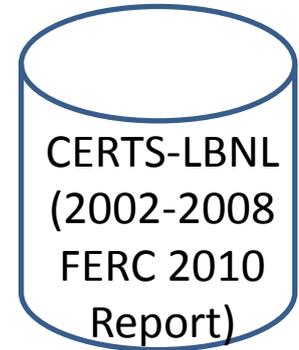
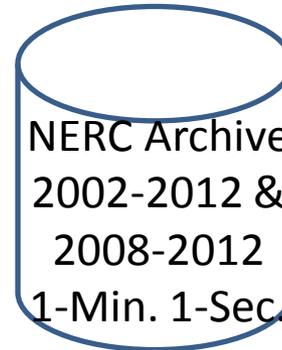


Known Interconnections Historical Datasets

Eastern, ERCOT Interconnections Frequency Response Events and Parameters

**4 Interconnections
NERC-RS Applications
1-Min., 1-Sec. Data**

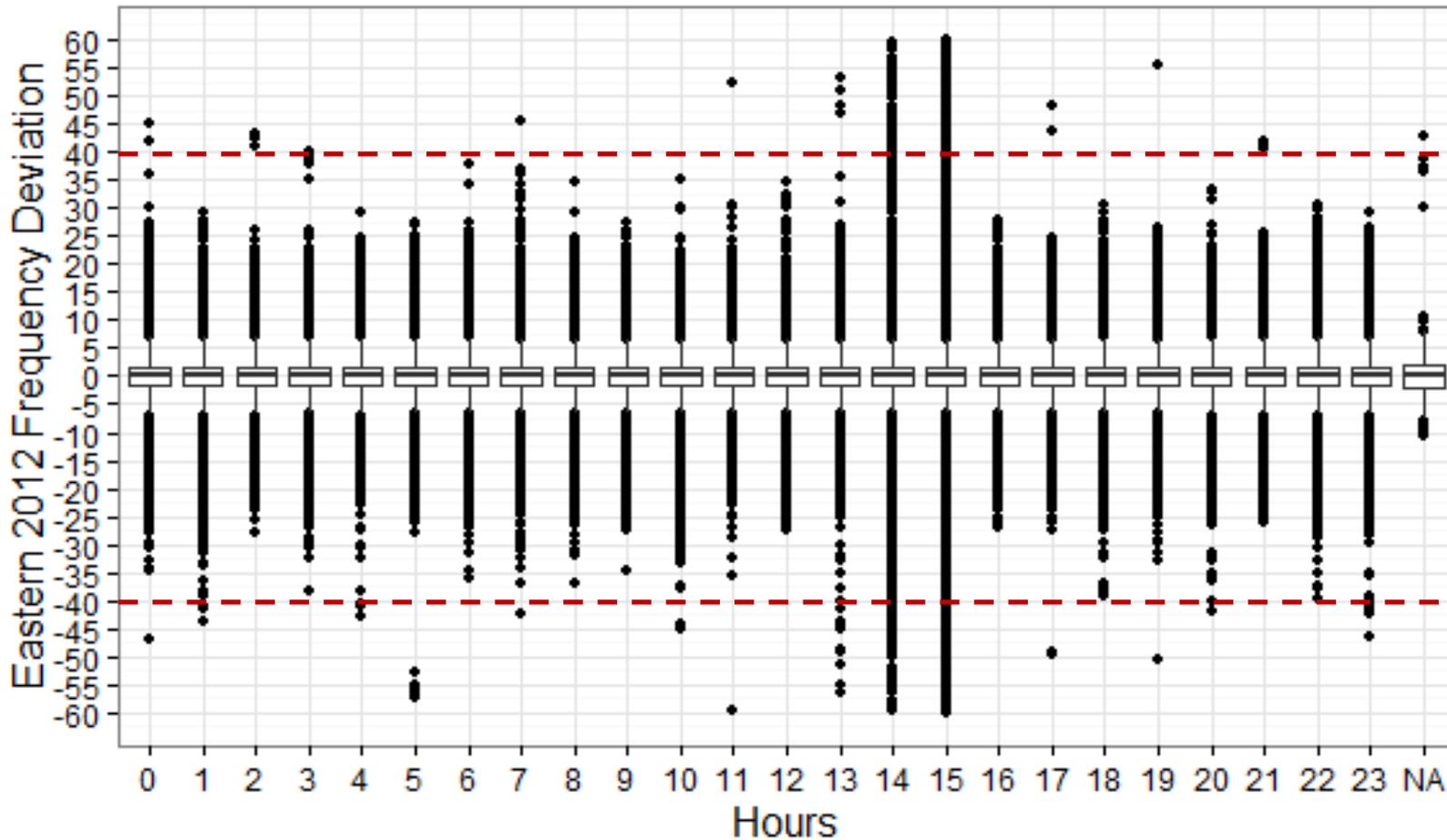
**3 Interconnections
Frequency Response**



**4 Interconnections 2008-2012
Frequency Response Events
and Parameters**

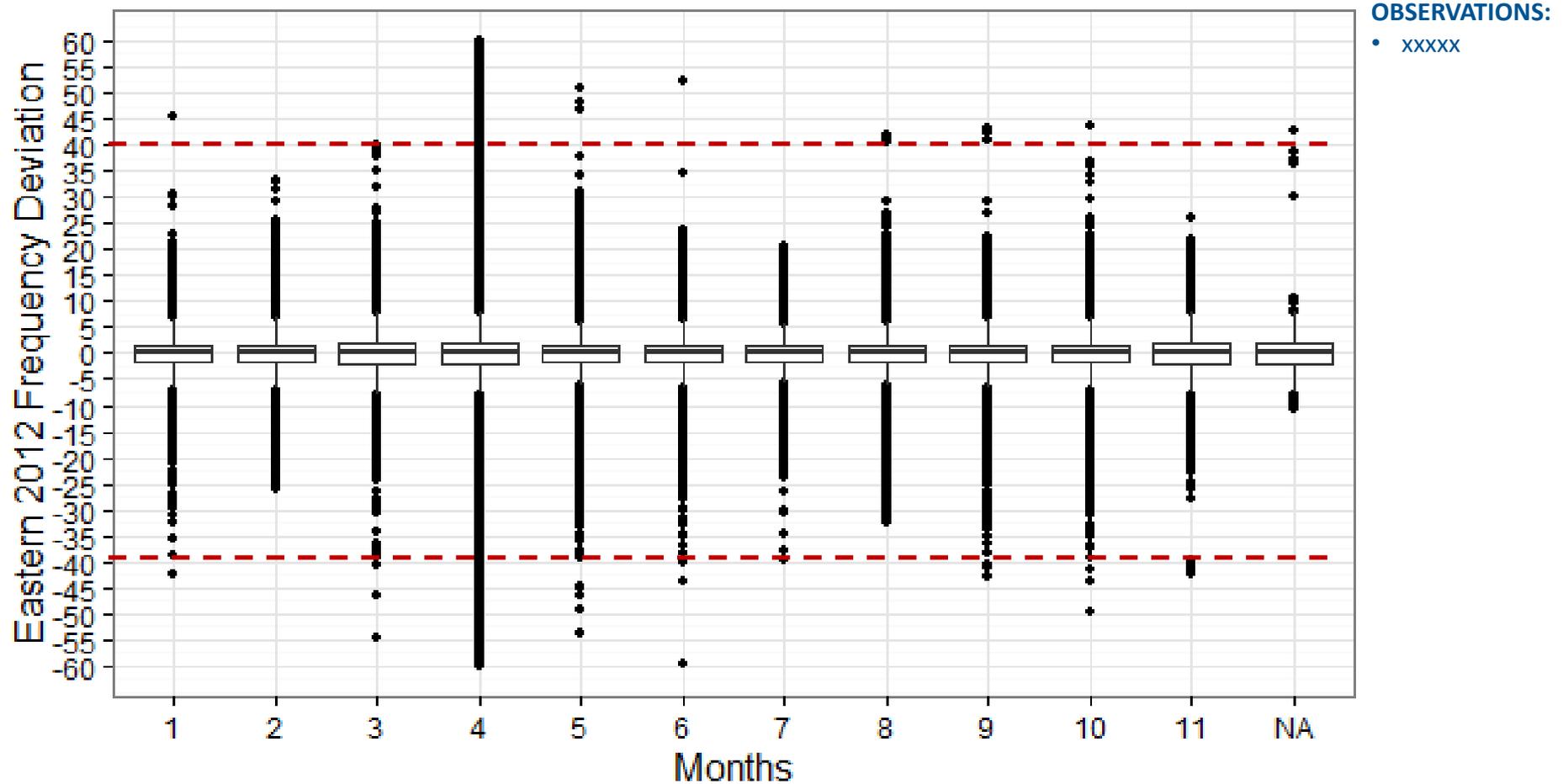
*Eastern 2012 Frequency Regulation
Metrics Identification and Quantification*

Eastern 2012 Frequency Deviation Metric Pattern and Statistics per Hour Type

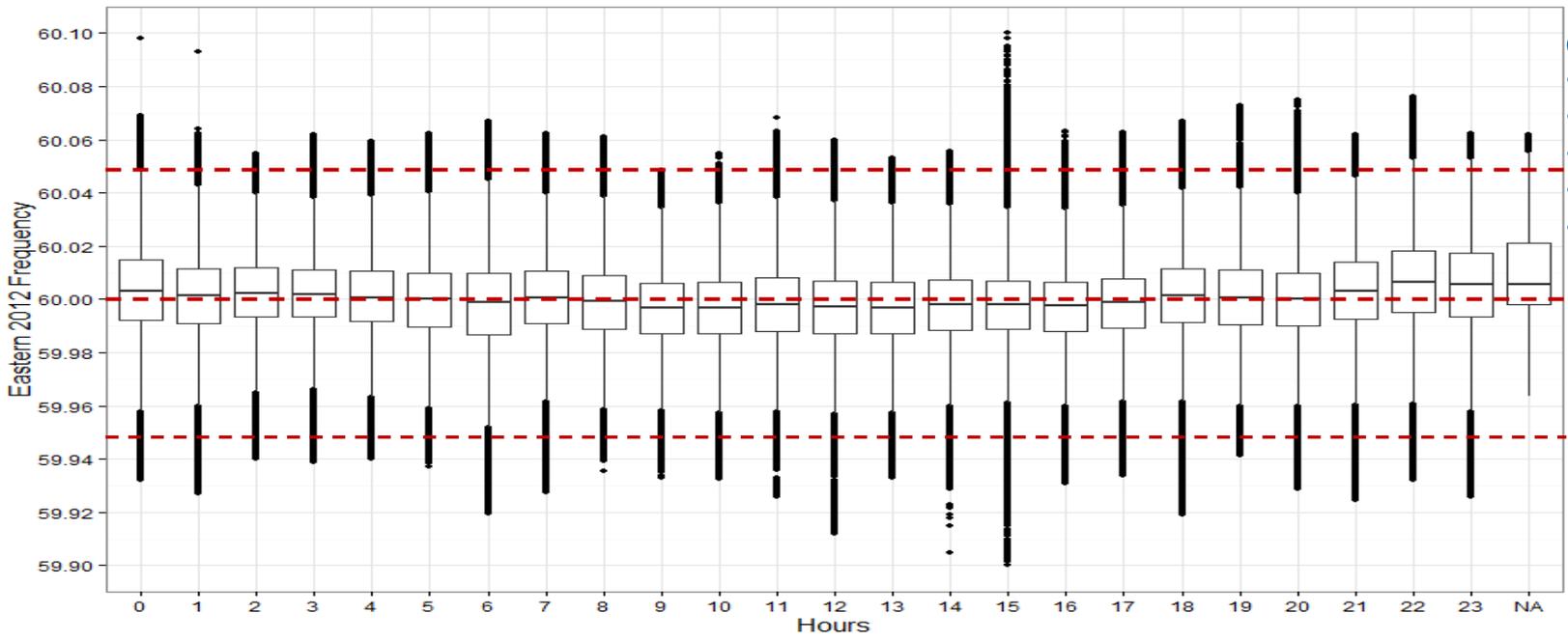


- OBSERVATIONS:**
- Data quality ??
 - Hours 14, 15, 16 ??
 - Hour 7, morning pk.
 - Duration impact

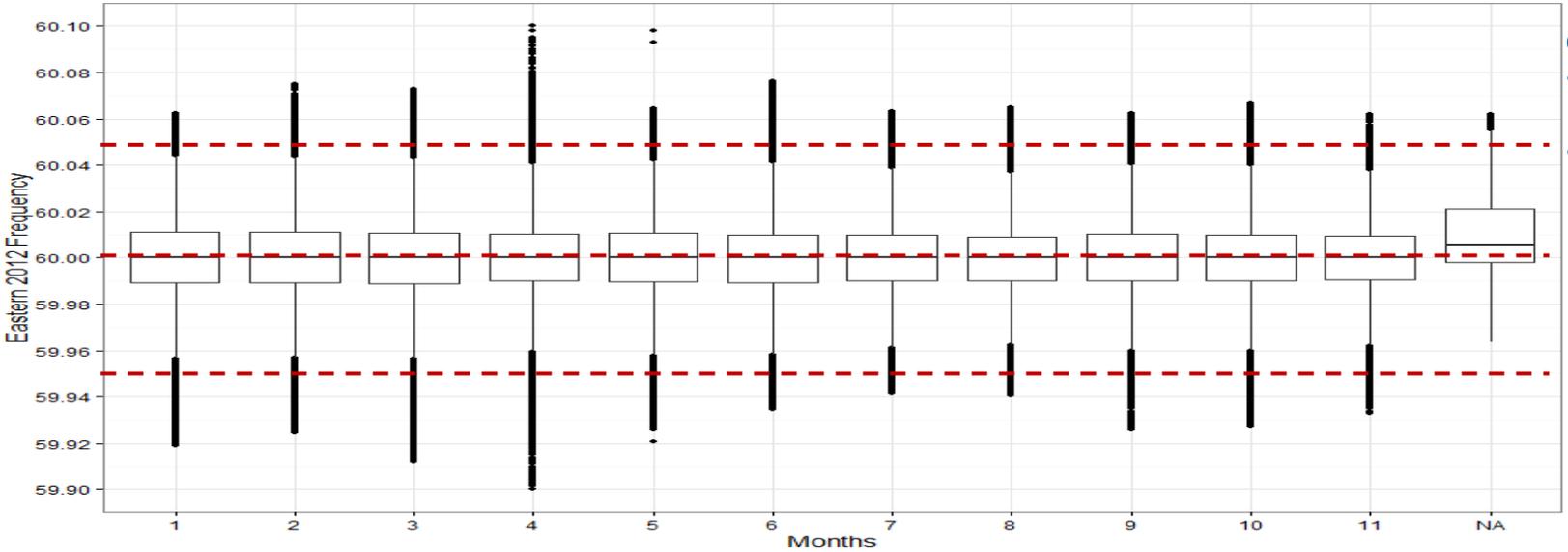
Eastern 2012 Frequency Deviation Metric Pattern and Statistics per Month Type



EASTERN 2012 FREQUENCY STATISTICS PER HOUR/MONTH – 1 SECOND DATA



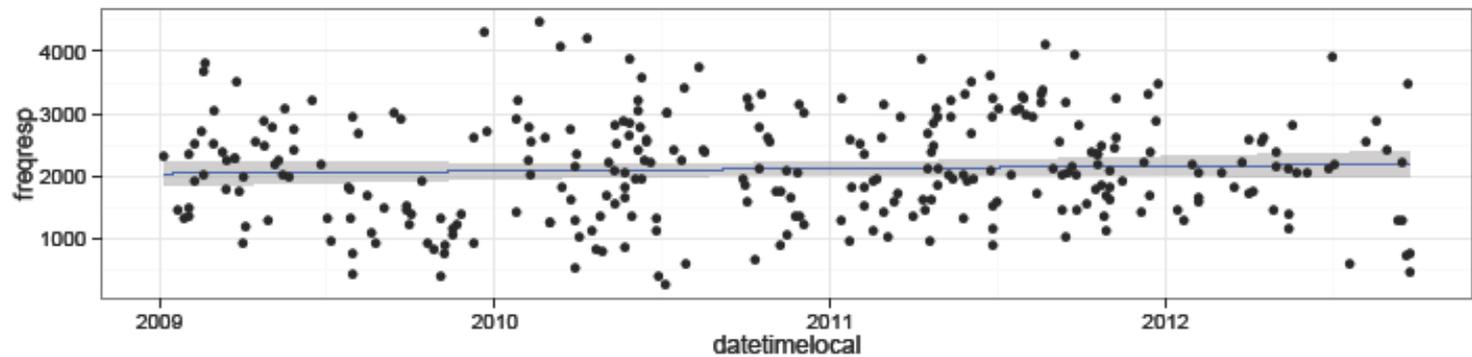
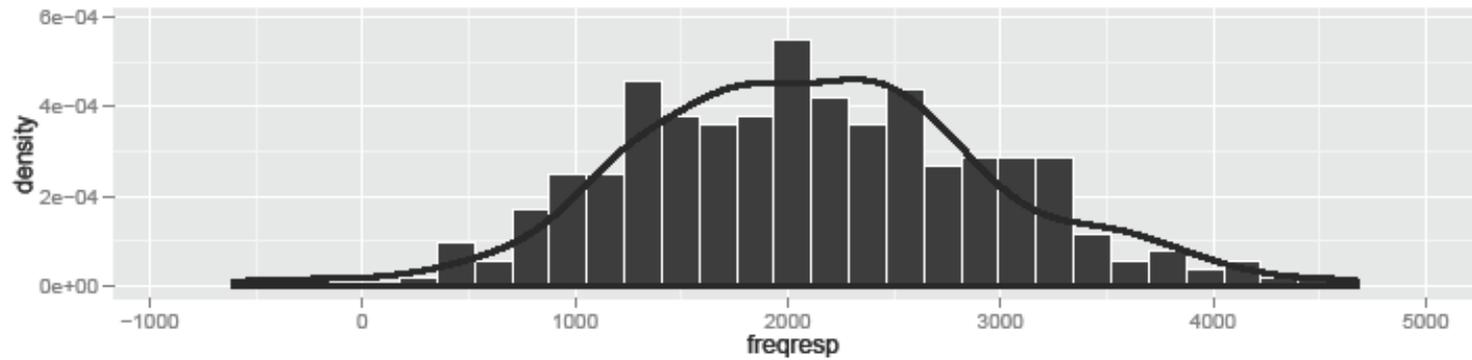
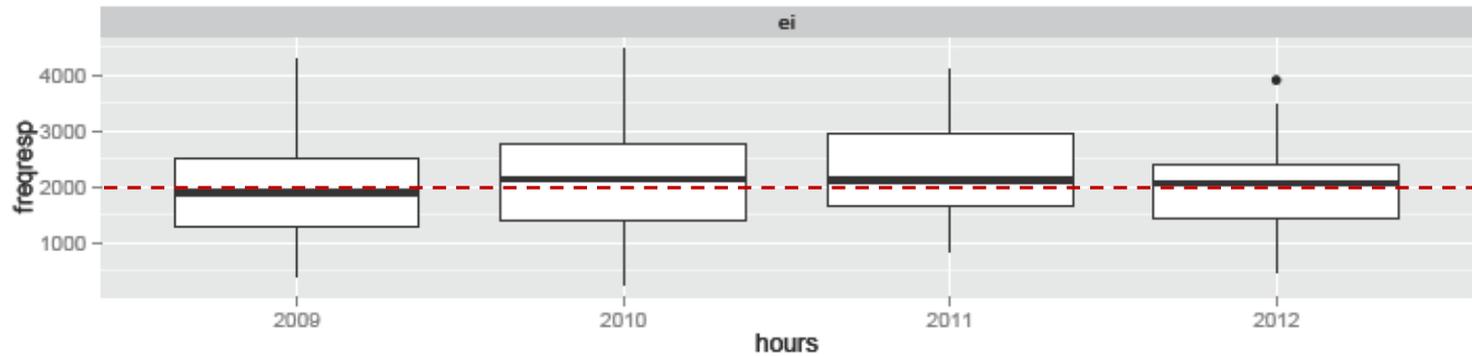
- OBSERVATIONS:**
- Above 60: 22 to 4
 - Below 60: 10 to 18
 - Most abnormal: 16
 - Most variable: 7, 23
 - Duration impact ??



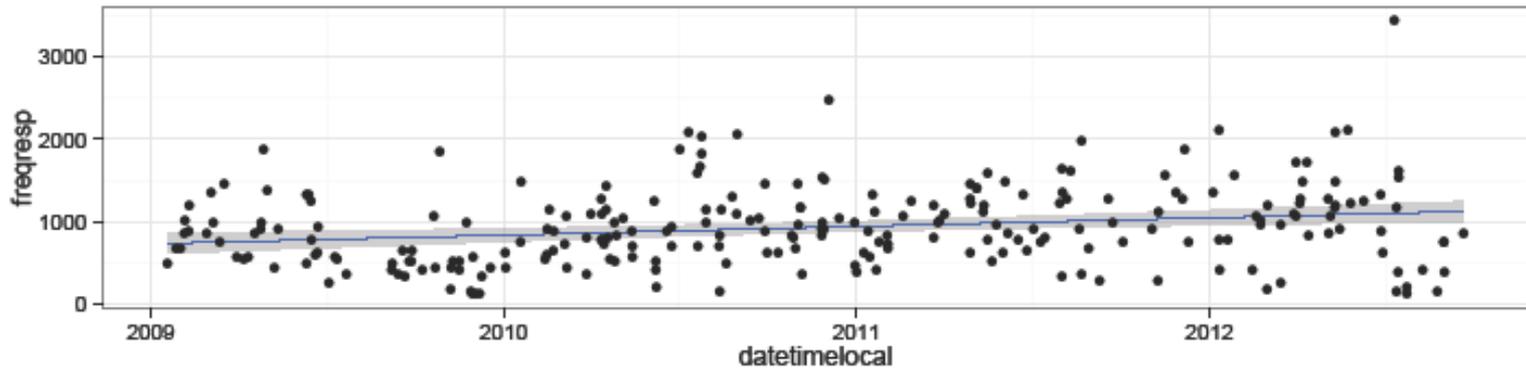
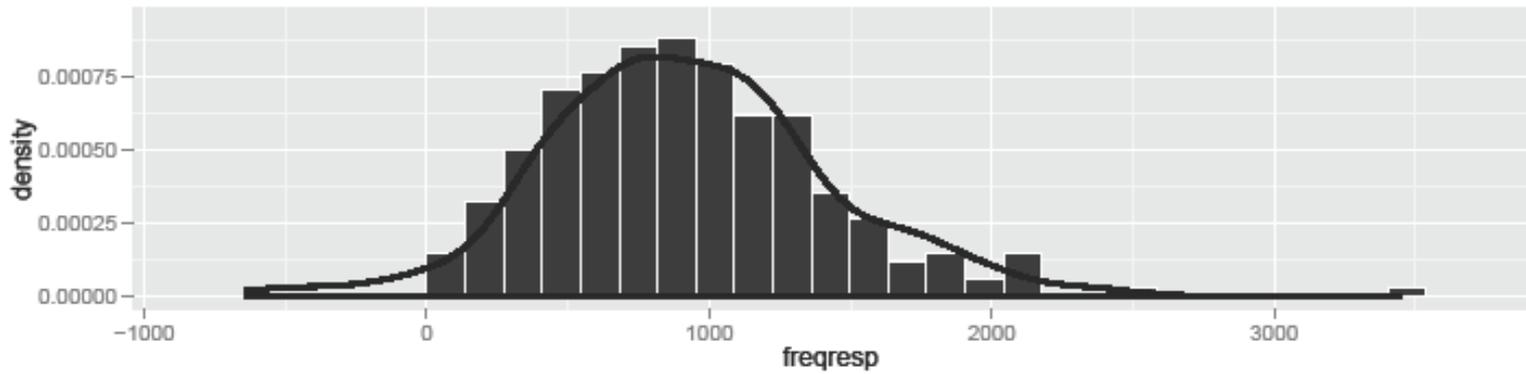
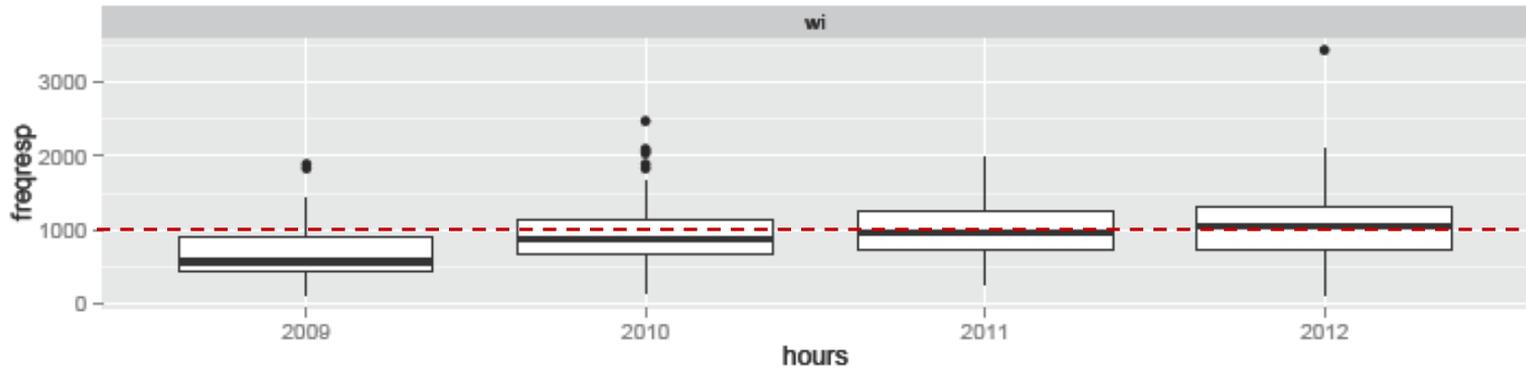
- OBSERVATIONS:**
- Most abnormal: Apr
 - Most variable: Jan, Feb, Mar

*NERC Interconnections 2009 to 2012
Events Frequency Response Statistics*

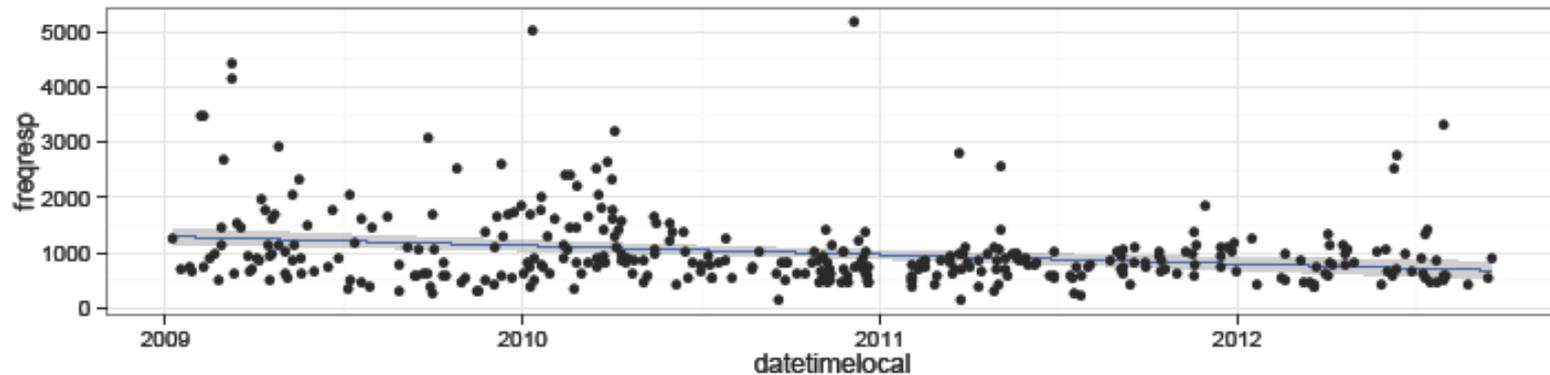
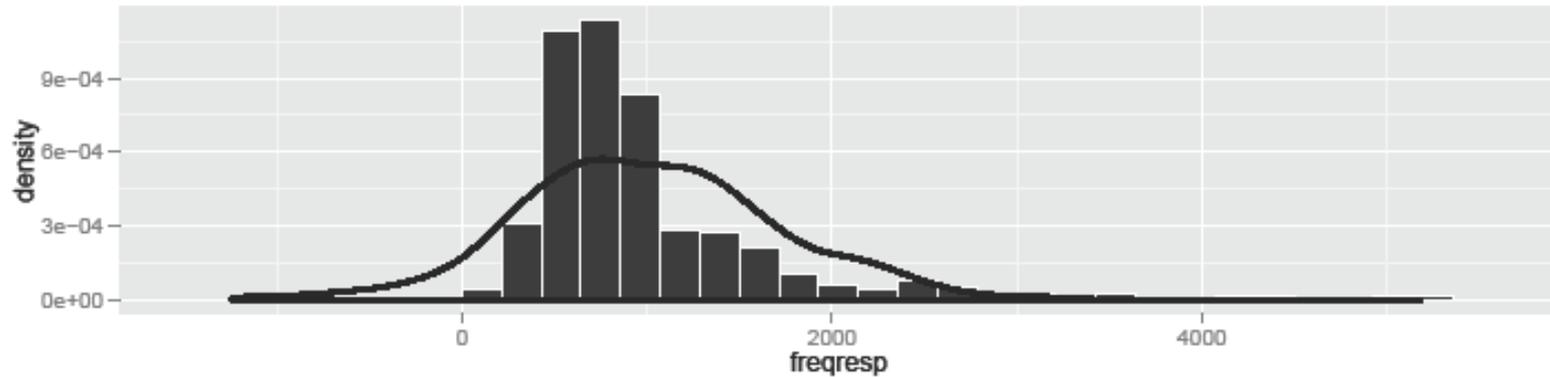
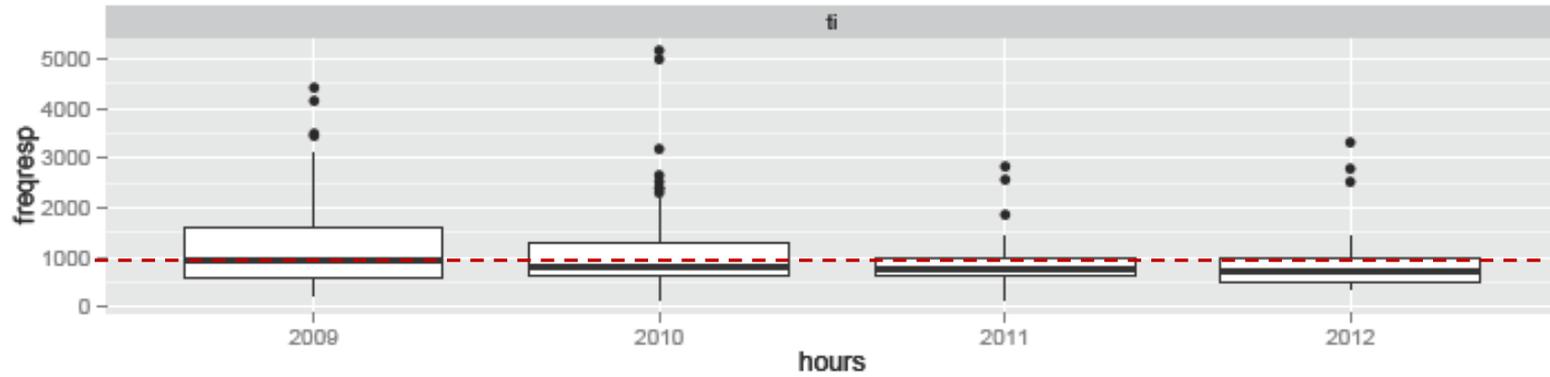
Eastern 2009-2012 Frequency Response Statistics



Western 2009-2012 Frequency Response Statistics

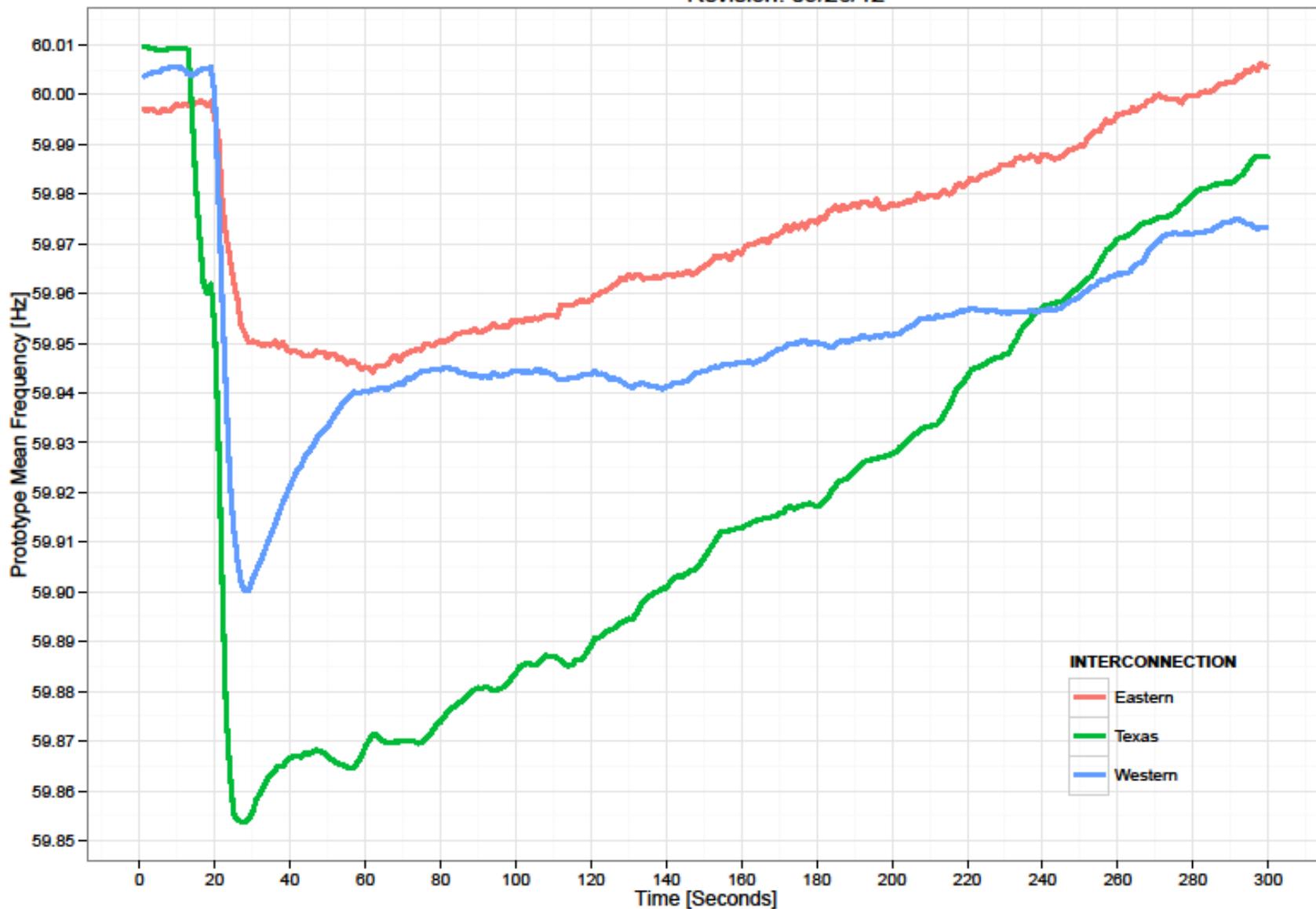


ERCOT 2009-2012 Frequency Response Statistics



NERC INTERCONNECTIONS 2011 TYPICAL EVENT FREQUENCY PATTERNS
USING THE MEAN OF THE SAME SECOND OF EACH RS-FWG SELECTED EVENT

Revision: 09/26/12



QUESTIONS