

Unexpected Consequences of New Reliability Rules

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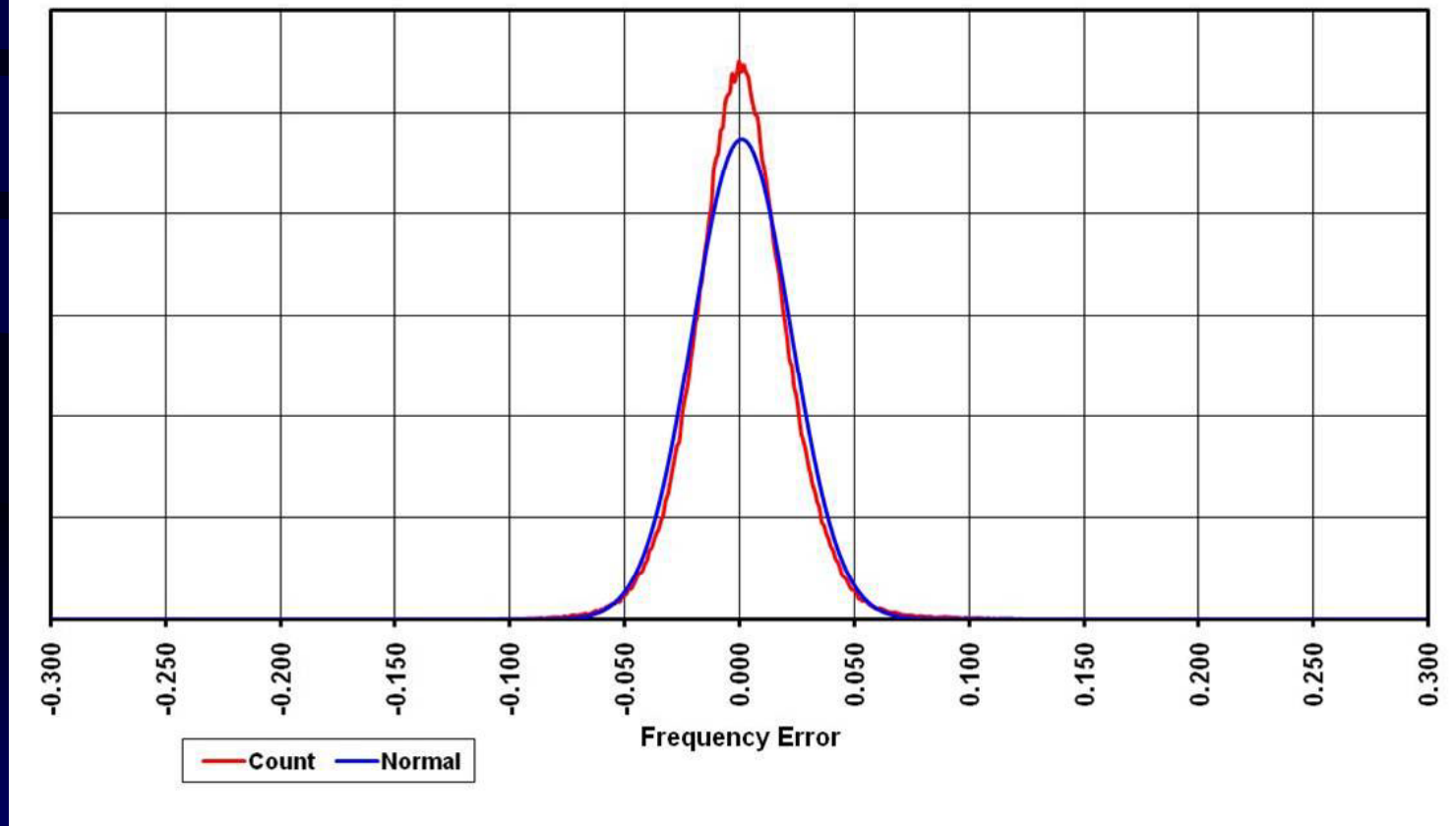


Overview

- **New Reliability Rules – 2 Examples**
 - ▶ **ERCOT Governor Response Rules**
 - **Results**
 - **ERCOT Conclusion**
 - ▶ **NERC Draft Frequency Response Rule**
 - **Results**
 - **NERC Draft Conclusions**
- **General Conclusions**

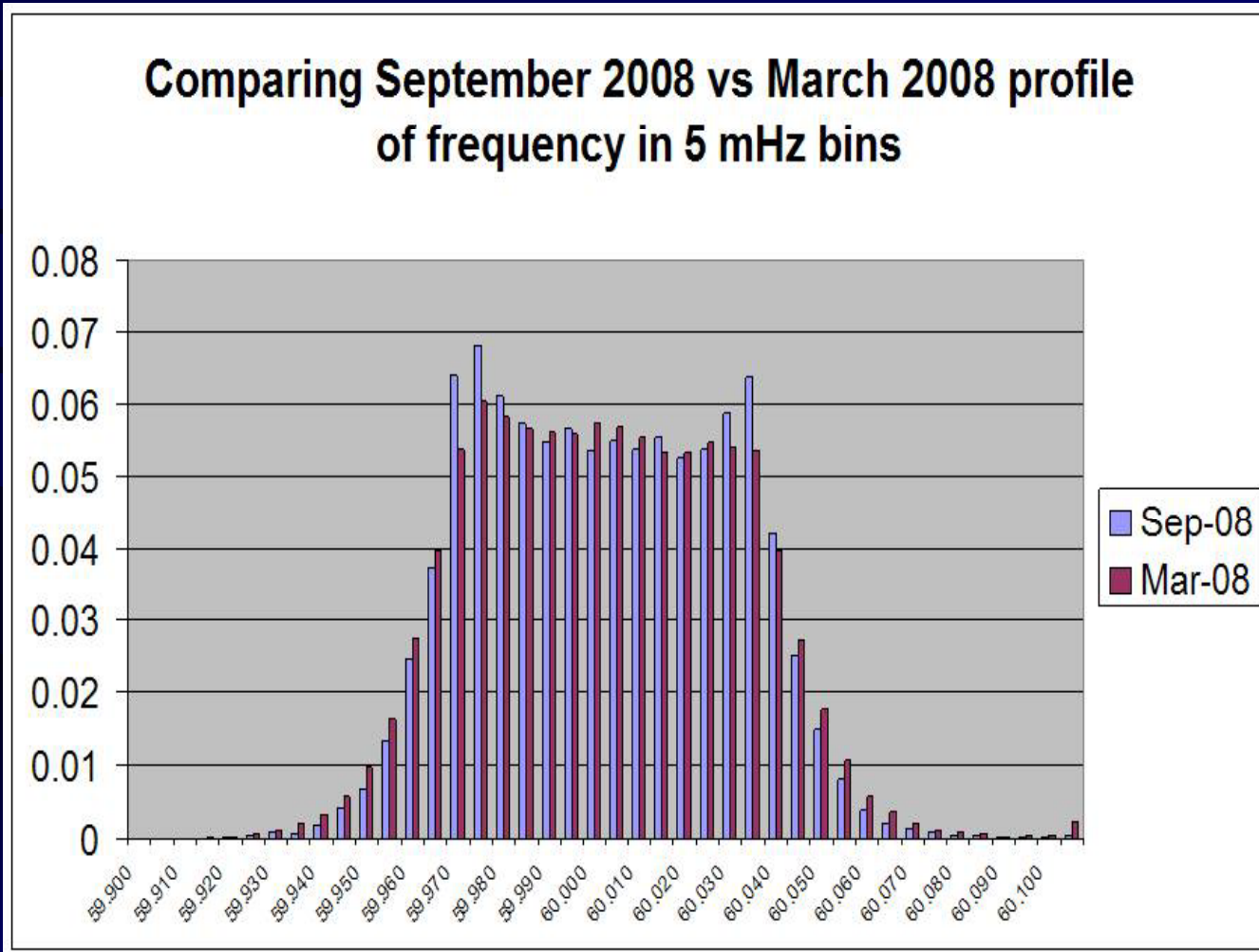
ERCOT Frequency Profile 2001

Frequency Error Density
1-Minute Data - 2001



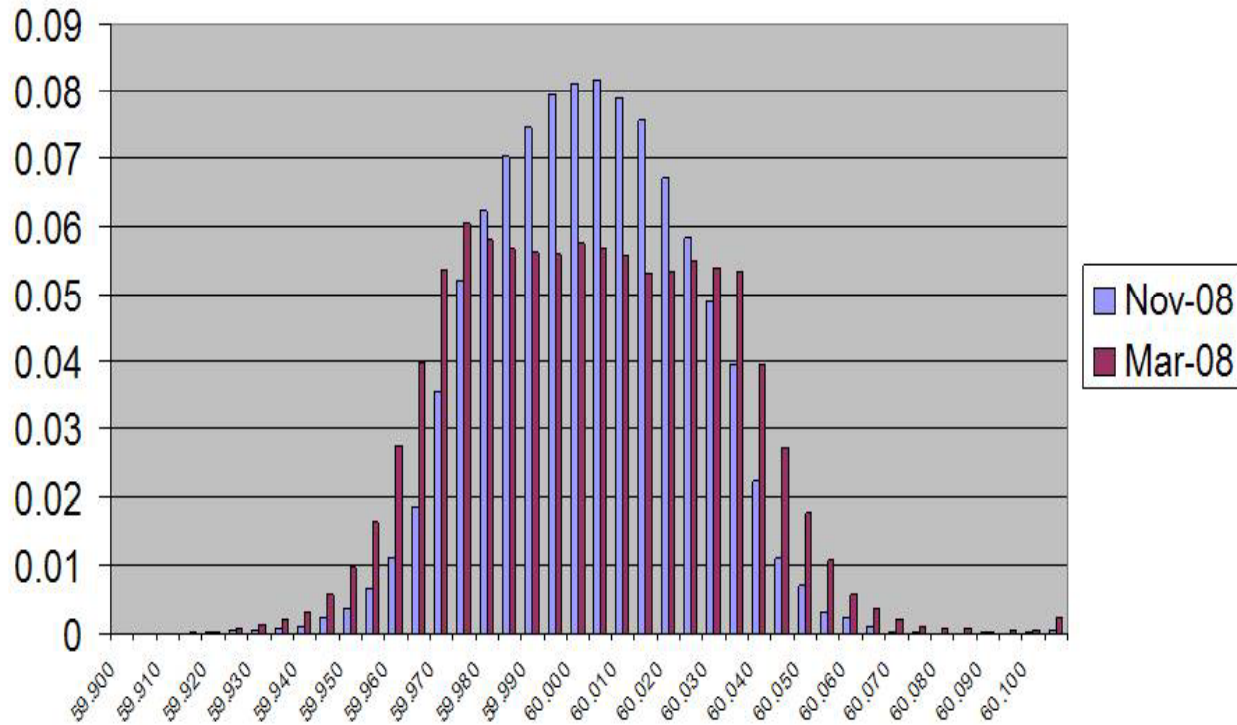
ERCOT Frequency Profile 2008

Comparing September 2008 vs March 2008 profile of frequency in 5 mHz bins



ERCOT Frequency Profile 2009

Comparing November 2008 vs March 2008 profile of frequency in 5 mHz bins



ERCOT Conclusion

- **Implementation of a reliability rule does not assure that reliability will improve or even be maintained at minimum acceptable levels !**

Frequency Response Rule

- Allocate Interconnection Minimum Frequency Response among BAs using the following ratio:

$$\frac{\text{BA Peak Load} + \text{BA Peak Generation}}{\sum \text{BA Peak Load} + \sum \text{BA Peak Generation}}$$

- This rule appears harmless, but it creates a problem because the allocation is fixed and does not change with demand for Frequency Response.

Load/Generation Ratio Share

➤ Test Case 1:

- ▶ BA with L/G Ratio Share of 5% must decide whether to spend \$1 M to reduce demand for Frequency Response saving \$5 M.

➤ Test Case 2:

- ▶ BA with L/G Ratio Share of 5% must decide whether to reduce spending by \$1 M resulting in increase in demand for Frequency Response costing \$5 M.

Test Case Results

➤ Test Case 1:

- ▶ The BA will choose to not spend the \$1 M because its reduction in cost for Frequency Response will be \$250,000, 5% of the \$5 M saving from the resulting reduction in required Frequency Response.

➤ Test Case 2:

- ▶ The BA will choose to reduce spending by \$1 M resulting in increase in demand for Frequency Response because additional cost will only be \$250,000.

Conclusions on Draft

- **A fixed allocation ratio:**
 - ▶ Is unresponsive to changes in demand for Frequency Response,
 - ▶ Eliminates demand side participation of Frequency Response in reliability,
 - ▶ Results in the inefficient allocation of Frequency Responsive resources,
 - ▶ Results in reliability actions to increase Frequency Response trailing increased need for Frequency Response, and
 - ▶ Reduces reliability.

Specific Solution

- **Develop a Frequency Response Standard that measures the relative contributions of supply and demand.**
- **Allocate responsibility for Frequency Response based on this measure that includes both the supply and demand contributions to reliability.**

General Conclusions

- These examples from ERCOT and NERC indicate that the general rule that “good management only needs to get the solution 80% right” does not work when writing Reliability or Market Rules. In those specific cases, the devil is in the detail and all aspects must be investigated in thorough detail before implementation.

Questions

