



# Browns Ferry Seismic Risk Insights

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July 14, 2015



# Outline

- Background
- Seismic Hazard Reevaluation
- Browns Ferry Improvements
- High Pressure Injection Seismic Capacity
- Browns Ferry Seismic Capacity
- GI-199 Risk Insights
- Assessment of Group 2 Plants
- Summary/Conclusions

# Background

## NTTF R2.3 Seismic Walkdowns

- Walkdown reports submitted on November 27, 2012.
- All findings resolved prior to March 2014
- For inaccessible items reported, subsequent walkdowns resulted in no findings



## NTTF R2.1 Seismic Hazard

- Hazard Reevaluation submitted on March 31, 2014

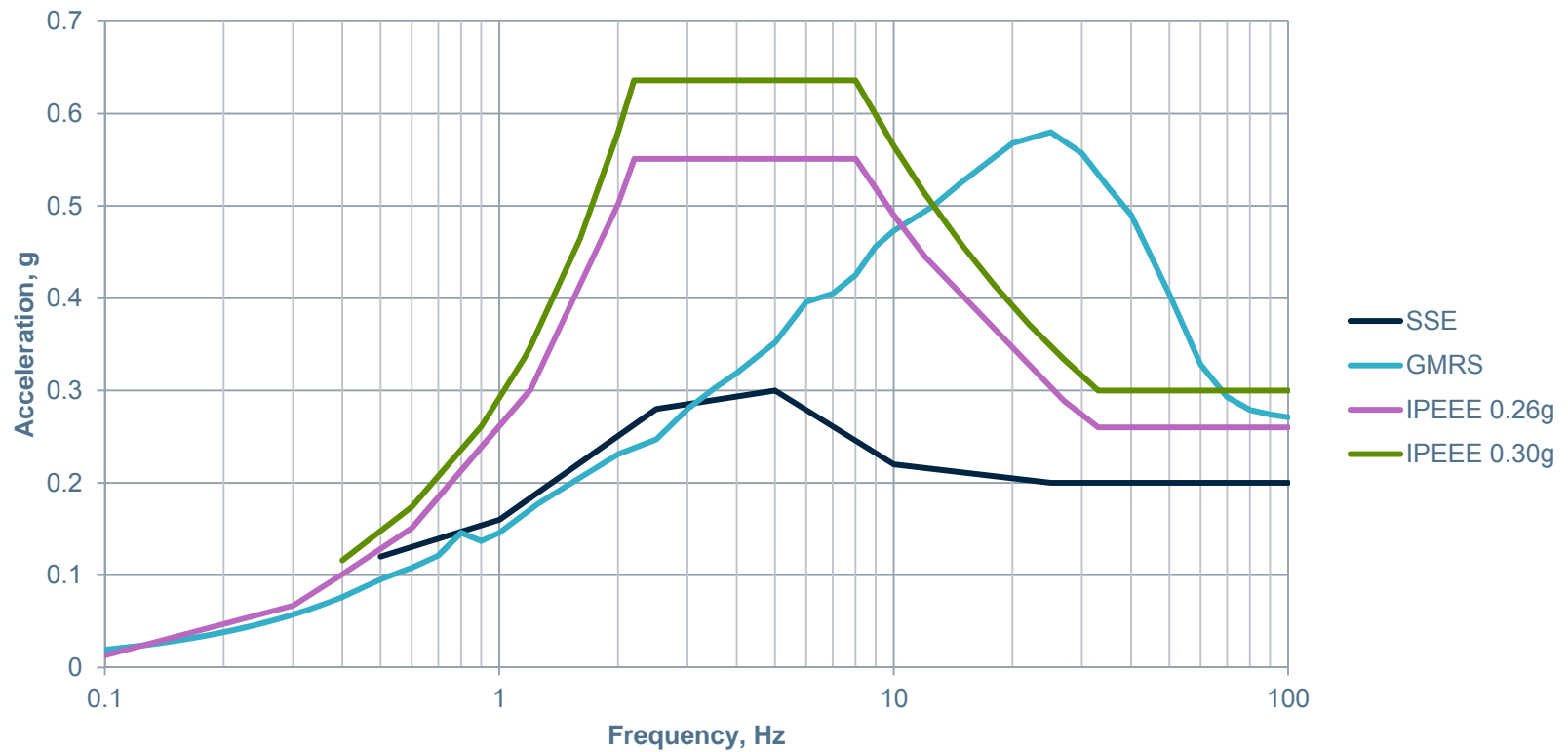


## NTTF R2.1 ESEP

- Expedited Seismic Evaluation Process submitted on December 22, 2014
- No Findings



# Seismic Hazard Reevaluation



# Browns Ferry Improvements

## Seismic Capacity Improvements

- IPEEE outliers resolved
  - (2) diesel auxiliary transformers replaced
  - BFN Site Seismic Capacity > 0.3g
- IPEEE weakness – no high pressure injection pathway evaluated
  - Evaluated high pressure injection path under ESEP
  - Limiting equipment for RCIC is relays at 0.37g
- ESEP evaluation completed
  - No modifications required

## Other Improvements

- FLEX
  - Additional layer for mitigation
  - FLEX equipment is stored in permanent structure

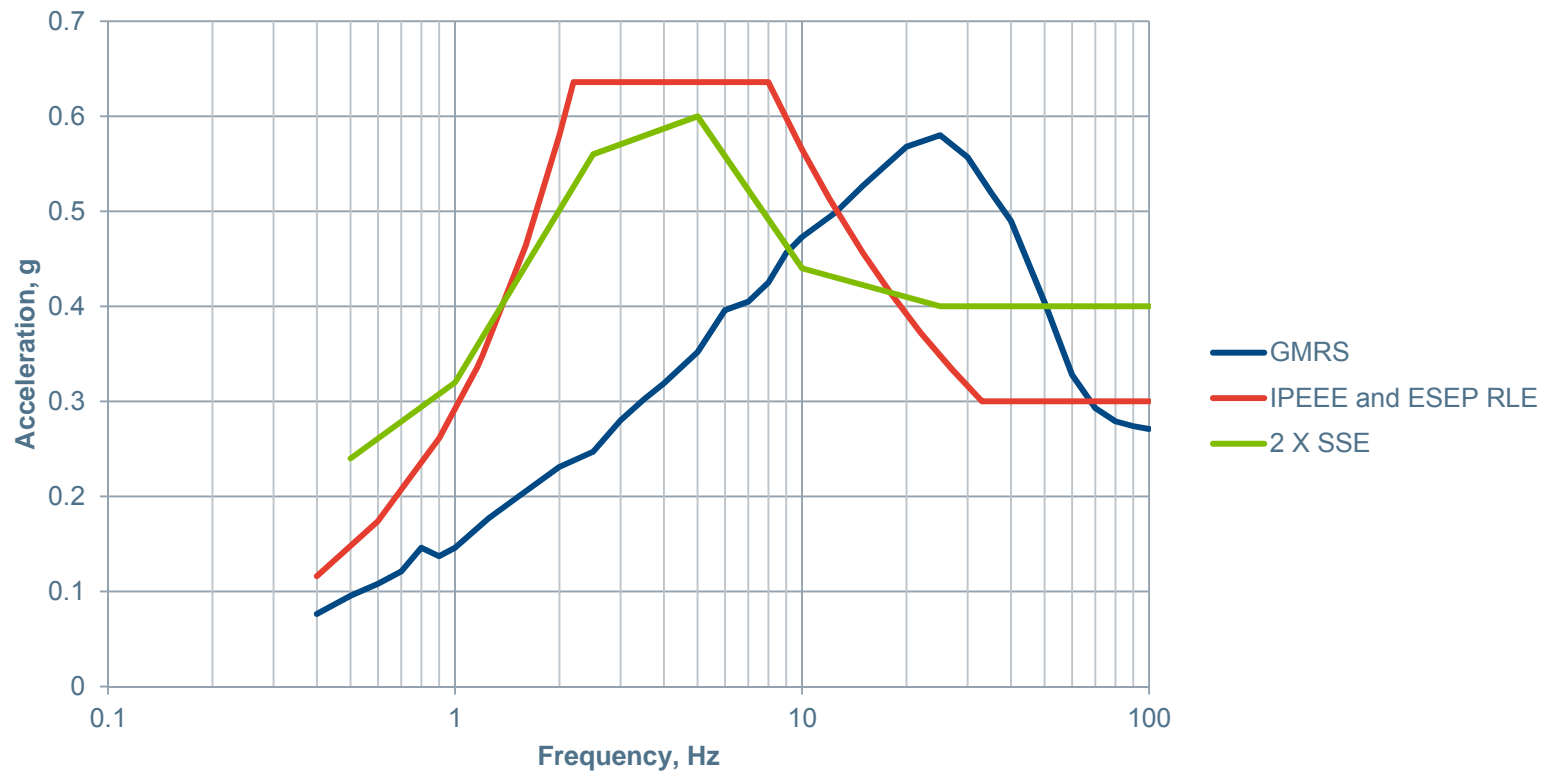
# High Pressure Injection Seismic Capacity

## RCIC Evaluation

- TVA Evaluated RCIC as part of ESEP- addressing NRC identified “weakness” in IPEEE
- Relays are the limiting component for RCIC, HCLPF = 0.37g
- RCIC is an extremely robust system.

Component (selection)	HCLPF
Suction from Torus	0.69g
RCIC Pump	0.85g
RCIC Vacuum Pump	1.38g
RCIC Turbine	0.85g
Power Supply RCIC flow controller	0.62g
RCIC Local Controls	0.74g
RCIC Relays	0.37g

# Browns Ferry Seismic Capacity



# GI-199 Risk Insights

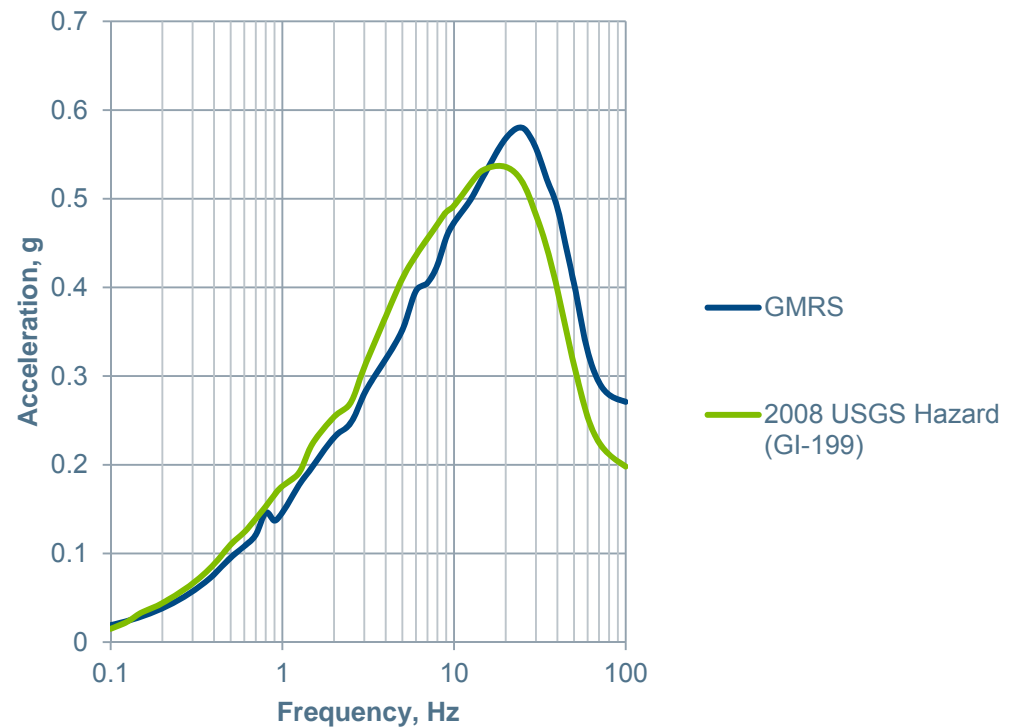
## SCDF estimates

NRC estimate SCDF

3.5E-6 for 0.26g  
seismic capacity and  
USGS hazard (2010  
GI-199 risk  
assessment)

TVA estimate SCDF

3.9E-6 for 0.3g  
seismic capacity and  
BFN GMRS





# Assessment of Group 2 Plants

Seismic Hazard Aspect	BFN results
GMRS/SSE Ratio in 1 to 10 Hz $\leq 2.0$	2.15 @ 10 Hz
GMRS Peak Spectral Acceleration	0.58g @ 25 Hz
R2.3 Walkdown reviews and inspections	No significant findings; all minor findings promptly resolved
IPEEE seismic plant capacity insights	Minimum HCLPF > 0.30g
Expedited Seismic Evaluation Process	No findings
GI-199 / Risk Insights for new hazard	Low estimated seismic CDF

# Summary/Conclusions

- Seismic Capacity Improvements
  - IPEEE outliers and weakness resolved
  - HCLPF = 0.3g
- Updated Hazard SCDF Risk
  - 3.9E-6

