

Current Diablo Canyon Seismic Evaluation

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Outline

- Background
- Near Term Task Force Hazard Assessments
- Diablo Canyon Seismic Hazard and Risk Evaluations
- References

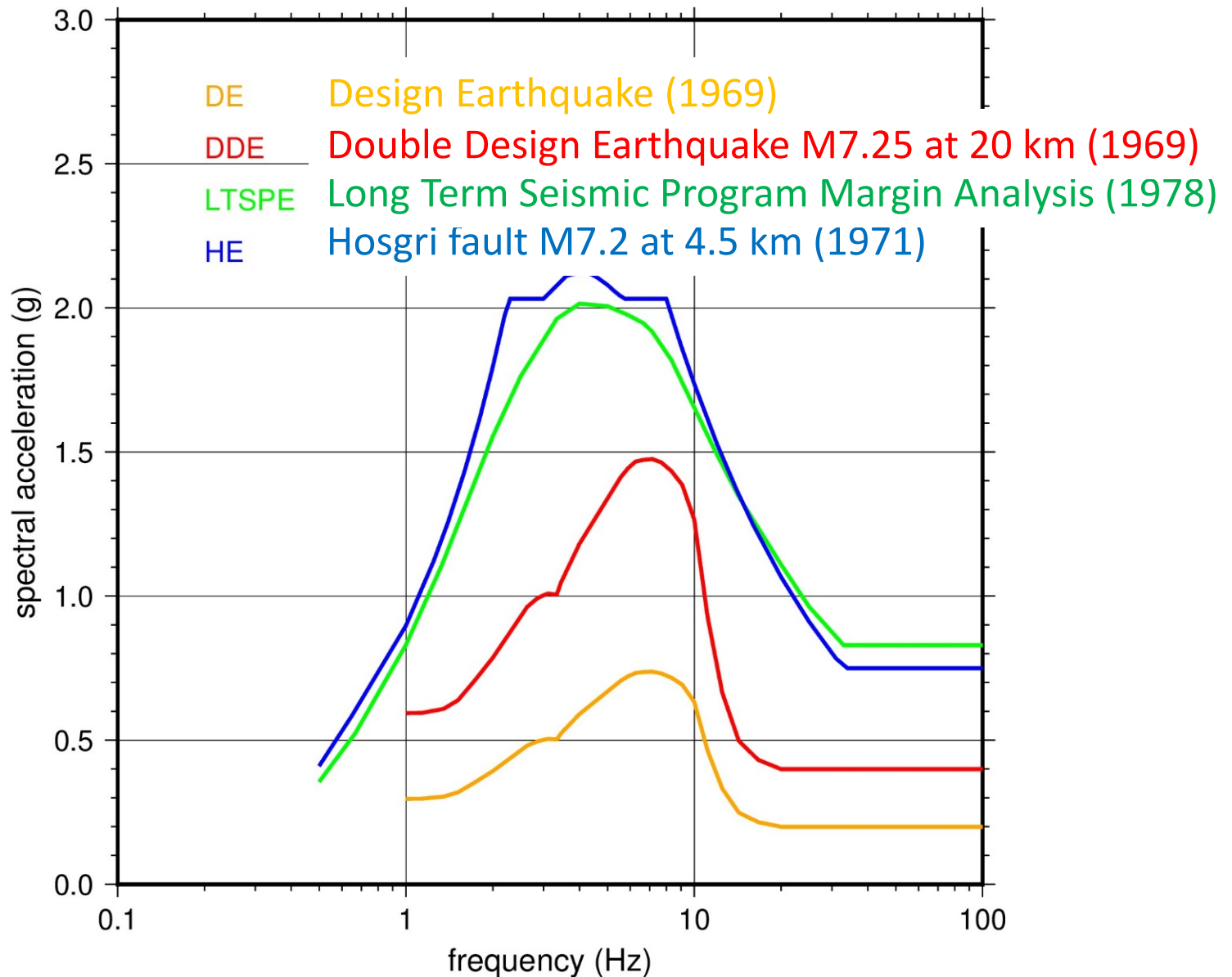
NRC Regulations – Safe Shutdown Earthquake

- Nuclear power plant structures, systems and components important to safety are required to be able to withstand effects of natural phenomena such as earthquakes
- Safe shutdown earthquake ground motion (SSE) is the vibratory ground motion for which safety-related structures, systems, and components must be designed to remain functional

NRC Regulations for Siting Facilities

- 10 CFR Part 100 – Reactor site criteria including geology and seismology
 - Specifies siting investigations and analyses in order to determine Safe Shutdown Earthquake ground motion (SSE)
 - Prior to 1997 SSE determined using Deterministic approach
 - Ground motion from maximum earthquake used to determine SSE

DCPP Seismic Design Spectra



NRC 2012 Request for Hazard Assessments

- In response to March 11, 2011, Great East Japan earthquake and tsunami NRC requested seismic hazard assessments for all U.S. NPPs
 - Request specified use of **present-day** NRC regulations and guidance to assess hazard
 - PG&E submitted its seismic hazard assessment to the NRC in 2015

Current NRC Regulations and Guidance for Seismic Hazards

- Post 1997 Geologic and Seismic siting regulations provided in 10 CFR 100.23
 - 100.23 requires determining slip **rates** for local and regional faults
 - 100.23 requires incorporating **uncertainty** into determining SSE
- Regulatory Guide 1.208 describes performance-based approach to define site-specific ground motion
 - Specifies a **Probabilistic** approach rather than Deterministic
 - Uses risk-informed approach to develop site ground motion that achieves performance goals in standard ASCE 43

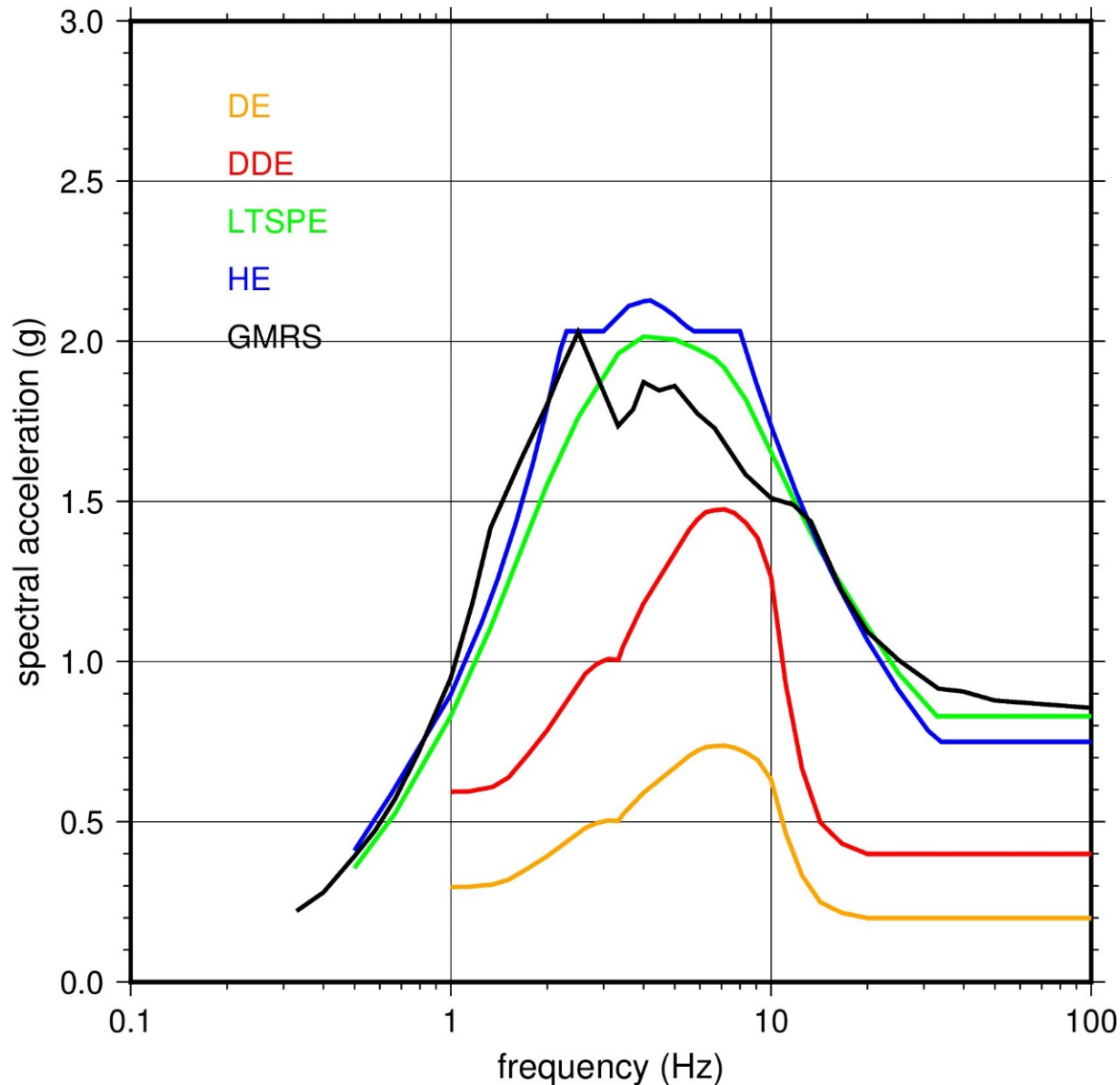
DCPP Seismic Hazard Assessment

- PG&E evaluated data from multiple offshore and onshore geophysical and geotechnical investigations to develop
 - Seismic source model
 - Seismic ground motion model
 - Amplification of seismic ground motions due to local soil and rock properties

DCPP Seismic Hazard Assessment

- PG&E developed a detailed seismic source model for the region
 - Fault slip rates
 - Fault geometries and locations
 - Maximum magnitudes for faults
 - Multiple fault rupture scenarios
- PG&E developed a seismic ground motion model to assess ground motion amplitudes from multiple faults
 - PG&E adjusted the ground motion model to account for the local site effects

DCPP Ground Motion Response Spectrum (GMRS)



DCPP Seismic Risk Evaluation

- Based on the results of the seismic hazard reevaluation PG&E performed a seismic probabilistic risk assessment (PRA)
 - Determined seismic fragilities of structures and components
 - Performed soil-structure interaction analyses
 - Evaluated system accident sequences
 - Evaluated containment performance
- Based on its review of the PG&E Seismic PRA, the NRC staff concluded that PG&E followed the appropriate guidance and adequately addressed the effects of the reevaluated hazard on the plant.

References

- Detailed summary of Diablo Canyon Seismic Hazard Assessment is provided in Section 3.3 of NUREG/KM-017 ML21344A126
- PG&E Seismic PRA ML18120A201
- NRC Staff Assessment of Seismic PRA ML18254A040