Use of Dynamic Rupture Models in Engineering Applications:
Needs and Schedule

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Planned Use of Dynamic Rupture Models for Engineering Applications

- Splay faulting
  - Chance of splay faulting
  - Ground motion near splay faulting
- Creeping faults
  - Near fault ground motions from creeping faults
- Hanging wall effects (RV and NML)
  - Ground motion differences from FW to HW?
- Source parameter correlations
  - Inputs to kinematic simulations

PG&E Schedule Needs

- Q1 2014
  - Deadline for inputs to Southwestern US (SWUS) GM models (NPPs) – splay faulting
- 2015
  - Deadline for ground motion evaluations for dams near creeping faults
- 2018
  - Planed update of next empirical GMPE
  - Inputs from modeling by 2017
- 2023
  - Planned update of SWUS GM models in 2025
  - Inputs needed by Q4 2023

Splay Faulting

- SS faults (Q1 2014)
  - Probability of splay faulting for range of fault geometries
  - Source model for use in kinematic simulations
  - Ground motions from dynamic ruptures
    - Compare near fault ground motions from single faults and combined splay faults
    - Up to 5 Hz?

Validation

- Follow SCEC BB Platform validation exercise (2015-2016)
  - Comparison with past earthquakes (part A)
    - How well does the model work for an optimized source?
  - Comparison with averages from empirical GMPEs (Part B)
    - Are the inputs for the source leading to "centered" distributions of rupture parameters for future earthquakes?
  - Freq Range: up to 5 Hz
  - Identifies reliable range (Mag, Dist, freq)

Creeping Faults

- Source characteristics for creeping faults (Q4 2014)
  - Inputs to kinematic simulations
- Ground motions from dynamic rupture models (2017) for creeping faults
  - After validation complete

Hanging Wall Effects

- Use existing verified models (pre-validation) to compare with kinematic results (Q1 2014)
  - Compare the computed ground motions on FW and HW sides
  - Differences between NML and RV?
- Post Validation (2017)
  - Support for next set of empirical models due in 2018
  - Use ground motions from dynamic ruptures over the range identified by validation

Source Parameter Correlations

- Inputs to Dynamic Ruptures (2014)
  - What are the distributions on the inputs?
  - Variability of results ground motions?
- Constraints on kinematic source inputs (2015)
  - Update from past work
  - What do rare (unusually severe) earthquake sources look like?