After receiving an overview of each project, the remainder of the day was spent discussing various issues of joint concern. These are summarized below, together with any conclusions that were made and/or the joint plan for resolving them.

Aftershocks:

Evidence was presented that "class 2" earthquakes (aftershocks that are close to the main shock rupture plane) have systematically lower ground motions by a factor of 0.7, on average, at lower frequencies (but not at longer periods).

There are very plausible physical arguments on why this might be the case (e.g., lower stress drops or greater attenuation within a damaged zone surrounding the fault), although it could also be an artifact of other effects (e.g., lower magnitudes are known to be over-predicted by the previous NGA models).

Questions NGA folks will pursue include whether this trend persists in the new data and regressions, and whether it could be a location effect only where all events occurring in the damage zone of large faults have lower values (not just those occurring as aftershocks). The good news is this is a very testable hypothesis.

Aleatory magnitude-area variability:

Intuitively is would seem that we must be double counting this variability, as UCERF2 gives a range of magnitudes for a given fault area, whereas the sigma in GMPEs must also include a range of areas for a given magnitude. Surprisingly, NGA folks have not been able to find any such correlation between event terms (residuals) and measures of static stress drop, which may result from the fact that areas of large ruptures are not well constrained (highly uncertain). Even if we are double counting, is this causing any real problems? The coordination plan is for the NGA folks to continue to search for these correlations, and for UCERF3 to provide an on/off switch for this aleatory variability so users can explore whether including it makes a difference to their specific application (including non-engineering studies such as the inconsistencies of PSHA with precarious rocks).

Assigning NGA parameters to multi-fault ruptures

The existence of multi-fault ruptures raises potential ambiguities with respect to setting parameters in the NGAs. For example, what's the rake or dip for a rupture that is half strike-slip and half thrust? Is it some average? Is it the value on the rupture surface closest to the site of interest (the latter making it site specific); what if in the latter the site is equidistant from the thrust and strike slip

parts? The same goes for other parameters such as depth to top of rupture. It was agreed that solving this issue falls on the NGA developers since these values have to be determined for the real data used in their regressions. The only issue is whether the UCERF3 grand inversion will produce any difficult cases that the NGA group has not considered. The coordination plan is for the NGA group to finalize their rules for setting these parameters, and then for the UCERF3 folks to make sure they will work for all ruptures in the Grand Inversion.

Glossary

The meeting exemplified the need for fixed nomenclature (e.g., that's the difference between an "aftershock" and a "triggered" event?). However, it was also acknowledged that establishing some master glossary spanning both communities would be very challenging and beyond the scope of the current projects. The plan is for each group, at the very least, to provide a glossary in their respective reports. But to make progress beyond this minimal accomplishment, the two projects agreed to review each others glossaries and to coordinate as much as possible. PEER will send an existing written document to the UCERF3 leadership (in fact this has already been sent), which will then get compared to the OpenSHA glossary used by UCERF3 (http://www.opensha.org/glossary). Thus, we should be able to make some tangible progress toward a community wide glossary.

Other Issues Discussed

The challenge in converting grid-based forecasts (which only specify a hypocenter) into a suite of finite-fault ruptures that span the parameter space of NGA models was discussed, with depth to top of rupture being used exemplify the challenges. It was agreed that we should strive for some some community based standards for doing this, but that doing so may not occur within the timing of the current projects.

Norm Abrahamson and Ned Field also discussed (at lunch) the need to continue the PEER PSHA verification project (to develop additional, formal PSHA test cases for verification and quality-control purposes). They plan to coordinate this activity, but not within the purview of the NGA-W2 and UCERF3 projects. Others are obviously welcome to join in planning this future activity.