TECHNICAL SUPPLEMENT

Methodology for Tsunami Inundation Modeling for the RCFZ Earthquake Scenario

San Diego Earthquake Planning Scenario - M6.9 Earthquake on the Rose Canyon Fault Zone

As discussed in Sections 4.3 and the Case Study – *Potential Tsunami off the Coronado Canyon* of the San Diego Earthquake Planning Scenario Report, a submarine landslide activated by shaking from the scenario earthquake within the offshore Coronado Canyon is a potential hazard of the scenario earthquake. Furthermore, should a submarine landslide occur within the Coronado Canyon, an associated tsunami could be generated as a result. It should be stressed that this type of event is considered a very low probability of occurrence but one with potentially high consequences and, therefore, was evaluated for the planning scenario.

A Hazus tsunami model was completed by the Pacific Disaster Center for the Coronado Canyon submarine landslide. The Hazus model incorporates the tsunami warning time and tsunami arrival time. For the Hazus model, the tsunami warning is the ground shaking from the earthquake and the potential tsunami arrival time is 5 to 10 minutes after initial ground shaking as the submarine landslide source location is only 12 miles offshore.

Hazus provided a submarine landslide tsunami inundation zone for the San Diego area coastline. Hazus also provided an economic loss evaluation of buildings exposed to the tsunami, though losses to harbor facilities are not considered. Estimates for casualties were based on a tsunami travel time of 5 minutes and 10 minutes to maximum inundation.

Pedestrian evacuation analysis was performed using the "roads only" approach. This is conservative in that there may be shorter ways out of tsunami zones, however, the "roads only" approach provides a safe analysis approach since it does not require assessing land areas that cannot be crossed, such as military bases, fenced areas, and canals. The results indicate the day and night pedestrian travel times range from 0 to 18 minutes with the longest pedestrian evacuation times observed near the U.S. Naval Amphibious Base and Imperial Beach. Vertical evacuations were not considered for this scenario but could be considered for emergency planning purposes.

The Hazus tsunami model estimated the numbers of casualties (fatalities and injuries) based on the tsunami inundation as a result of the Coronado Canyon submarine landslide. Casualties are based on community preparedness levels (Good, Fair, and Poor), the pedestrian travel times, and estimated tsunami arrival times. Casualties are estimated at 992 persons for the daytime range pedestrian travel time and assuming a good preparedness level. For a poor preparedness level assuming the daytime pedestrian travel time range, casualties are estimated to be 4,352 persons. For the nighttime pedestrian travel time range, casualties are estimated to be of 724 persons assuming a good preparedness level to 4,750 persons assuming a poor preparedness level. Preparedness levels control how quickly members of the community respond to the event using the probabilistic survival rate methodology.

The Hazus tsunami model also provides an economic loss evaluation of buildings exposed to tsunami. Losses to infrastructure or harbor facilities are not considered, however, are not considered. Induced losses, such as, impact of tsunami debris on buildings, are also not considered. The Hazus tsunami model produced approximately $102 million in direct building losses as a result of the considered tsunami. Infrastructure damage due to the potential tsunami generated from the Coronado Canyon submarine landslide is further discussed in Section 4.0 of this report.