Chapter Five

Future Work

In response to Senate Bill 4 (SB 4), the California Council on Science and Technology (CCST) and Lawrence Berkeley National Laboratory (LBNL) are conducting an independent scientific study of well stimulation technologies in the state to assess current and potential future practices, evaluate the impacts of well stimulation technologies and related data gaps, analyze risks associated with current practices, and identify alternative practices that might limit these risks. The study findings are issued in three report volumes. This document, Volume I, provides the factual basis for the upcoming Volumes II and III. Chapter 2 in Volume I comprises a general description of well stimulation technologies as applied in oil and gas production for both onshore and offshore locations, including well drilling, well construction, and well completion, with an emphasis on aspects of these activities that affect well stimulation treatments. Chapter 3 provides a review of historical and current well stimulation in California, for onshore and offshore oil production and gas production, and Chapter 4 details the oil and gas provinces of California and assesses the probability of expanded or new production using well stimulation technologies in each. The basic assessment conducted in Volume I will be used in upcoming Volumes II and III to evaluate the potential impacts of current and future well stimulation in California. Volume II, entitled "Generic and Potential Environmental Impacts of Well Stimulation Technologies," assesses such impacts with respect to water, air quality, and greenhouse gas emissions, as well as induced seismicity, ecology, traffic, and noise. Volume III, entitled "Case Studies with Selected Evaluations of Environmental and Public Health Risk," presents case studies to evaluate environmental issues and qualitative hazards specific to geographically focused scenarios. Volumes II and III will be issued June 30, 2015.

5.1. Assessment of Environmental Impacts in Volume II

Volume II describes the various pathways and mechanisms that lead to environmental impacts in a general sense—with respect to water, air quality, and greenhouse gas emissions, as well as induced seismicity, ecology, traffic, and noise—and specifically assesses the available data and literature on these impacts in California. Analysis and discussion of current and potential future impacts then leads into development of a hazard matrix, as a starting point to a hazard assessment and risk analysis for human populations addressing occupational and community exposures to chemical/physical stressors associated with well stimulation treatments. Volume II also includes a discussion of methods that facilitate safe and effective well stimulation, summarized from the scientific literature as well as government and industry/trade association publications.

5.2. Case Studies in Volume III

Volume III presents case studies to assess environmental issues and qualitative hazards specific to selected locations. Case studies are geographically focused cases, based on findings in Volumes I and II. The case studies are focused on key issues specific to a regional setting involving current or potential well stimulation activities, which are evaluated and discussed. Each case study starts with a description of the geologic and technical basis for well stimulation in the region, and then assesses key issues and selected impacts for current and/or potential future operations. Four likely case studies have been identified: (1) the San Joaquin Basin, where the vast majority of well stimulation takes place now and likely will continue in the future; (2) the Los Angeles Basin, where oil production coincides with a major urban environment, (3) an assessment of current practices of well stimulation offshore, and (4) a Monterey Shale development case study which assumes production enabled by well stimulation from Monterey Shale source rock could take place in the future. In each case study, important data gaps will be identified and qualitative risk assessments will be conducted.