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CCST Releases Report on Past, Present, and Potential Future of Well Stimulation in California

SACRAMENTO, Calif. Jan. 14, 2015 — The California Council on Science and Technology (CCST) released the first volume of an independent scientific assessment today on well stimulation in California, including hydraulic fracturing. This volume describes how and where operators deploy these technologies for oil and gas production in the state, and where the technologies might enable production in the future.

The assessment was prepared for the California Natural Resources Agency in response to Senate Bill 4. It is the first volume in a three-volume CCST study that will assess current and potential future practices of well stimulation technologies in the state. This study builds on the findings of the CCST report “Advanced Well Stimulation Technologies in California” of August 2014, commissioned by the Federal Bureau of Land Management (BLM).

“We applaud state leaders for seeking an independent scientific assessment to inform policy choices about well stimulation, which is the reason CCST was created as an independent organization by the Legislature,” said CCST Executive Director, Dr. Susan Hackwood.

The report was developed by experts from CCST and Lawrence Berkeley National Laboratory (Berkeley Lab). CCST studies follow a rigorous process modeled after the National Academies study process, with checks and balances and careful vetting at each stage.

“CCST assembled a steering committee for this report from some of the state’s finest experts on oil and gas production, environment, water, risk assessment and geology,” said Dr. Jane C. S. Long, chairman of CCST’s committee on California’s Energy Future. “The group debated the issues and reached consensus on all conclusions.”

Jens Birkholzer, project leader for Berkeley Lab and Division Deputy of Berkeley Lab’s Earth Sciences Division, added, “A highly qualified group of scientists with many years of research experience worked several months to assess the facts associated with well stimulation in California.”

The report’s findings and conclusions are based on a review of published literature and official and voluntary databases through June 2014. Key findings and conclusions include:

- **Over the last decade, one-fifth of oil and gas production in California came from wells that had been subject to hydraulic fracturing.** In this time period, operators fractured about 125 to 175 wells of the approximately 300 wells installed per month in California.
- **Current hydraulic fracturing activities in California differ from those in other states and, as such, recent experiences with hydraulic fracturing in other states do not necessarily**

apply to current hydraulic fracturing in California. Hydraulic fracturing in California tends to be performed in shallower wells that are vertical as opposed to horizontal and requires much less water per well, but uses fluids with more concentrated chemicals than hydraulic fracturing in other states.

- **Ninety-six percent of hydraulic fracturing in California occurs in the southwestern portion of the San Joaquin Basin.** Hydraulic fracturing could continue to enable oil and gas production in this region for the foreseeable future, in and around existing oil fields that currently use the technology.
- **Oil resource projections for production from deep source rocks in the Monterey Formation are highly uncertain.** Investigators found no reports of significant production from the Monterey Formation or other source rocks to date in California. If and when operators attempt production in these reservoirs, they will need innovative technology, likely including hydraulic fracturing.
- **Geologic assessment indicates that large unconventional natural gas resources on a large, basin-wide scale (such as the Marcellus (OH, WV, PA, NY) or Barnett shales (TX) or in the Piceance basin (CO) which produce using hydraulic fracturing) probably do not exist in California.** Most of the remaining undiscovered natural gas reservoirs in California are likely to be similar to reservoirs in production today that currently do not use well stimulation technology.
- **The majority of offshore production takes place without hydraulic fracturing.** Operators conducted an average of 16 fracturing operations per year in state waters during the period from 2002 to 2013. Most of this limited hydraulic fracturing activity is conducted on man-made islands close to the Los Angeles coastline.
- **Operators report the use of acid for well stimulation much less often than hydraulic fracturing and acid stimulations in California reservoirs are not expected to lead to major future increases in oil and gas development in the state.** In general, the geologic conditions in the state's oil reservoirs are not amenable to effective acid stimulation treatment.

The full report and executive summary can be viewed at: <http://ccst.us/publications/WST>

Volumes II and III of the study will be delivered to the California Natural Resources Agency on or before July 1, 2015. Volume II will discuss how well stimulation affects water, the atmosphere, seismic activity, wildlife and vegetation, traffic, and light and noise levels. It will also explore human health hazards, and identify data gaps and alternative practices. Volume III will present case studies to assess environmental issues and qualitative risks for specific geographic regions.

The California Council on Science and Technology is a nonpartisan, not-for-profit corporation established in 1988 via a unanimous vote of the California Legislature. Bringing together world-class expertise from academia, the national labs, companies and a broad array of Senior Fellows who are distinguished scientists and technical experts, CCST offers expert advice to the Governor, the Executive Branch and the Legislature on science and technology-related policy issues. In recent years, CCST has produced a series of reports on California and innovation, water, energy, STEM and digitally enabled education.

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