An Independent Review of Scientific and Technical Information on Advanced Well Stimulation Technologies in California

A report in progress by the California Council on Science and Technology (CCST) for the Bureau of Land Management (BLM)

Public Webinar

January 16th, 9:00 – 10:30 AM PST

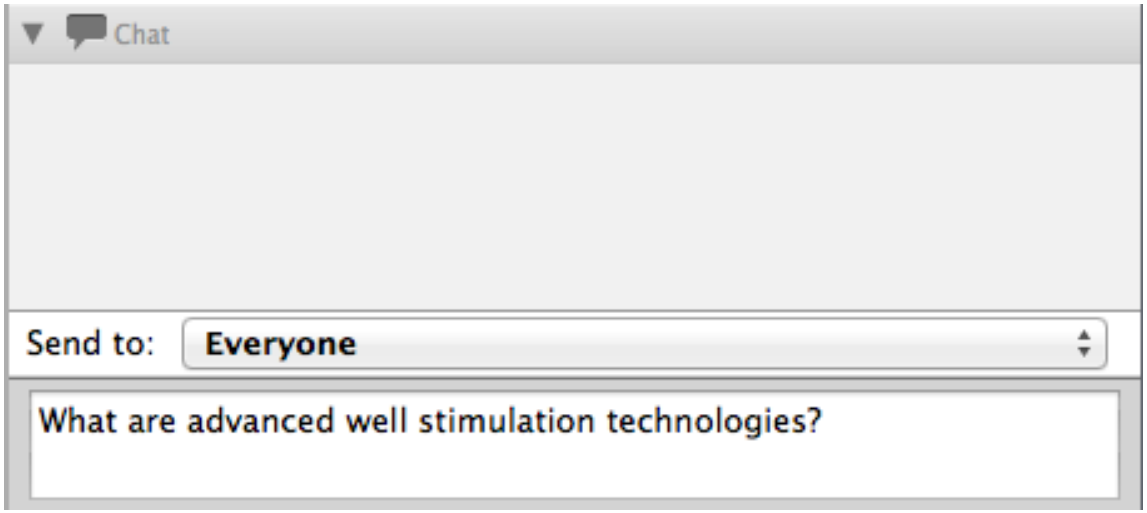
Purpose of the Webinar

The intent of this meeting is to provide transparency on how CCST is conducting its study on advanced well stimulation technologies in California for BLM.

How to Participate

Please confine questions to ones of clarification about how the study will be performed.

Use the “chat” feature to submit questions in writing. In the drop-down menu, choose to send your questions to everyone.



How to Participate

If time and number of participants permit, we will accept verbal questions during the final question and answer session.

To ask questions verbally, use the “raise your hand” feature by clicking on the hand icon in the lower left hand corner of the participants window.

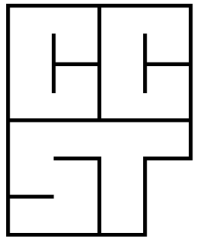
The moderator will call as possible.

In Case of Technical Difficulties

Call Jennifer Kofoid at (916) 600 - 7870

Agenda

9:00 – 9:05	Welcome and Overview	Jane Long
9:05 – 9:10	**Introduction to CCST**	**Susan Hackwood**
9:10 – 9:20	Introduction by BLM	Jim Scrivner
9:20 – 9:35	Study Process	Jane Long
9:35 – 9:55	Study Topics	Preston Jordan
9:55 – 10:30	Clarifying questions from audience	

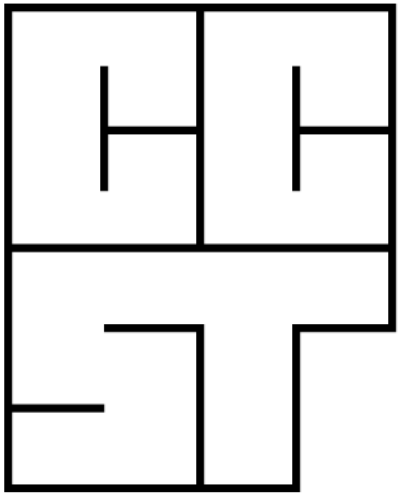


California Council on
Science and Technology

Assessment of Well Stimulation Techniques in California

Project Purpose, Scope and Schedule

Public Webinair
January 16, 2014



California Council on Science and Technology

An Overview

Susan Hackwood

January 16, 2014

California Council on Science and Technology

- CCST is a nonpartisan, impartial, not-for-profit 501(c)(3) corporation established via Assembly Concurrent Resolution (ACR 162) in 1988 by a unanimous vote of the California Legislature
- It is designed to offer expert advice to the state government and to recommend solutions to science and technology-related policy issues.
- CCST is governed by a Board of Directors composed of representatives from its sponsoring academic institutions, from the corporate and business community, as well as from the philanthropic community

The Role of CCST - Science and Technology in the State's Interest

- Not for profit, 501(c)3 comprised of over 200 of California's top talent
- Committed to serving the State in all aspects of science and technology
  - Sustaining institutions: UC, CSU, CCC, Stanford, USC, CalTech
    - Affiliate members: LBNL, LLNL, Sandia, SLAC, NASA Ames, JPL

CCST is comprised of :

16 Board Members

30 Council Members (18 Academia, 8 Industry, 4 DOE/NASA)

136 Senior Fellows

12 Cal Teachers Advisory Council Members

10 S&T Policy Fellows

And includes:

3 Nobel Laureates

81 National Academies' Members

11 National Medal of Science or Technology

6 National Board Certified Teachers

Bringing expertise into the discussion

- CCST explores S&T issues that are profoundly important for California's future at meetings, bringing together expertise from CCST's ranks and elsewhere. We partner with others whenever possible
- CCST responds to requests for help from the Legislature and Executive branches of government
- CCST produces reports and recommendations, with a view towards specific agents of change and the long-term picture
- A broad footprint of activity that impacts policy discussions

CCST Explores S&T Issues
Science, Values, and Public Policy

- Many policy decisions have S&T components that policy makers are not trained to handle
- Clear communication, trust and accountability are paramount
- A technical topic is inherently difficult to explain
- Scientific method can be at odds with personal feelings such as outrage, irrational hope or groupthink

CCST has produced a series of energy reports: California's Energy Future

- Summary Report on meeting 2050 climate goals
- "Transportation Energy Use"
- "Possibilities, Problems, and Potential Envisioned for Nuclear-Powered California in 2050"
- "Electricity from Renewable Energy and Fossil Fuels with Carbon Capture and Sequestration"
- "Building and Industrial Efficiency"

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An Overview of the Bureau of Land Management (BLM)

Jim Scrivner
Deputy State Director for Energy and Minerals
BLM CA State Office
January 16, 2014

BLM’s mission

- The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations.
- The BLM is the federal agency that has the delegated authority to manage public lands and all onshore Federal mineral estate on behalf of the American people.

BLM's need for the science assessment

- In response to a series of legal challenges, the BLM CA requested an independent assessment of well stimulation technologies
- BLM CA needs up-to-date, scientifically accurate information about well stimulation techniques to improve our environmental analysis documents
- Information resulting from the science assessment will be used in future oil and gas planning, leasing and development decisions (including the Hollister Field Office Oil and Gas Leasing and Development EIS)

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CCST's Independent Review of Scientific and Technical Information on Well Stimulation Technologies in California

- Purpose of the study is to conduct an independent scientific assessment of the potential and impacts of well stimulation technologies in California
- This is an independent scientific expert study
  - An assessment of published literature and available data
  - No new data collection
  - Interested parties may nominate literature to the study

Who will do the study

- The CCST's California Well Stimulation Committee will provide oversight, scientific guidance and input for the project
- The study analysis is conducted by Lawrence Berkeley National Laboratory (LBNL) with expertise in Earth Sciences
- Pacific Institute is subcontracted through LBNL to provide expertise in water issues

Committee members will be experts in a variety of topics

Expertise required
Behavior in fractured rock, energy systems, petroleum reservoirs
LCA for energy systems, air quality and air emissions from oil and gas production
California oil and gas data, geology and hydrogeology, and risk analysis
Sustainability and general industry practice
Water resources
Environmental science and engineering
Methane and measurement of methane leakage
Air pollution, environmental public health, and climate dimensions of oil and gas development and energy production.
Industry fracking theory and practice

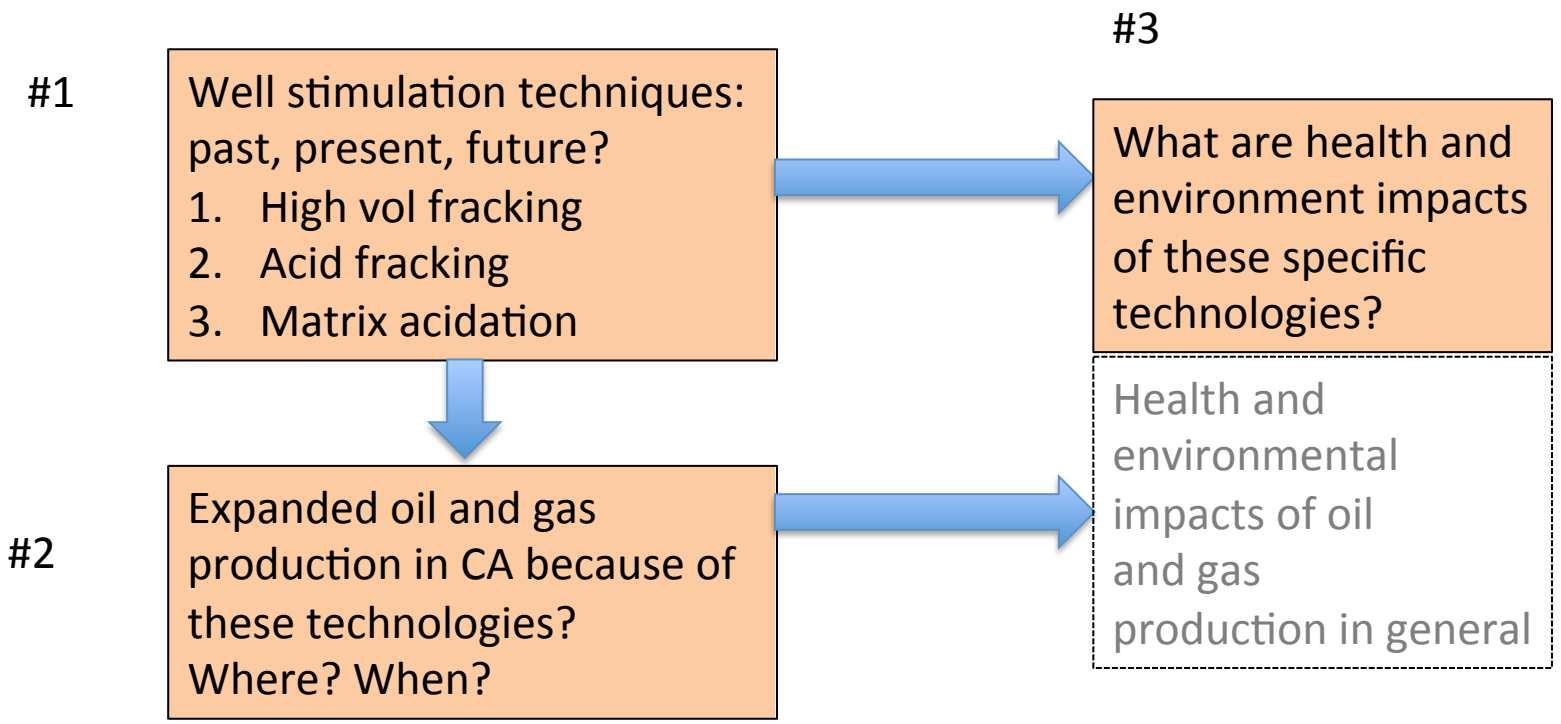
Forming the Steering Committee

- Committee expertise requirements defined nominations through consultation with the academic and research community
- Committee members disclose conflicts of interest
- Committee roster submitted to CCST Board for approval
- Committee approved by the CCST Board

Key Questions Addressed by the Study

- What is past, current and potential future practice in well stimulation technologies including hydraulic fracturing, acid fracturing and matrix acidization in California?
- Where might these technologies allow expanded production of oil onshore in California?
- What are the potential direct environmental hazards of these specific technologies in California?

Relationship between the three questions



What will be the basis of our assessment?

- Peer reviewed published literature
- Analysis of available data from CDOGGR and other publicly available sources.
- Other relevant publications including reports and theses. Make the qualifications of this information transparent.
- The expertise of the committee and scientific community to identify issues
- Literature can be nominated to the committee emailed as attachments to CAFRAC@ccst.us and through the following website:
- http://ccst.us/projects/fracking_public/submission-form.php

Report Review Process

- CCST will use the highest standard of scientific peer review
- The review will be managed by the CCST Oversight Committee,
- The Oversight Committee will seek qualified anonymous reviewers, including the USGS
- The Oversight Committee will communicate review findings to the steering committee and insure that the committee responds to these comments appropriately

Project Schedule

- Draft completed: March 2014
- Review completed: April 2014
- Final report: May 2014

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- What is past, current and potential future practice in oil well stimulation onshore, including hydraulic fracturing, acid fracturing and matrix acidization in California?
  - The purpose of these technologies is to increase the permeability of the rock containing the oil by injecting at high pressure to open fractures and/or injecting acid to enlarge pathways, such as by etching fractures

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Information availability varies greatly between properties

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Potential environmental hazards of
production facilitated by well stimulation

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Potential environmental hazards due directly to well stimulation	Potential environmental hazards of production in general

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Potential environmental hazards due directly to well stimulation	Potential environmental hazards of production in general

For example:

- Seismicity induced by stimulation and flowback fluid disposal

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For example:

- Seismicity induced by stimulation and flowback fluid disposal
- Changes in water quality due to stimulation chemical spills during transportation and mixing
- Stimulation fluid leakage in the subsurface
- Changes in water availability due to stimulation fluid production

For example:

- Seismicity induced by disposal of water produced with oil
- Oil spills during separation, storage and transportation
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focus of this study

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Questions?