Well Stimulation in California: Update on Implementation of Senate Bill 4 (Pavley)
Overview

• What is Well Stimulation
  – Focus on Hydraulic Fracturing
• California and Other States’/Regions’ Experience
• Senate Bill 4 (Pavley)
Note:

- Geology creates formations/zones
- Well construction

Source: CA Department of Conservation
What is Hydraulic Fracturing?

- Increase permeability of oil-/gas-bearing formations
- Use of water, proppant, and chemicals to open fissures to allow oil/gas to flow to well
- Recent development? Combination of multi-stage HF in long, horizontal formation
- “Tight” shales or other types of formations require HF

Source: http://today.uconn.edu/blog/2011/12/fracking-%E2%80%93-good-news-or-bad-for-americas-energy-needs/
Land Use Impacts

North Dakota -- Before and After

Source: www.hittinghome.org

Department of Conservation
Land Use Impacts

Existing California Oilfield Operations, Lost Hills Field

Source: www.aeraenergy.com

Department of Conservation
The Monterey Shale?
The Monterey Shale?

Source: http://www.indybay.org
The Monterey Shale?
Geology of Oil and Gas Deposits

Source: CA Dept of Conservation

Department of Conservation
Water Use in Hydraulic Fracturing

- Nat’l water use for HF in 2014
- CA avg. water use per HF ≈ 160,000 gallons
- Total CA water use all HF in 2013 ≈ 300 acre feet

Source: “Hydraulic Fracturing & Water Stress: Water Demand by the Numbers”
Hydraulic Fracturing in CA – 2013 to date

Source: conservation.ca.gov
Historic Regulation

- Well Construction Standards
  - Focus on competent well bores
  - Ensure “zonal isolation”
- Facilities regulation
  - Covers pipelines, collection/separation vessels / tanks
  - Includes Spill Prevention and Contingency Planning
Senate Bill 4
Permanent Regulations

• Will require:
  • Permit from DOGGR
  • Neighbor notification
  • Pre-WST evaluation of formation & well
  • Monitoring during and after WST
  • Water quality monitoring plans and water management plans
  • Public disclosure of job and chemicals used
• Process for adoption
Senate Bill 4
Interim Regulations

• **Now** require:
  • Neighbor notification
  • Pre-WST pressure testing of well and surface equipment
  • Water quality monitoring plans
  • Disclosure of HF fluid content
  • Public disclosure
Senate Bill 4

“Well Stimulation” EIR and Independent Scientific Study

- EIR
  - WST as a “project”
  - Process for EIR

- Independent Study
  - SB 4 direction and scope of study
  - Expected completion
Conclusion

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