California Division of Oil, Gas, & Geothermal Resources (DOGGR)
Response to Aliso Canyon Gas Leak

Climate Action Team
Public Health Workgroup Meeting
May 23, 2017

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Supervising Oil & Gas Engineer
Porter 39A (relief well #1, in background)
Relief Well #2 (foreground)
Agenda

• Introduction
• Impact
• Surface well control attempts
• Control-Cement-Confirm
• Safety Review
• California Underground Gas Storage Regulations
• Path forward

“Never waste a crisis.”
- Winston Churchill
Key Events

10/1/1953 - Standard Sesnon 25 well spud
2/25/1954 – SS 25 completed as oil well
6/6/1973 - SS25 converted to gas storage
  • Annual temperature and noise logs
  • 2014 SoCalGas filed Storage Integrity Management Plan (SIMP) with CPUC
10/23/2015 - Leak noted near SS25 wellhead
12/4/2015 - Relief well #1 (Porter 39A) spud
2/12/2016 - SS25 controlled from P39A
2/13-14/2016 - SS25 cemented
2/15-18/2016 - SS25 confirmed sealed
Impact

• Governor declared State of Emergency
• Federal, state, and local agencies
• Well control operations >$60 MM
• Significant Community Impact
  • Relocation cost >$700 MM
  • ~8,000 residents relocated
  • 2 Elementary schools closed
  • Community groups activated
• Environmental: released ~ 5 Bcf methane
• Legal
  • Litigation cost TBD
  • >25 Class action lawsuits
State & Local Agencies Responded

• Governor Brown’s State of Emergency, Jan 6
• Three orders by Supervisor of Oil and Gas and Feb 5 Emergency Regulations
• Other agency actions
  • Public Utilities Commission
  • Office of Emergency Services
  • Office of Environmental Health Hazard Assessment
  • Air Resource Board (CARB and SWCAQD)
  • Fire (LA County and LA City)
  • Public Health Agencies
  • Occupational Safety and Health Administration
Federal Agencies Responded

- Federal action
  - Secretary of Energy visit
  - National Labs: LBNL, LLNL, Sandia, Brookhaven
  - Pipeline Hazardous Material Safety
  - Jet Propulsion Lab
Top Down Well Control

- Seven top down well control attempts
  - Heavy barite mud
  - Lost circulation materials
  - Ball sealers
  - Steel balls
  - Golf balls
  - Woody plugging agents
  - Junk shots
- Successive attempts eroded opening
CONTROL: Well was controlled within 5 minutes of intercept with mud

CEMENT:
- After 24 hours of stable pressures, cement from total depth (TD) to open reservoir perforations
- After 24 hours to cure, next cement stage from reservoir up to ~6,500 feet inside well
- After 24 hours, plug back relief well

CONFIRM:
- Shot fluid level – no change in 60 minutes
- Temperature and noise log – no unexplained anomalies & top of cement in tubing = 8199’ MD
- Cement bond log - annular TOC = 7610’ MD
- Positive pressure test, held 900 psi for 70 minutes, loss = 0.75%
Heat Shields and Bridge
Safety Review General & Battery 1

- 114 gas storage injection and withdrawal wells
- 100% noise and temperature logs
- Transparency – DOGGR website
  - News releases
  - Safety Testing and Review Requirements
  - Test Results of Aliso Canyon Wells
  - Emergency Orders and Regulations
  - Maps, every log used, reports
- Decision point
  - Plug and abandon permanently or
  - Plug in tubing and fluid in tubing and annulus < 12 months or
  - Conduct full suite of tests to return to injection and withdrawal
Safety Review Battery 2 & Resumption

- All injection and withdrawal wells
  - Casing inspection (HRVRT and/or USIT) and caliper log
  - Cement bond log
  - Positive pressure test
- SoCalGas may resume injection
  - All wells either P&A’d, isolated from the reservoir, or passed all tests – January 2017
  - After public workshop and comment period – February 2017
  - Tubing only production, with minimal pressure on isolated annulus
    - If authorized by State Oil and Gas Supervisor
    - If approved by the California Public Service Commission
- 45 wells completed Battery 2, plan 20 to 25 more
- 40 to 45 planned for plug & abandonment
Proposed Regulations

- Approval Process
- Required Data
  - Risk Management Plans
    - Emergency Response Plans
  - Geology and Engineering
  - Casing Diagrams
  - Leak Detection Protocols
- Well Construction Standards
- Mechanical Integrity Testing
- Monitoring
- Inspections
The operator shall ensure that a single point of failure does not pose an immediate threat of loss of control of fluids and to make certain that integrity concerns with a gas storage well are identified and addressed before they can become a threat to life, health, property, or natural resources.
Risk Management Plans

Identify potential threats and hazards

- Ongoing verification of well mechanical integrity
- Corrosion monitoring and evaluation
- Protocols for evaluation of wells and facilities
- Ongoing verification of reservoir integrity
- Evaluation of geologic hazards and natural disaster threats
- Prioritization of risk mitigations efforts
Path Forward

• Improved interagency coordination with PHMSA, national labs, CPUC, CARB, etc.
• Protecting Our Infrastructure of Pipelines and Enhancing Safety (PIPES) Act of 2016
• California Legislation
  • SB 380 Natural gas storage
  • SB 887 Natural gas storage wells
  • SB 57 (pending) Natural gas storage: moratorium
• Lessons learned applied to all gas storage facilities
• CARB regulation will supersede DOGGR regs
Public Workshops and Hearings

Department of Energy (PHMSA) Workshop – UGS Safety
July 12-13-14, 2016 in Denver, CO

Northern California Workshop – DOGGR UGS Regulations
August 9, 2016 in Sacramento, CA

Southern California Workshop – DOGGR UGS Regulations
August 11, 2016 in Woodland Hills, CA

Aliso Canyon - Safety Review Hearings
February 1 and 2, 2017 in Woodland Hills, CA

Formal Hearing on Final DOGGR Regulations
July 10 in Sacramento and July 12, 2017 in LA
Thank You

http://www.conservation.ca.gov/dog/Pages/AlisoCanyon.aspx