



# 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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# 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**





# Participating Agencies



# 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-CEMENT-CONFIRM

- **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**



# Well Construction

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>

