



## **Aliso Canyon Update March 28, 2015**

---

This memo provides an update on several ongoing state agency actions in response to the Aliso Canyon natural gas leak.

As you know, the natural gas leak at the Aliso Canyon Gas Storage Facility discovered on October 23 was permanently sealed last month. The California Department of Conservation's Division of Oil, Gas & Geothermal Resources (the Division) confirmed the well permanently sealed on February 18, based on a five-step test developed in consultation with independent technical experts from the Lawrence Berkeley, Lawrence Livermore and Sandia National Laboratories.

Sealing this leaking well is only the first step among several necessary actions moving forward to protect safety, public health and air quality at and around Aliso Canyon and all other gas storage facilities in California. State agencies are implementing several actions to strengthen operational safety at Aliso Canyon and all gas storage facilities in the state, while protecting energy reliability within the Los Angeles Basin. These actions are explained below.

### **Comprehensive Safety Review Required for Aliso Canyon Facility**

Since October 25, two days after the gas leak was reported, no natural gas has been injected into the Aliso Canyon facility. Pursuant to Governor Brown's Emergency Proclamation issued on January 6, all new gas injections shall be prohibited until a "comprehensive review, utilizing independent experts, of the safety of the storage wells" is completed. In response to this directive, the Division has consulted with the independent technical experts from the Lawrence Berkeley, Lawrence Livermore, and Sandia National Laboratories to develop the requirements of this facility safety review. These independent technical experts reviewed and concurred with the testing requirements for the comprehensive safety review, and the Department of Conservation will continue to consult with these experts throughout its supervision of the implementation and completion of the safety review.

On March 4, the Division issued an Order to the Southern California Gas Company (SoCalGas) to complete a comprehensive safety review that requires all 114 active wells in the Aliso Canyon facility to either pass a thorough battery of tests in order to resume gas injection or be taken out of current operation and isolated from the underground gas reservoir. A detailed description of the requirements of this comprehensive safety review, as well as the Division's Order, are

attached to this letter for your information. The Division's Order also mandates that all wells in the Aliso Canyon facility injecting gas will be required to:

1. Install real-time pressure monitors that provide immediate notification to the facility operator when pressures deviate from normal in the well's interior tubing and its annular space between the interior tubing and exterior casing of the well;
2. Operate with lowest possible operating pressure on the tubing-casing annulus;
3. Inject and withdrawal gas only through interior metal tubing; under no circumstances will injection and withdrawal through tubing and casing be approved for any wells;
4. Complete testing of any downhole devices (e.g., valves, diverters) after the device has been installed and prior to the well resuming operation;
5. Complete testing of any downhole devices every six months;
6. Comply with the state's Underground Injection Control regulations, which are a broad set of regulations applying to all oil and gas wells in the state; and,
7. Complete an updated risk management plan that includes a facility-wide emergency response plan, a safety and spill contingency plan, and geologic hazards mitigation protocols that includes assessing seismic risks to the facility.

On March 25, the Division published a webpage that tracks the status of the comprehensive safety review on a well-by-well and makes available the results from each test applied to the wells. That webpage can be found here:

<http://www.conservation.ca.gov/dog/AlisoCanyon/Pages/Well-Detail.aspx>

### **Emergency Regulations on all Storage Facilities in the State**

The Governor's January 6 Emergency Proclamation ordered the Division to immediately issue emergency regulations to require all gas storage facilities in the state to undertake several actions to protect against uncontrolled gas leaks. The emergency regulations, which have been in effect since February 5, include the following requirements:

1. *Pressure Limits:* The emergency regulations require the establishment of minimum and maximum reservoir gas pressure limits at each gas storage facility in the state and prohibit operation of each storage facility beyond these established pressure limits. Gas pressure is a critical factor in the safe operation of underground gas storage facilities and these pressure requirements will limit risks to safety, public health and air quality by ensuring that underground reservoirs are operated at safe and appropriate pressure levels.
2. *Monitoring for Annular Gas:* The emergency regulations require storage facility operators to monitor each well's annular pressure—the gas pressure between the interior tubing

and external casing— and annular gas flow. Because fluctuations in annular pressure or annular gas flow can indicate a defect in the well casing or other subsurface well installation, this monitoring provides early detection and allows for appropriate response to potential risks within a well before such risks develop into a larger threat.

3. *Valve Testing:* The emergency regulations require function testing of all surface and subsurface safety valve systems, master valves, and pipeline isolation valves in each well. Mandatory testing of valves at regular intervals will help ensure that these important components of gas storage infrastructure are maintained in good working order and able to perform as expected.
4. *Inspections of Wellhead Assembly and Attached Pipelines for Leaks:* The emergency regulations require operators to inspect the wellhead assembly at the top of each well and attached pipelines to the well for leaks. Operators are required to monitor at least daily and use effective leak detection technology such as infrared imaging. This requirement will provide immediate discovery of leaks or other irregularities in or around the wellheads and pipelines.
5. *Risk Management Plans.* The emergency regulations require operators to complete updated, comprehensive Risk Management Plans for each storage facility in the state. These plans identify potential hazards and risks to each facility, identify what data need to be collected during the facility's operations, and outline the preventative actions and monitoring processes that are in place to address those hazards and risks. Operators are required to include in these Plans protocols for ongoing verification of mechanical integrity of the wells within the gas storage facility, corrosion monitoring and corrosion risk assessments, ongoing verification of reservoir integrity, and specific identification of potential threats and hazards, including geologic hazards, associated with the project. These Plans are subject to approval by the Division and must be routinely updated. This requirement will compel all operators of underground gas storage facilities to undertake a holistic, project-scale risk assessment of their operations. It is anticipated that the Risk Management Plans will facilitate more effective oversight of operations and implementation of targeted prevention measures, thereby reducing risks and decreasing the overall chances of unmitigated infrastructure-related accidents.

### **Expedited Permanent Rulemaking for all Storage Facilities in the State**

On February 17, the Department of Conservation initiated rulemaking activities to establish a comprehensive set of permanent regulations for all gas storage facilities in the state. To commence this permanent rule making process, a set of regulatory objectives and policy questions were publicly issued in order to solicit public comments by March 18. This document is attached. Important regulatory objectives of these permanent regulations, which will enhance the existing emergency regulations, include: 1) modernizing well construction standards for gas storage wells and; 2) determining what types of safety devices should be required to be installed within each well. This permanent rulemaking will also address requirements for leak detection technology, inspections, and emergency response plans. This rulemaking is expected to be

submitted to the Office of Administrative Law for final review by the end of this calendar year, during which time the emergency regulations outlined above remain in effect.

### **Continued Outdoor Air Quality Monitoring**

The Air Resources Board (ARB) and the South Coast Air Quality Management District (SCAQMD) continue to collect air quality monitoring in neighborhoods nearby to Aliso Canyon. Real time monitoring includes eight sites that measure methane and two sites that measure benzene. Results from these sites are posted hourly to both the ARB and SCAQMD websites. This air quality monitoring network was built out in late 2015 and has not changed since the leaking well was controlled on February 11. ARB is also continuing to organize downwind airplane flights, scheduled approximately bi-weekly, to characterize the total emissions from the storage facility and posting those results to ARB's site. On the day of well control (February 11) methane emissions were reduced by more than 95%, and have since reduced by another 80% as residual methane gas off gasses. ARB and SCAQMD also developed air quality criteria to determine when air quality in nearby neighborhoods has returned to what is considered normal. Air quality results collected from ARB and SCAQMD, and data collected from continued monitoring carried out by SoCalGas, are compared to these air quality criteria daily and results are posted on ARB's website ([http://www.arb.ca.gov/research/aliso\\_canyon/aqcriteria.htm](http://www.arb.ca.gov/research/aliso_canyon/aqcriteria.htm)).

### **Investigations of Aliso Canyon Incident**

Two major investigations of the gas leak by state agencies are currently underway. The Division's Investigation Team is conducting an in-depth independent investigation to determine the cause of the well leak. The Division began its investigation of the incident upon receipt of the initial notification by SoCalGas of the well leak. The Investigation Team is primarily made up of a select group of engineers within the Division's Monitoring and Compliance Unit and is to work independently from management and the district office where the incident occurred. The investigation review will include, but not be limited to, the well file and project data to identify contributing factors of the well leak. Independent third party analyses will inform the investigation and may conduct forensic assessments and other analyses as deemed necessary. Based upon analysis of the leaking well and thorough evaluation of well records and project data, the Investigation Team will make findings about the cause of the leak. The Investigation Team will complete and publicly issue a report detailing its findings regarding the cause of the leak.

In addition, the Safety and Enforcement Division of the California Public Utilities Commission (CPUC) also launched an investigation to determine the cause of the well leak. The Safety and Enforcement Division's investigation will include an assessment of SoCalGas' emergency response; design, construction, operations and maintenance activities of the failed well; SoCalGas' management of contractors involved in Aliso Canyon, including actions (preceding and following the discovery of the leaking well) that the company took to promote the safety, health, comfort, and convenience of its patrons, employees, and the public at the Aliso Canyon storage field.

## **Aliso Canyon Climate Impacts Mitigation Plan**

On March 14, ARB posted a draft of its Aliso Canyon Climate Impacts Mitigation Program on its website ([http://www.arb.ca.gov/research/aliso\\_canyon\\_natural\\_gas\\_leak.htm](http://www.arb.ca.gov/research/aliso_canyon_natural_gas_leak.htm)). The deadline for providing comments on the draft was March 24. ARB will review these comments and prepare a final version of its mitigation program on or before March 31. Among the proposed program's objectives are 1) generating significant environmental and economic co-benefits, including benefits to public health and reduced reliance on fossil fuels, and 2) conferring co-benefits upon disadvantaged communities and communities directly impacted by the leak, and incorporating avenues for engagement by these communities in the program development and implementation process. The draft describes a multi-pronged approach toward mitigating the climate impacts of the leak, emphasizing projects designed to reduce methane emissions from the agriculture (dairy) and waste (landfill and wastewater) sectors, as well as emission-reduction projects that will enhance the sustainability of the State's energy infrastructure or identify and abate methane "hot spots" not presently addressed under federal, State, or local law.

## **Interagency Energy Reliability Efforts**

In response to Governor Brown's Emergency Proclamation, California Energy Commission (CEC) Chair Robert Weisenmiller, CPUC President Michael Picker, and President Stephen Berberich of the California Independent System Operator issued a letter to the Governor on February 1 committing to developing an Action Plan that identifies reliability risks and mitigation measures. The Los Angeles Department of Water and Power has joined the three agencies to develop a unified plan. The plan, which is primarily focused on maintaining summer electricity reliability in the coming months, will be released at the beginning of April to be presented at a public workshop near Porter Ranch (Warner Center Marriot in Woodland Hills, California) on April 8th. The plan will be based on technical analysis and modeling of gas flows in SoCalGas pipelines and will highlight measures that can help reduce potential risks to electricity system interruptions. The agencies are also planning to conduct similar analyses for gas and electricity reliability for the 2016/17 winter and will hold a workshop on that plan in the July/August timeframe.

In addition, the Safety and Enforcement Division of the CPUC directed SoCalGas to identify maintenance projects SoCalGas is planning to defer in order to ensure reliability. SoCalGas identified 22 projects, including pressure testing and replacement on transmission pipelines that are part of the SoCalGas' Pipeline Safety Enhancement Plan and its Transmission Integrity Management Program. As a next step, the Executive Director of the CPUC will issue a letter directing SoCalGas to formally file the list of projects and corresponding safety risk mitigation plans in one of the currently open proceedings. SoCalGas will also be directed to hold a clarification session, in-person or via webinar, to answer questions about the deferred projects from interested parties.

## **Customer Engagement and Demand Reduction Efforts**

The CPUC has taken and will continue to explore a variety of steps to reduce end-use gas demand and peak electric demand (which relies largely on gas-fired generation) in areas impacted by SoCalGas' Aliso Canyon Storage Facility leak.

### ***Education and Outreach Funding***

On March 16, the CPUC issued a ruling seeking comments on ordering SoCalGas to provide up to \$15 million of additional funding for education and outreach activities for the purpose of reducing the risk of natural gas and electricity curtailments in the Los Angeles basin this summer. This order focuses on funding FlexAlert to help reduce electric demand on critical days and a similar campaign focused on natural gas savings. After comments are received a Proposed Decision will be prepared for a targeted full CPUC vote in early May.

### ***Energy Savings Investments in Low-Income Buildings***

On March 14, CPUC issued a ruling directing SoCalGas and Southern California Edison (SCE) to take immediate steps to intensify their Energy Savings Assistance Program (ESAP) efforts in low-income eligible buildings in the Southern California areas impacted by SoCalGas' Aliso Canyon Storage Facility leak. ESAP is a low-income energy efficiency program as authorized by Public Utilities Code §2790(a). This ruling seeks comment on whether to suspend certain ESAP administrative rules such as the requirement that a household be eligible for a minimum of three approved measures before a household can be treated, and the rule that prohibits new measures from being installed in a household treated by ESAP within the last 10 years (the "go back" rule). The ruling also notes that both SoCalGas and SCE have large underspent from the ESAP program and thus have funds available for immediate deployment. The available funding for SoCalGas is \$158.6 million and for SCE it is \$89.7 million. Comments are due 10 days after ruling issuance a CPUC Decision is anticipated in April. The Assigned Commissioner's Ruling is available at: <http://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=159361680>.

### ***Mainstream Energy Efficiency Projects***

CPUC staff is coordinating with SCE and SoCalGas energy efficiency staffs to identify large projects that could be expedited to come on line to reduce peak electric demand for SCE by this summer and end use gas demand for SoCalGas by next winter.

### ***Demand Response***

The CPUC is preparing a ruling seeking comments on changes to demand response programs administered by SCE. The most likely changes will focus on increasing participation in AC cycling programs and industrial/agricultural curtailment; offering customers incentives for the purchase and/or installation of programmable thermostats combined with enrollment in an effective tariff or load control program; and, conducting a custom Demand Response Auction targeted at the areas most impacted, or adjusting the focus of the current 2017 Demand Response Auction. The Commission aims to have these program changes in place by June.

### ***Solar Water Heating***

The CPUC is working with solar thermal (solar water heating) rebate program administrators for rule changes to the solar thermal program that will focus immediate efforts on installations in the Los Angeles Basin that will result in fuel switch/gas savings. The CPUC's Energy Division has already approved additional funding of the low-income program incentive budget, which was exhausted, with funds from the general market program. Likely additional changes include: increasing early-stage incentive rates and moving additional funding from late-stage incentive steps to early-stage incentive steps. The CPUC aims to have these program changes in place by June.

### **Report on the Viability of Gas Storage Facilities**

The Governor's January 6 Emergency Proclamation ordered ARB, the CEC, the CPUC, and the Division to jointly assess the long-term viability of natural gas storage facilities in California. The assessment will address operational safety and potential health risks, methane emissions, supply reliability for gas and electricity demand in California, and the role of storage facilities and natural gas infrastructure in the State's long-term greenhouse gas reduction strategies. This report will be submitted to the Governor within six months after the completion of the investigation of the cause of the well leak in the Aliso Canyon facility.

### **Regulations for Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities**

ARB is moving forward on its regulatory process to reduce greenhouse gas emission from the oil and gas sector, which includes natural gas storage. A workshop was held on February 4 to discuss revisions to draft regulatory language including new requirements for natural gas storage facilities. ARB staff plans to bring this item to ARB at its July meeting with a subsequent board hearing by early 2017. Overall this regulation is anticipated to achieve over 1 million metric tons of CO<sub>2</sub>e reductions (using the 20 year GWP).

1 Department of Conservation, Division of Oil, Gas, and Geothermal Resources  
2 Legal Office for the STATE OIL AND GAS SUPERVISOR  
3 801 K Street, MS 24-03  
4 Sacramento, California 95814-3530  
5 Telephone (916) 323-6733  
6 Facsimile (916) 445-9916

7 **STATE OF CALIFORNIA**  
8 **NATURAL RESOURCES AGENCY**  
9 **DEPARTMENT OF CONSERVATION**  
10 **DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES**

11 **ORDER TO**  
12 **TAKE SPECIFIED ACTIONS RE:**  
13 **ALISO CANYON GAS STORAGE FACILITY**  
14 [Pub. Resources Code, §§ 3013, 3106, 3219, 3224, 3226, 3300, and 3403.5.]  
15 [Cal. Code Regs., tit. 14, §§ 1724, 1724.6, 1724.7, subd. (e), and 1724.10]  
16

17 **Order No. 1109**

18 **March 4, 2016**

19 **Operator: Southern California Gas Company (S4700)**

20 **Aliso Canyon Field**

21 **Los Angeles County**

22  
23 **BY**

24 **Kenneth A. Harris, Jr.**

25 **STATE OIL AND GAS SUPERVISOR**  
26

1 I. Introduction

2 Under the authority of the Public Resources Code (PRC), the State Oil and Gas  
3 Supervisor (Supervisor) may order tests and remedial work concerning oil field operations  
4 which, in his judgment, are necessary to prevent damage to life, health, property, and natural  
5 resources. (See Pub. Resources Code, §§ 3106 and 3224.) Further, the Supervisor is to ensure  
6 that “no damage occurs to the environment by reason of injection and withdrawal of gas” in  
7 underground gas storage facilities. (Pub. Resources Code, § 3403.5.) To that end, the  
8 Supervisor may request from the operator any data that are pertinent and necessary for the  
9 Division of Oil, Gas, and Geothermal Resources (Division), and its District Deputy, to properly  
10 evaluate underground injection projects. (See, e.g., Cal. Code Regs., tit. 14, §§ 1724.6 and  
11 1724.7, subd. (e).) The operator must maintain those data and make them available to Division  
12 personnel to show, among other things, that no damage to life, health, property, or natural  
13 resources is occurring by reason of the project. (Cal. Code Regs., tit. 14, § 1724.10, subd. (h).)

14 At all times relevant to this Order, **Southern California Gas Company**<sup>1</sup> (SoCal Gas or  
15 Operator) is the “operator,” as defined in PRC section 3009, of certain “wells,” as defined in  
16 PRC section 3008, subdivision (a), and is conducting “operations” as defined in California Code  
17 of Regulations, title 14, (Regulations) section 1720, subdivision (f), at a gas storage project (see  
18 Regulations section 1724.9) in the Aliso Canyon Field in Los Angeles County (Field).

19 Based on data in Division files, discussions with Operator, and Division site visits, the  
20 Supervisor determined that there was an uncontrolled flow of fluids (see Regulations  
21 section 1722.5) from well “Standard Sesnon” 25 (API no. 037-00776) and a waste of gas in the  
22 Field, which Operator has addressed. On February 18, 2016, the Division confirmed that the  
23 lead was under control. Operator’s response to the uncontrolled flow of fluids from well  
24 “Standard Sesnon” 25 included halting all injection into the gas storage injection project in the  
25 Field. On December 10, 2015, the Supervisor issued Order 1106, ordering Operator to continue  
26 to not inject gas into the gas storage project until injection is authorized by the Division.

27 <sup>1</sup> The Operator Code for Southern California Gas Company is S4700.

1 (Supervisor's Emergency Order 1106, p. 9.) Order 1106 is a final order of the Supervisor and  
2 currently remains in effect.

3 The uncontrolled flow of fluids from well "Standard Sesnon" 25 has brought into  
4 question the integrity and safety of all of the wells in the gas storage injection project in the  
5 Field. The Storage Integrity Management Plan submitted to the Public Utilities Commission in  
6 connection with 2016 General Rate Case Proceeding A.14-11-XXX also raises concerns about  
7 the integrity and safety of the wells in the gas storage injection project. In order to protect life,  
8 health, property, and natural resources, it is necessary to demonstrate the integrity and safety of  
9 each of the wells in the gas storage project in the Field. **Therefore, in accordance with PRC**  
10 **sections 3013, 3106, 3219, 3224, 3300, and 3403.5, and Regulations sections 1724, 1724.6,**  
11 **1724.7, subdivision (e), and 1724.10, subdivisions (a), (h), and (k), the Supervisor hereby**  
12 **orders Operator to take the actions identified below.** This order does not supplant previous  
13 orders of the Supervisor, and the actions ordered herein shall be in addition to the actions that  
14 the Supervisor has previously ordered Operator to take.

## 15 16 **II. Definitions**

17 The following definitions apply to the terms used in this Order:

18 **PRC section 3008, subdivision (a),** defines "Well" to include "any well drilled for the  
19 purpose of injecting fluids or gas for stimulating oil or gas recovery, repressuring or pressure  
20 maintenance of oil or gas reservoirs, or disposing of waste fluids from an oil or gas filed; [and]  
21 any well used to inject or withdraw gas from an underground storage facility[.]"

22 **PRC section 3009** defines "Operator" to mean "a person who, by virtue of ownership,  
23 or under the authority of a lease or any other agreement, has the right to drill, operate, maintain,  
24 or control a well or production facility."

25 **Regulations section 1720, subdivision (f),** defines "Operations" to mean "any one or all  
26 of the activities of an operator covered by Division 3 of the Public Resources Code [i.e., the oil  
27 and gas law, commencing with PRC section 3000]."

1  
2 **III. Statutory and Related Authority**

3 **PRC section 3013** states that the oil and gas law (Division 3 of the PRC, commencing  
4 with section 3000) “shall be liberally construed to meet its purposes” and grants the Supervisor  
5 “all powers” that may be necessary to carry out those purposes.

6 **PRC section 3106, subdivision (a)**, authorizes the Supervisor to “supervise the drilling,  
7 operation, maintenance, and abandonment of wells and the operation, maintenance, and removal  
8 or abandonment of tanks and facilities attendant to oil and gas production ... so as to prevent, as  
9 far as possible, damage to life, health, property, and natural resources ... [and] loss of oil, gas, or  
10 reservoir energy[.]”

11 **PRC section 3219** requires the operator of a well wherein high pressure gas is known to  
12 exist to equip the well with casings of sufficient strength, and with such other safety devices as  
13 may be necessary, in accordance with methods approved by the Supervisor, and to use every  
14 effort and endeavor effectually to prevent blowouts, explosions, and fires.

15 **PRC section 3224** requires the Supervisor to “order such tests or remedial work as in his  
16 judgment are necessary to prevent damage to life, health, property, and natural resources[.]”

17 **PRC section 3300** states that “[t]he blowing, release, or escape of gas into the air shall be  
18 prima facie evidence of unreasonable waste.”

19 **PRC section 3403.5** states that “[t]he supervisor is required to maintain surveillance over  
20 [underground gas storage] facilities to insure that the original reserves are not lost, that drilling  
21 of new wells is conducted properly, and that no damage occurs to the environment by reason of  
22 injection and withdrawal of gas.”

23 **Regulations section 1724** specifies the types of well records that an operator must  
24 maintain and includes “[s]uch other information as the Supervisor may require for the  
25 performance of his or her statutory duties.”  
26  
27



1 **3300, and 3403.5, and Regulations sections 1724, 1724.6, 1724.7, subdivision (e), and**  
2 **1724.10 that Operator take all of the following actions:**

3 (1) For each of the wells in the gas storage injection project in the Field that have not  
4 been properly plugged and abandoned in accordance with Public Resources Code section 3208,  
5 follow the comprehensive safety review detailed in Attachment 1 of this order (Safety Review).  
6 Division staff shall be provided an opportunity to witness testing as specified in the Safety  
7 Review. Documentation of testing under the Safety Review shall be provided to the Supervisor  
8 in an electronic format within the timeframe specified in the Safety Review Testing Regime.  
9 The Safety Review shall be undertaken with all reasonable haste and with the understanding that  
10 until all of the actions required under the Safety Review are complete, the Supervisor will not  
11 lift the prohibition against injection imposed under Order 1106.

12 (2) Provide the Division with regular reports on progress towards completion of the  
13 Safety Review. Progress reports shall be provided to the Division every first and third Friday of  
14 the month until the Supervisor has confirmed in writing that the Safety Review is complete.

15 (3) Properly plug and abandon in accordance with Public Resources Code section 3208  
16 all wells in the gas storage injection project in the Field that have not been tested and remediated  
17 to the Division's satisfaction within one year after completion Step 6b of the Safety Review.

18 (4) In order to facilitate Division staff witnessing to ensure the effectiveness of testing  
19 under the Safety Review, provide an on-site trailer for use as a base of operation for Division  
20 staff while the Safety Review is being carried out.

21 (5) Equip all wells to be employed in the gas storage injection project with tubing and  
22 packer completions that isolate the tubing-casing annulus. If and/or when injection in the gas  
23 storage injection project in the Field resumes, all injection and production shall be through  
24 tubing only.

25 (6) Equip all wells to be employed in the gas storage injection project with real-time  
26 pressure monitors that provide immediate notification to the operator when pressures in the  
27 well's production tubing or tubing-casing annular space deviate from normal.

1 (7) If and/or when injection in the gas storage injection project in the Field resumes, all  
2 wells shall be operated with lowest possible operating pressure on the tubing-casing annulus.

3 (8) For all wells to be employed in the gas storage injection project, all downhole  
4 devices, including but not limited to any installed subsurface safety valve systems, shall be  
5 function tested prior to initial injection or withdrawal and every six months after that.

6 (9) Comply with all requirements of sections 1724.6 through 1724.10.

7 (10) Ensure that the spill contingency plan filed under section 1722, subdivision (b), is  
8 complete and up-to-date.

9 (11) Ensure that the Risk Management Plan filed under section 1724.9, subdivision (g),  
10 includes an effective facility-wide emergency response plan and effective geologic and  
11 geotechnical hazard mitigation protocols.

#### 12 13 **V. Operator's Appeal Rights**

14 Operator may appeal this Order to the Director of the Department of Conservation by  
15 filing a written notice of appeal with the Supervisor as described in PRC section 3350. The  
16 Legal Office for the State Oil and Gas Supervisor (801 K Street, MS 24-03, Sacramento,  
17 California 95814-3530; Facsimile (916) 445-9916) accepts appeal notices on the Supervisor's  
18 behalf. Failing to file a notice of appeal within the timeframe prescribed in PRC section 3350,  
19 subdivision (a), waives Operator's right to challenge this Order and makes the Order final. If  
20 Operator timely files a notice of appeal, Operator will be informed of the appeal hearing date,  
21 time, and place. After the close of the hearing, Operator will receive a written decision that  
22 affirms, sets aside, or modifies the Order.

#### 23 24 **VI. Court Order and Other Potential Actions to Enforce This Order**

25 Failing to comply with Sections IV (Actions Required of Operator) of this Order will  
26 subject Operator to potential significant further enforcement action. **Such enforcement action**  
27 **can include a civil penalty of up to \$25,000 per violation (PRC section 3236.5) and/or**

1 criminal prosecution, as a misdemeanor, punishable by a fine up to \$1,000, imprisonment  
2 up to six months, or both, for each offense (PRC section 3236). Similarly, the Supervisor  
3 could deny approval of proposed well operations until compliance is achieved and/or order the  
4 plugging and abandonment of wells. (Pub. Resources Code, §§ 3203, subd. (c), and 3237, subd.  
5 (a)(3)(C).)

6 DATED: March 4, 2016

7  
8 Kenneth A. Harris, Jr.  
9 State Oil and Gas Supervisor

10   
11  
12

13 Certified mail receipt number: 70121010000092699623

**ATTACHMENT 1  
TO DOGGR ORDER 1109**

**SAFETY REVIEW TESTING REGIME  
FOR THE ALISO CANYON NATURAL GAS STORAGE FACILITY**

This document identifies the requirements of this comprehensive safety review that shall be completed by the Southern California Gas Company (Operator) and verified by the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division). The Operator shall use accepted industry practices and procedures.

The Division has consulted with independent technical experts from the Lawrence Berkeley, Lawrence Livermore, and Sandia National Laboratories ("National Laboratories") to develop the requirements of this facility safety review. The National Laboratories experts independently reviewed and concurred with the testing requirements for the safety review detailed below.

This comprehensive safety review requires that each of the active injection wells in the Aliso Canyon Storage facility either pass a thorough battery of tests in order to resume gas injection or be taken out of operation and isolated from the underground gas storage reservoir. Several steps, detailed below, are required in this safety review. Documentation of all testing required under this comprehensive safety review shall be provided electronically to the Division within 72 hours of completion of a test in digital (i.e. LAS) and printed (i.e. pdf) form. All pressure tests required under this comprehensive safety review shall be witnessed by Division staff. A well that is properly plugged and abandoned in accordance with Public Resources Code section 3208 is not subject to testing under this comprehensive safety review. A well that does not pass all tests must be repaired, retested, and pass all tests, or be plug and abandoned.

**REQUIRED TESTS FOR EACH WELL IN THE FACILITY**

- Step 1:** The Operator shall perform an initial casing assessment on the well consisting of temperature and noise logs.
- a. **Temperature Log:**  
A temperature survey shall be run from the surface to the packer to measure the temperature within the wellbore. A temperature survey that demonstrates no unexplained anomalous temperature changes in the well is one indication of casing integrity.
  - b. **Noise Log:**  
An acoustic sensor survey capable of detecting the sound of fluid flow will be conducted the length of the well above the packer to the surface. The survey will include stops at least every 250 feet and at the midpoint of any anomaly detected by the temperature survey. The absence of anomalous sound above the packer is an indication of well integrity

- Step 2:** The results of the Temperature Logs and Noise Logs will be independently reviewed by Division engineers. Any unexplained abnormal findings in this set of tests shall be addressed by the Operator in one of the following ways:
- a. Conduct further investigation and demonstrate to the Division's satisfaction that the abnormal finding is not an indicator of a lack mechanical integrity;
  - b. Remediate the well to the Division's satisfaction; or
  - c. With Division review and approval, remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

Necessary actions to remediate any abnormalities revealed by these tests will be reviewed by Division engineers. Once repairs or mitigations are completed, the Temperature Log and Noise Log must then be repeated on the well and reviewed by Division engineers to ensure that there are no additional abnormal test results and to confirm the issue was repaired.

- Step 3:** After these tests are completed on the well, and all required action has been completed, the operator shall either:
- a. Conduct the additional tests and evaluations on the well, outlined in Steps 4a through 7a below, in order to gain approval for injecting gas through that well; or
  - b. Remove the well from operation and isolate the well from the underground gas storage reservoir in accordance with Steps 4b through 7b below.

#### **REQUIRED TESTS IF A WELL IS INTENDED TO RESUME OPERATIONS**

If Temperature and Noise Logs have been completed on a well and they indicate well integrity, and the Operator designates the well to return to injection operations, then the Operator shall perform the additional testing outlined in Steps 4a through 7a. The results of these tests will be independently reviewed by Division engineers and posted publicly. Each of the following tests requires that the production tubing be removed from the well.

**Step 4a:** The Operator shall conduct a **Casing Inspection log**.

The Operator shall conduct a Casing Inspection log of the well that measures the thickness of the production casing, from the surface to the bottom of the gas storage reservoir cap rock. If the inspection reveals a reduction in wall thickness, the current minimum strength of the casing will be calculated. If the current minimum strength of the casing has diminished to the point that it cannot withstand authorized operating pressures for the well plus a built-in additional safety factor of pressure, the well has failed this test. *A passing test for a casing inspection log would show no thinning of the casing that diminishes the casing's ability to contain at least 115% of the well's maximum allowable operating pressure as authorized in the current Project Approval Letter.*

**Step 5a:** The Operator shall conduct a **Cement Bond Log** for the well.

The Operator shall conduct a Cement Bond Log (CBL) that measures the bonding between cement and the production casing of the well, and also the bonding between the annular cement and the formation. Cement should be solidly bonded to both the well's production casing and the geologic formation to ensure a seal that prevents fluids from migrating up or down the outside of the well. *A passing test for a cement bond log shows definitive bond, as demonstrated by sonic waveform,*

*between cement and casing and between cement and the gas storage formation and/or cap rock for at least 100 feet above the top of the gas storage reservoir.*

**Step 6a:** The Operator shall conduct a **Multi-Arm Caliper Inspection** of the well.

The operator shall conduct an inspection that measures any internal degradation or significant changes to the well's geometry from the surface to the top of the gas storage reservoir, using a minimum 32-arm caliper tool. If the inspection reveals a thinning or deformity of the casing, the current strength of the casing will be calculated. If the current strength of the casing has diminished, such that it cannot withstand authorized operating pressures plus a built-in safety factor of additional pressure, the well fails this inspection. *A passing test for a Multi-Arm Caliper Inspection would show no deformation or thinning of the casing that diminishes the casing from being able to properly contain at least 115% of each well's maximum operating pressure.*

**Step 7a:** The Operator will conduct a **Pressure Test** of the production casing and of the well once the production tubing has been reinstalled. The Operator may conduct the casing pressure test prior to reinstalling the production tubing. Using a digital recorder, the operator will conduct a liquid-filled positive pressure test within the production tubing of the well, and in the annular space between the production tubing and the casing, to determine the well's ability to withstand normal operating pressures. The production tubing will be isolated and then pressure tested. The annular space between tubing and casing will be pressure tested. This testing also evaluates the integrity of any packers, which seal the annular space between the tubing and casing. The pressure test will be one hour and begin at a pressure of 115% of the maximum operating pressure or the minimum yield strength of the casing and tubing, whichever is less. *A passing pressure test is a pressure loss not exceeding 10% for any 30 minute period during the hour long test.*

After conducting the above tests, the Operator will conduct any indicated remediation so that the well can pass these tests. All remediation will be subject to the review of Division engineers. The well would then be required to undergo the tests once again to demonstrate well integrity.

If the well passes the Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper inspection and the Pressure Test to the Division's satisfaction, then the Division may clear the well for use for gas injections and withdrawal, once the Division has authorized resumption of injection into the gas storage reservoir. As noted below, wells approved for operation will only be permitted to inject or withdraw gas through the production tubing.

**REQUIRED ACTIONS IF THE WELL IS TO BE TAKEN OUT OF OPERATION AND ISOLATED FROM THE GAS STORAGE RESERVOIR:**

If the operator elects to take a well out of service, then the following steps shall be taken to isolate the well from the gas storage reservoir:

**Step 4b:** The Operator shall confirm the presence of cement outside the well's external casing in the section of the well that prevents the movement of gas from the underground gas storage reservoir to shallower geologic zones above the gas storage reservoir. Existing cement bond logs and well construction

records may be used to make this confirmation. This confirmation requires concurrence from Division engineers.

**Step 5b:** The Operator shall install a mechanical seal or “packer” within the well’s production casing and install a mechanical plug within the well’s production tubing, if applicable. These seals shall be set in place near the bottom of the well, within the portion of the well surrounded by cement. This kind of seal is an industry standard practice for isolating a well from reservoir gases or fluids and will further protect the casing from internal gas pressure.

**Step 6b:** The Operator shall fill the well with fluid to the well’s surface in order to create appropriate downward hydrostatic pressure in the well that further contributes to the integrity of the well seal.

These measures will isolate a well from the underground gas reservoir, as confirmed by National Laboratory experts. Each of the above actions is subject to review and approval by Division Engineers.

**Step 7b:** Once the Operator has completed steps 4b, 5b, and 6b, and the seal is in place at the bottom of the well and the well is filled with fluid above the seal, the operator shall:

- a. Conduct daily gas monitoring at the surface of the non-operational well, including monitoring the area around the well perimeter and in the annular space between the plugged casing string and the outmost casing;
- b. Conduct noise log, temperature log and positive pressure test every six months;
- c. Conduct weekly monitoring of fluid levels in the well or, install and operate real-time pressure monitors that provide immediate notification to the operator when pressures deviate from normal in the well’s interior tubing and its annular space.

The above monitoring shall be reported to Division engineers and maintained as a part of the well file. Division engineers will review all submitted information for evaluation on a regular basis to ensure that the well taken out of service has maintained safety, and the operator shall take all necessary steps maintain the safety of the well.

Any well taken out of operation cannot be approved to resume operations and gas injection until the successful completion of the battery of tests outlined above in Steps 4a through 7a (Casing Wall Thickness Inspection, the Cement Bond Log, the Multi-Arm Caliper Extension and the Pressure Test) is completed. Those tests must be successfully completed within one year of completing step 6b. If a well cannot successfully complete all necessary steps required in this safety review after one year of completing step 6b, then the well shall be properly plugged and abandoned in accordance with Public Resources Code section 3208.

#### **REQUIREMENTS FOR WELLS RESUMING OPERATIONS IN ALISO CANYON**

The Division’s authorization to resume injection in the Aliso Canyon Storage Facility will be contingent on the successful completion of this comprehensive safety review. The State Oil and Gas Supervisor must confirm in writing that all wells in the facility have either completed and passed the full battery of tests required in the safety review, been taken out of service and isolated from the underground gas storage reservoir, or been properly plugged and abandoned in accordance with Public Resources Code Section 3208.

## PROOF OF SERVICE BY CERTIFIED U.S. MAIL

1) I am at least 18 years of age, not a party to this action, and I am a resident of or employed in the county where the mailing took place.

2) My business address is: Department of Conservation, Division of Oil, Gas, and Geothermal Resources, 801 K St., MS-1805, Sacramento, California 95814-3530.

3) I served a copy of the following documents:

**ORDER TO TAKE SPECIFIED ACTIONS RE: ALISO CANYON GAS STORAGE FACILITY NO. 1109**

by enclosing them in an envelope and placing the envelope for collection and mailing by certified U.S. mail on the date and at the place shown in item 4 following our ordinary business practices. I am readily familiar with this business's practice for collecting and processing correspondence for mailing. On the same day that correspondence is placed for collection and mailing, it is deposited in the ordinary course of business with the United States Postal Service in a sealed envelope with postage fully prepaid.

4) The envelope was addressed and mailed as follows:

a. Name of person served:

Amy Kitson

b. Address:

Southern California Gas Company  
12801 Tampa Avenue, SC9382  
Northridge, CA 91326

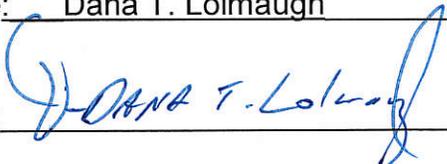
c. Date mailed: March 4, 2016

d. Place of mailing: Sacramento, California

5) I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: 3/4/16

Name: Dana T. Lolmaugh

Signature: 

**SENDER: COMPLETE THIS SECTION**

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. **Amy Kitson**  
 Southern California Gas Company  
 12801 Tampa Avenue, SC9382  
 Northridge, CA 91326

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature  
**X**  Agent  
 Addressee

B. Received by (*Printed Name*) C. Date of Delivery

D. Is delivery address different from item 1?  Yes  
 If YES, enter delivery address below:  No

3. Service Type

Certified Mail  Express Mail  
 Registered  Return Receipt for Merchandise  
 Insured Mail  C.O.D.

4. Restricted Delivery? (*Extra Fee*)  Yes

2. Article Number  
 (Transfer from service label)

7012 1010 0000 9269 9623

PS Form 3811, February 2004

Domestic Return Receipt

102595-02-M-1540

PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

**CERTIFIED MAIL™**



7012 1010 0000 9269 9623  
 7012 1010 0000 9269 9623

**U.S. Postal Service™**  
**CERTIFIED MAIL™ RECEIPT**  
 (Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)

**OFFICIAL USE**

Postage	\$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	\$

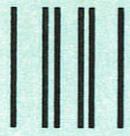
Postmark Here

Sent To  
 Amy Kitson, SoCal Gas Co.  
 Street, Apt. No. or PO Box No. 12801 Tampa Avenue, SC 9382  
 City, State, ZIP+4 Northridge CA 91326

PS Form 3800, August 2006

See Reverse for Instructions

UNITED STATES POSTAL SERVICE



First-Class Mail  
 Postage & Fees Paid  
 USPS  
 Permit No. G-10

• Sender: Please print your name, address, and ZIP+4 in this box •

Dana Lolmaugh Bond Coordinator  
 Department of Conservation  
 Division of Oil, Gas, and Geothermal Resources  
 801 K Street, MS 18-05  
 Sacramento, CA 95814-3530

NATURAL RESOURCES AGENCY  
DEPARTMENT OF CONSERVATION  
DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES  
801 K STREET, MS 18-05  
SACRAMENTO, CA 95814-3530



Amy Kitson  
Southern California Gas Company  
12801 Tampa Avenue, SC9382  
Northridge, CA 91326

# Pre-Rulemaking Discussion

## Gas Storage Operations

The Department of Conservation, Division of Oil, Gas, and Geothermal Resources (Division) is preparing to undertake rulemaking to make significant revisions to the regulations governing the Division's Gas Storage Program. This rulemaking effort will build upon the requirements adopted by emergency rulemaking to update regulations governing the Gas Storage Program to address concerns identified by the Division and other key stakeholders. The purpose of this document is to outline the Division's immediate regulatory goals, and to solicit specific input on how best to accomplish these goals. Although the Division is looking for any and all input on these questions, suggestions about a specific regulatory approach are most useful if they are supported by discussion of the costs and benefits associated with the approach. **The Division will be accepting comments until March 18 at 5pm. Please see the bottom of this document for information about submitting comments.**

### Regulatory Goals and Questions

#### **Regulatory Goal # 1: *Clarify standards for gas storage project data requirements***

- What type of unique geology and reservoir data, outside of what the Division requires for all injection projects, should the Division receive to perform a thorough review?
- Should there the Area of Review analysis for a gas storage project address any particular concerns other than ensuring the injected gas is confined to the intended zone?
- Currently the Division receives monthly reports regarding the injection and withdrawal of natural gas, including days in operations during the month, volumes of gas injected or withdrawn, and casing and tubing pressures. Does any other data need to be collected regarding the injection or withdraw of stored natural gas?

#### **Regulatory Goal # 2: *Clarify well construction standards for gas storage wells***

- What specific casing cementing standards should gas storage wells be required to meet? Cement from casing shoe to surface? All casing strings?
- Should all gas storage wells be required to inject and withdrawal through tubing and packer?
- Should all gas storage wells be required to have safety shut-in valves? Should these be surface safety valves or subsurface safety valves, or both? Are there other types of failsafe devices that should be considered as an alternative?

#### **Regulatory Goal # 3: *Clarify testing and monitoring standards and other risk mitigation protocols to ensure safe operations***

- What type of inspection and leak detection protocol should be required for gas storage operations?
- What type of mechanical integrity testing should be required?
- What type and frequency of corrosion testing should be required?
- What type and frequency of master valve testing should be required?

- Should a Supervisory Control and Data Acquisition (SCADA) be required?
- What type of cementing evaluation standards should be required?
- What types of risk mitigation protocols should be expressly required in the risk management plan for a gas storage project?
- How often should risk management plans be reviewed and re-evaluated? When operation conditions change?

**Regulatory Goal # 5: Clarify emergency response plans standards to ensure rapid and safe responses when emergency situations arise**

- What type of emergency contingency standards must be included in the plan?
- What type of emergency equipment and deployment standards must be included in the plan?
- What type of notification standards must be included in the plan?
- How will the operator be folded into an incident command system controlled by a regulatory agency?
- How often should the plans be reviewed and re-evaluated? When operation conditions change?

**Comment Submission:**

Written submissions may be provided to the Division by:

Mail:

Department of Conservation  
801 K Street, MS 24-02  
Sacramento, CA 95814  
ATTN: Gas Storage Regulation

Or Email:

[DOGGR\\_GasStorageRegs@conservation.ca.gov](mailto:DOGGR_GasStorageRegs@conservation.ca.gov)

The Division strongly encourages comments to be submitted by March 18, 2016. Comments submitted at a later date for developing draft regulations will be considered as time permits. When submitting comments via email, be sure to use **[DOGGR\\_GasStorageRegs@conservation.ca.gov](mailto:DOGGR_GasStorageRegs@conservation.ca.gov)**.