



Air Resources Board



Matthew Rodriguez
Secretary for
Environmental Protection

Mary D. Nichols, Chair
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Edmund G. Brown Jr.
Governor

December 10, 2015

Mr. Dennis Arriola
President and CEO
Southern California Gas Company
P.O. Box 3150
San Dimas, California 91773

Dear Mr. Arriola:

In light of the ongoing leak of natural gas from the Southern California Gas Company's (SoCalGas) Aliso Canyon facilities, I am writing to document the process that our staffs have agreed upon to coordinate activities and data sharing to measure the leak rate and estimate total emissions over the duration of the leak. I am also including a set of detailed questions that the State is asking SoCalGas to answer to support ongoing efforts to quantify emissions from the Aliso Canyon leak.

The State, working with the research community, is making ambient measurements of methane in the Los Angeles basin near the ground at the well site, from towers, airplanes, and satellites to develop an estimate of the methane leaking in Aliso Canyon. The measurements enable quantification of instantaneous flux at specific times and will also enable estimating total emissions based on continuous measurements and atmospheric modeling after the leak is plugged.

Since SoCalGas now expects that the leak could continue for three to four months as a secondary well is drilled to plug the leak, ongoing measurements will be important to monitor how the leak rate changes over time. SoCalGas has agreed to pay for flights with a small plane downwind of the leaking well carrying research instruments that measure methane. Researchers operating those instruments will provide simultaneously to the California Air Resources Board (ARB), California Energy Commission (CEC), and SoCalGas the results of those measurements. I am requesting written confirmation that SoCalGas will pay for the ongoing flights and measurements until the leak is stopped and confirmation of the process for delivering the data to ARB and CEC. I propose a follow-up call where we can discuss the flight frequency and budget.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.

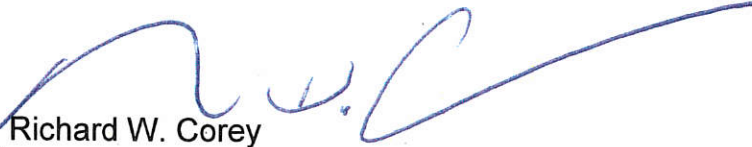
California Environmental Protection Agency

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To better assess these instantaneous flux estimates and to support further analyses of the total emissions from the leak over its duration, additional information regarding the leak is needed. To that end, I have attached a list of questions. Answers to these questions will support the State's ongoing efforts to quantify emissions from the Aliso Canyon leak.

SoCalGas's prompt response to these questions will greatly assist the State's efforts. I have asked Dr. Jorn D. Herner, Branch Chief of ARB's Research Division, to coordinate with SoCalGas staff on any clarification of the questions and data needs. Dr. Herner can be reached at (916) 324-9299. Thank you for your cooperation.

Sincerely,



Richard W. Corey
Executive Officer

Attachment

cc: See next page.

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cc: Rob Oglesby, Executive Director
California Energy Commission
1516 9th Street
Sacramento, California 95916

Jill Tracy, Director of Environmental Services
Southern California Gas Company
P.O. Box 3150
San Dimas, California 91773

Dr. Jorn D. Herner
Air Resources Board

Attachment

Information Needed from Southern California Gas Company to Assist with Calculating Total Methane Emissions from the Aliso Canyon Gas Leak

The information needed from Southern California Gas Company to assist the Air Resources Board with estimating total emissions is centered around the release duration and variability of emission rates during the release.

Specific questions are identified below. To the extent available, please provide supporting documentation for your responses. In the event you do not know the answer, please indicate your current understanding as well as any follow-up actions and schedule for providing a subsequent response.

1. When did the leak start and how was it determined?
2. Do you have any reason to believe there are any other leaky wells on your site or do you have data suggesting you don't?
3. Do you have any reason to believe the leak started before Oct. 23?
4. Was the release of natural gas to the atmosphere constant during the release or did it vary, and if so how and why?
5. If so, what factors caused the variation?
6. Can you provide a log of events/actions that may have contributed to a variation in emissions since the leak was discovered, when they happened and how they would be expected to affect the release rate?
7. Does the fact that the natural gas is leaking into the soil dampen any variability in the release rate to the atmosphere?
8. Do you have a plot of time vs NG release rate to the atmosphere during the leak?
9. How do you anticipate the efforts to plug the leak to impact emissions over the next several weeks and months and what are the underlying rationale for your assessment?
10. How much natural gas do you expect was in the soil from the leak once you plugged the leak and how did you make that determination?
11. How much natural gas was released to the atmosphere after the leak was plugged and at what rate?
12. What happened to the natural gas that was still in the soil, but not released to the atmosphere?
13. What is your best estimate, basis of estimate and level of uncertainty at a 95% (TBR) confidence interval for the following quantities:
 - o A. Baseline natural gas leakage rate (for the entire facility) prior to Oct. 23?
 - o B. Total volume of natural gas vented during this incident (as a minimum - between Oct. 23 and Nov. 20)?
 - o C. Natural gas leakage rate (for the entire facility) following resolution/plugging/remediation?

14. What instrumentation/methodology do you have for monitoring the following variables and what is the precision or uncertainty and sample frequency of these instruments/methods:
- A. reservoir gas volume?
 - B. bottom-hole pressure?
 - C. gas flow rate at the top of the well?
 - D. gas flow rate in rock/soil surrounding the bore?
 - E. atmospheric mixing ratio (mole fraction) of methane near the well head?
 - F. meteorological variables near the well head (wind, temperature, pressure, etc.)
15. What are your best estimates for the variables listed in Question 14 before, during, and after the leak incident? (As a minimum: what were the values on Oct. 22, Nov. 5, Nov. 10 and Nov. 20; ideally, continuous time-series spanning those dates.) [Rationale: leak discovered on Oct. 23, ice breakthrough reported Nov. 6, surface and airborne survey Nov. 10; Nov. 20 assumes leak plugged on that date.]
16. What was the estimated area at the surface through which methane was emitted from the soil and how was that determined?
17. What is the chemical and isotopic composition of the natural gas in the Aliso Canyon storage facility?
18. What is the chemical and isotopic composition of associated gas in oil operations in Aliso Canyon?