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Subject: Comments on the Development of the Aliso Canyon Mitigation Plan

Dear Messrs. Graham and McCarthy,

Please accept these comments in support of the Board's work to develop a greenhouse gas mitigation plan for the Aliso Canyon well failure event. As directed by Governor Brown, your agency has the important task of ensuring the atmosphere is fully made whole after the release of nearly 100,000 tons of methane into the Los Angeles air basin. We submit this letter to support several aspects of your efforts to date and offer additional ideas and issues for consideration as you move forward in developing a final mitigation plan.

I. Background recommendations

In Section II below, we make several specific recommendations on project types and investment options that warrant prioritization by the Board as it proceeds with developing the Aliso mitigation plan. However, before considering the more detailed aspects of our letter, we offer several high level recommendations that should inform ARB's approach to the mitigation plan.

a) The mitigation plan should focus on achieving greater (or at least equivalent) reductions in methane than as has been released

The Aliso Canyon release has significantly elevated awareness of methane as a climate pollutant of concern. This awareness extends not only to the leaked methane from Aliso Canyon, but also to the hundreds of thousands of other sources across our state and national economy that leak methane – a pollutant that over the 20-years after it is released is ***84 times more potent*** than carbon dioxide at contributing to climate change.

Focusing the mitigation plan on achieving equivalent or greater reductions in methane, ton-for-ton, will ensure the climate impact of the release is fully mitigated by avoiding disputes over which time horizon and global warming potential number (GWP) to use in converting methane to carbon dioxide equivalent. Depending on which GWP and time horizon is employed (20 versus 100 years), the mitigation required to offset the climate impacts of Aliso Canyon can vary by a factor of three – from as little as 2.7 MMT CO2 to as much as 8.2 MMT C02. To promote public confidence in the mitigation plan, ARB should sidestep this technical quagmire and focus the plan on methane reductions.

Furthermore, as identified in ARB's Short-Lived Climate Pollutant (SLCP) draft reduction plan, and in inventories of methane pollution from sectors such as the state's oil and gas industry, there is both an ample need and opportunity to cut methane pollution across California that escapes into the air every day. Finally, due to the time lag between when the pollution event occurred and the completion of reduction efforts, the Board should ensure the mitigation plan results in less cumulative methane emissions than if the Aliso accident never occurred, and on a timeline that corresponds to the magnitude and urgency of the effort.

b) The mitigation plan should incorporate core integrity principles including additionality, permanence, enforceability and rigorous emissions accounting

Ensuring complete mitigation of the climate impact of the Aliso Canyon release, as directed by the Governor's proclamation, will require careful consideration and adherence to key operational goals and principles. Foremost among them, as staff recognized in its Feb. 18 presentation to the Board, the mitigation plan must ensure all reductions are additional to what otherwise would have been accomplished in the absence of the plan (a term commonly referred to as "additionality"). Failing to adhere to strict additionality requirements would allow double-counting of reductions and fall short of achieving full mitigation. Similarly, CARB must ensure the investments result in permanent reductions that will not erode or be reversed over time. Finally, to ensure full mitigation and promote public confidence, CARB should require third-party verification of individual projects and fully account for and track all reductions made under the plan.

c) The mitigation plan must not impede the timely implementation of California's oil and gas regulatory initiatives to reduce methane

Aliso Canyon offers a stark reminder of the need to rigorously complete and implement the series of oil and gas sector rulemakings currently in development at CARB, the CPUC and DOGGR. Through CARB's oil and gas methane regulation, the CPUC's SB 1371 rulemaking, and DOGGR's underground injection control process, California has the opportunity to complete a series of nation-leading regulatory enactments to prevent another disaster like Aliso from happening again, as well as achieving significant reductions in the pollution released from tens of thousands of ongoing leaks located across the state. Unfortunately, years of inertia and industry obstruction continue to impede the development of cost-effective solutions such as requiring updated technology and more frequent inspections, resulting in shorter intervals between inspections. Accordingly, as ARB looks for new reduction opportunities to mitigate the Aliso disaster, it must not

lose sight of the complementary programs currently under development that are needed to drive lasting reductions and innovation across the industry.

d) The mitigation plan should be considered in the larger context of improving the diversity and resiliency of Southern California's energy system, including cutting natural gas demand and the need for natural gas storage

In addition to considering discrete options for cutting climate pollution, the Aliso Canyon mitigation plan should also be viewed within the long-term context of the SoCalGas and California energy strategy needed to achieve the state's climate goals, which requires reducing gas use while also reducing the need for facilities like Aliso Canyon.

To help attain California's aggressive renewable energy requirements, major gas corporations like SoCalGas are currently planning for increases in the use and storage of natural gas. These plans are supported by California's current codependence between natural gas and intermittent renewables in order to maintain system reliability. As the 2014 biannual California Gas Report filed by the regulated gas and electric utilities with the Public Utilities Commission reveals, the gas utilities see this trend continuing, with more of a role for natural gas and a greater need for gas storage in the future,[1] unless there is a shift in the status quo.

Due to this pairing of renewables and natural gas, and the corresponding need for gas storage to meet supply needs during periods of high demand, California must accelerate its efforts to cut overall gas demand and break the linkage between renewables and gas while maintaining regional and statewide energy reliability.

II. Implementation approach and priority investments for the Aliso Canyon mitigation plan

a. Unless CARB can ensure full mitigation by achieving additional methane reductions from the oil and gas sector, the Board should employ a portfolio approach to mitigation

Among the many mitigation opportunities before the Board, the option that provides perhaps the most direct response to Aliso Canyon would be to secure equivalent methane pollution reductions from the oil and gas industry within the Los Angeles air basin. Such reductions could achieve similar levels of climate pollution and toxic air contaminant reductions as that which Aliso Canyon released, though offset in time, while keeping pressure on the industry as a whole to clean up. However, as discussed above, state regulatory efforts underway are already focused on achieving reductions from these activities, making much of those reductions non-additional. As a result, and due to the sheer volume of methane pollution reductions required, it is unlikely that any one investment category can satisfy the pollution debt while advancing other important objectives, such as prioritizing projects that deliver co-benefits to disadvantaged communities.

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[1] For example, the gas utilities argue that "the intermittent nature of renewable generation is likely to cause the electric system to rely more heavily on natural gas-fired generation" and with "higher daily fluctuations of gas usage in the future … [the] gas system will need to be able to accommodate such operations." 2014 California Gas Report, p. 8, available at https://www.socalgas.com/regulatory/documents/cgr/2014-cgr.pdf.

Accordingly, we support staff's direction for the mitigation plan to consider a portfolio of investments in methane emissions reductions – some aimed at short-term reductions, while others aimed at longer-term transformational objectives. Within this portfolio, ARB should evaluate a wide range of reduction opportunities, including in the oil and gas sector, developing sustainable biogas collection and utilization systems with low levels of methane leakage, and reducing methane emissions at California's ports. Below, we recommend three priorities to guide ARB's selection of projects between and within those project categories.

b. The mitigation plan should prioritize oil and gas (O&G) sector reductions

As described above, the well failure at Aliso Canyon is an extreme example of the problems that occur daily at sources throughout the oil and gas sector. By focusing on oil and gas sector reductions, the Aliso Canyon mitigation plan can cut climate pollution, help transform an industry where lax oversight and inadequate field performance have too often been the norm, and help reduce emissions of ozone precursors and toxic air contaminants at no additional cost.

To place the methane pollution emitted by California's O&G sector in context, both with respect to the opportunity for mitigation and the significant challenge California faces, a few numbers warrant consideration. Aliso Canyon is estimated to have released about 100,000 tons of methane. In a 2007 survey by CARB, O&G production in the Los Angeles air basin was calculated to be responsible for about 5,000 tons of methane per year – stemming from 1,000–3,000 active oil wells and hundreds of thousands of components. Statewide, O&G production is responsible for about 50,000 tons of vented and fugitive methane per year. Accordingly, there will likely be significant opportunities for additional reductions from O&G, even after considering the imposition of new rules on the industry currently in development.

Specifically, the Aliso Canyon disaster is the embodiment of what happens when aging and decrepit O&G infrastructure meets lax construction, maintenance and oversight regulations. While the well failure and corresponding leak at Aliso Canyon represents a singular failure in the O&G supply chain, it is clear that many such releases (albeit smaller) develop and/or persist in the supply chain – both in-state and upstream in other states where California sources the majority of its gas. By prioritizing methane reductions in O&G operations, the Aliso Canyon mitigation plan can drive significant additional reductions throughout California's supply chain and offer a platform for developing best practices that can be replicated more broadly.

One area CARB should evaluate in particular is reducing methane pollution from idled and abandoned oil and gas wells. In 2015, DOGGR listed over 20,000 idled wells, with at least 1,500 in Los Angeles alone. Recent studies indicate a small percentage of these wells and associated infrastructure are leaking large amounts of methane.[2] Unfortunately, even after considering proposed rules in California, there would be little, if any, oversight of these unused wells by the state or industry since the equipment is not in active production.

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[2] *See, e.g.*, "Emissions of coalbed and natural gas methane from abandoned oil and gas wells in the United States," Geophysical Research Letters (Feb. 2016).

Moreover, methane leakage from idled and abandoned infrastructure is generally not counted in the state's emissions inventory, although recent research indicates on average it is a factor, albeit modest (i.e. less than 10%), across several basins. Recent research further indicates that methane emissions in Los Angeles are higher than previously thought, including research led by the Jet Propulsion Laboratory (NASA) that is actively measuring methane emissions in the LA basin.[3]

c. The mitigation plan should prioritize investments that cut demand for imported natural gas and promote development of low carbon alternatives, such as sustainably sourced renewable natural gas

As documented within the draft SLCP, significant opportunity exists to cut methane pollution in California though the capture and utilization of biogas (renewable natural gas, or RNG) that is released by the decomposition of organic material. Whereas conventional fossil-fuel based natural gas, when it is leaked to the atmosphere or combusted and converted to carbon dioxide, is a major source of GHG emissions (130 MMT of CO2 annually, as of 2013), RNG – if sourced and produced carefully – can have a significantly lower net impact on the climate, while also improving energy security and driving economic development.

By reducing fuel imports, in-state production of RNG would reduce methane leakage associated with out-of-state production and transmission of natural gas, which is not accounted for in California's emissions inventory (leakage associated with the production of natural gas imported into California is conservatively estimated at 200,000 to 600,000 tons of methane per year). At the same time, in-state RNG can reduce reliance on fuel imports and protect California's energy supply from price fluctuations while also creating jobs and driving new investments in the state's economy.

Of course, for RNG to work from a climate and ecosystems perspective, rigorous attention to ensuring that the supply chain is tight is needed to make sure overall emissions are less than from the natural gas supply chain. The Aliso Canyon mitigation plan presents a promising opportunity to refine these safeguards and put them in practice to promote investments in sustainable RNG.

d. The mitigation plan should prioritize projects that deliver co-pollutant benefits in disadvantaged communities

In alignment with the state's overarching climate and environmental justice goals, the Aliso Canyon mitigation plan presents an opportunity to cut global climate pollution while also improving public health in areas that are already overburdened with air pollution. For example, by seeking methane reductions in areas like the ports, along transportation corridors, and in areas with higher densities of large stationary sources, the mitigation plan can deliver multiple benefits. ARB should prioritize these opportunities wherever possible.

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[3] *See* Wong et al., "Mapping CH4: CO2 ratios in Los Angeles with CLARS-FTS from Mount Wilson, California" (2014), and Hopkins et al. "Spatial patterns and source attribution of urban methane in the Los Angeles Basin" (2016).

As always, thank you for your time and consideration of the points made herein. Please do not hesitate to email toconnor@edf.org with any questions or comments you may have.

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