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Submitted Online

March 24, 2016

California Air Resources Board
1001 I Street
Sacramento, California 95812

Re: Aliso Canyon Draft Mitigation Plan

The following comments are submitted on behalf of the Center for Biological Diversity ("Center"). We appreciate the opportunity to comment on the proposed plan for mitigation of the Aliso Canyon leak, which emitted approximately 94,500 tons of methane over a period of about four months.

The Center is a non-profit organization with more than 990,000 members and online activists and offices throughout California and the United States. The Center's mission is to ensure the preservation, protection and restoration of biodiversity, native species, ecosystems, public lands and waters and public health. In furtherance of these goals, the Center's Climate Law Institute seeks to reduce greenhouse emissions and other air pollution to protect biological diversity, the environment, and human health and welfare.

The Air Resources Board ("ARB") has proposed a general, broad framework for the Aliso Canyon mitigation project that outlines important principles, but falls short of the detailed and enforceable requirements that are crucial to ensure adequate and timely mitigation of the Aliso Canyon disaster. Overall, the draft mitigation plan lacks the strict timelines and fully enforceable criteria needed to address the urgency of the climate crisis, this disaster's contribution to climate change, and its effect on California's GHG reduction targets in the near term.

There are a number of specific areas that must be addressed in the final mitigation plan. The plan must include: an enforceable timeline of no more than five years for completion; a financial support structure that precludes any possibility of polluter avoidance or windfalls; a greater than one-to-one mitigation structure in light of the delay until mitigation will be complete; use of a methane global warming potential that includes carbon cycle feedbacks; and more careful consideration of mitigation measures to avoid unintended consequences. Finally, we note that the comment period for this draft plan was only ten days – two of which were weekend days. Such a short comment period curtails stakeholders' ability to provide meaningful feedback.

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Finally, we find it disconcerting that the draft mitigation plan refers to the planned mitigation as a "boon"[1] and "unique and opportune vehicle."[2] The Aliso Canyon disaster drove community residents from their homes, increased criteria and toxic air pollution such as ozone (smog), volatile organic compounds (VOCs), and benzene, and released significant volumes of the potent greenhouse gas, methane. This environmental and health disaster poses a challenge to ongoing efforts to clean California's air, keep our communities safe, and address the present and future impacts of climate change. The ARB should be very clear that any potential mitigation opportunities can never fully remediate the multiple harms resulting from this massive methane leak. At best, with the amendments discussed below, the climate harms from this tragic event might be mitigated to a non-significant level.

A. Mitigation Must be Completed within Five Years

A short timeline with specific near-term deadlines for mitigation is essential to avoid exacerbated climate impacts. One of the immediate dangers from climate change is "tipping points" or abrupt shifts to a qualitatively different state that can be irreversible for millennia.[3] It is well-recognized that the Arctic is at particular risk of passing beyond tipping points as early as this decade.[4] Once triggered, tipping points can lead to a positive-feedback cycle with global consequences in the form of "runaway climate change."[5] The science tells us that reducing short-lived climate pollutants such as methane represents a unique opportunity to bring global radiative forcing down to a sustainable level and avoid potential tipping points, but time is of the essence. With global radiative forcing already exceeding dangerous levels,[6] the Aliso Canyon methane bomb must be mitigated as rapidly as possible: at most within five years and preferably by 2020.

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[1] ARB, Aliso Canyon Methane Leak Climate Impacts Mitigation Program: Draft 12 (Mar. 14, 2016) (hereinafter "Draft Mitigation Plan").

[2] *Id*. at 13-14.

[3] T. Lenton et al., *Tipping elements in the Earth's climate system*, 105 PROC. NATL. ACAD. OF SCIENCES 1786 (2008); M. Molina et al., *Reducing abrupt climate change risk using the Montreal Protocol and other regulatory actions to complement cuts in CO_2 emissions*, 106 PROC. NATL. ACAD. OF SCIENCES 20616 (2009); H. J. Schellenhuber, *Tipping elements in the Earth System*, 106 PROC. NATL. ACAD. OF SCIENCES 20561 (2009).

[4] For instance, a recent paper predicted that the Arctic Sea would be ice-free in the summer within a decade or two. J. E. Overland & J. Wang, *When will the summer Arctic be nearly ice-free in the summer?*, 40 GEOPHYS. RES. LETT. 2097 (2013).

[5] In the Arctic, the ice-albedo feedback loop is already occurring, where the loss of highly reflective sea ice due to warming increases solar absorption, making the Arctic more vulnerable to future warming and ice loss. Increasing temperatures are expected to trigger other feedbacks including the release of large stores of carbon and the potent greenhouse gas methane from melting Arctic permafrost. *See, e.g.*, D. Archer et al., *The Millennial Atmospheric Lifetime of Anthropogenic CO_2*, 90 CLIMATIC CHANGE 283, 22 (2008); C. D. Koven et al., *Permafrost carbon-climate feedbacks accelerate global warming*, 108 PROC. NATL. ACAD. OF SCIENCES 14769 (2011).

[6] See Richard E. Zeebe et al., *Anthropogenic carbon release rate unprecedented during the past 66 million years*, NATURE GEOSCIENCE (published online Mar. 21, 2016) (characterizing current emissions rate as a "no-analogue" state in the geological climate record, exceeding even release rates during the Paleocene-Eocene Thermal Maximum); Dana Nuccitelli, *Current record-shattering temperatures are shocking even to climate scientists*, THE GUARDIAN (Mar. 21, 2016) (discussing NASA data showing that "[t]he past 5 months have been 1.06°C, 1.03°C, 1.10°C, 1.14°C, and 1.35°C hotter than that average, absolutely destroying previous records"), *available at* http://www.theguardian.com/environment/climate-consensus-97-per-cent/2016/mar/21/current-record-shattering-temperatures-are-shocking-to-even-climate-scientists; James Hansen et al., *Assessing ''Dangerous Climate Change'': Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature*, 8 PLOS ONE e81648 (Dec. 2013).

The mitigation also should be completed in time to meet California's AB32 goal of reducing state emissions to 1990 levels by 2020. If the mitigation is not complete by 2020, other sources will have to compensate for the Aliso Canyon leak. Because AB 32's emissions limit must "be achieved by 2020," it will be unacceptable to count future intended mitigation under this plan as a "reduction" if it has not fully occurred in 2020.[7] Consequently, we recommend that the ARB set 2020 as the deadline for complete mitigation – with all mitigation additional to a business-as-usual baseline and accounting for all foreseeable emissions reduction measures that would otherwise occur.[8]

B. The Financial Structure of the Plan Should be Re-organized to Ensure Adequate Mitigation

Full financial assurance from the polluter in the form of a bond or other mechanism should be required under the mitigation plan. The draft plan indicates that ARB is reserving judgment on the imposition of a financial "backstop" or "minimum supplemental financial commitment [by the polluter] within the mitigation program."[9] The Center urges the ARB to re-consider its position and require SoCalGas to post a bond that would completely cover the estimated cost of mitigation and full administrative costs. There is significant uncertainty as to outcome and adequacy of implementation of the mitigation plan. As such, it is essential that more than the polluter's promise secure the success of the mitigation plan.

Furthermore, we note that the draft mitigation plan touches on the distinct possibility that some mitigation measures would financially benefit the polluter, SoCalGas. The draft plan states that SoCalGas "may be required to forfeit some benefits associated with mitigation projects, or contribute these benefits toward additional mitigation efforts."[10] We recommend, however, that such forfeiture be required as the mitigation process should not produce a windfall or otherwise inure to the benefit of the polluter. The ARB must maintain an active role in the selection of mitigation projects to ensure that mitigation measures are selected for maximal climate, health, and environmental benefit, rather than cost.

Finally, the mitigation plan should emphasize that all mitigation measures will be real, permanent, quantifiable, verifiable, and enforceable, per Health & Safety Code § 38562(d). For many years, it has been known that it is relatively cheap and easy to reduce methane from numerous sectors, including fossil fuels, agriculture, and waste. Methane reductions are indeed the "low hanging fruit" of climate mitigation: in many instances polluters can actually make money while reducing methane pollution. Nonetheless, industry has vehemently and successfully fought regulation of methane at both the federal and state level, delaying the adoption of many commonsense and urgently needed regulations to reduce methane from these sectors. Consequently, many pollution reduction actions which should have been required by regulation

[7] AB 32 provides that "[b]y January 1, 2008, the state board shall, after one or more public workshops, with public notice, and an opportunity for all interested parties to comment, determine what the statewide greenhouse gas emissions level was in 1990, and approve in a public hearing, a statewide greenhouse gas emissions limit that is equivalent to that level, *to be achieved by 2020*." Health & Safety Code § 38550 (emphasis added).
[8] We note and fully support the ARB's intention to wait for a final analysis of the volume of leaked methane to ensure the most accurate mitigation possible. *See* Draft Mitigation Plan at 5.
[9] Draft Mitigation Plan at 16-17.
[10] Draft Mitigation Plan at 9.

long ago and thus not available as mitigation today remain unrealized. With damage from climate change accelerating in California and around the nation and the world, adoption of commonsense, cost-effective, mandatory methane reduction measures should accelerate. Therefore the ARB must review, at least annually, that potential mitigation activities and projects (1) are not required by any law and are otherwise additional to what would occur in the absence of the mitigation program; and (2) are real, permanent, quantifiable, verifiable, and enforceable within the meaning of section 38562(d) of the Health and Safety Code.

C. The ARB Should Consider Greater than One-to-One Mitigation

The Center fully supports the ARB's commitment to ensuring that the Aliso Canyon leak is mitigated to the full extent of the resulting climate damage. As it stands, the mitigation plan calls for one-to-one mitigation. We ask, however, that the ARB consider that full mitigation may require emission reductions that amount to more than the volume of methane initially released from the Aliso Canyon leak.

As noted above, the timing of greenhouse gas emissions matters. Cumulative carbon emissions dictate our climate future. The concept of a carbon budget[11] is often used to characterize the limited carbon emissions available before we reach the point of dangerous or catastrophic climate change. Earlier emission reductions, however, result in a greater chance for climate stabilization, reduce the likelihood of triggering climate "tipping points," and are also less expensive in terms of implementation and associated or externalized costs.[12] The practical consequence of the massive Aliso Canyon methane leak is a deferral of carbon reductions in California, which carries a very real burden. To truly mitigate the full impact of the leak, the deferred reductions in climate pollutants to mitigate the leak will need to be greater than the volume of the initial leak.

We suggest that the ARB consider imposing a correction factor that requires greater-than-equivalent reductions for each year mitigation is delayed. This would also provide motivation to ensure that mitigation occurs as rapidly as possible. For instance, one approach would be to base the additional amount of required mitigation on the product of unmitigated methane and an exponential factor that reflects how much methane has already been cleared by atmospheric processes. Our concern is that the longer the methane from this leak remains unmitigated, the greater the cumulative climate damage and the larger the additional mitigation should be to fully offset the damage. On one hand, the additional factor for methane mitigated within one year could be zero. On the other hand, the additional factor for remaining unmitigated methane in 12 years – the atmospheric lifetime of methane and at which point approximately 63 percent of the methane from the leak would have been cleared –would be 0.63. That is, 1.63 tons of methane would have to be mitigated for every ton emitted by the original leak that has yet to be mitigated in year 12.

D. The Global Warming Potential for Methane Must Include Carbon Cycle Feedbacks

[11] *See, e.g.*, UNEP, The Emissions Gap Report – 2015 (Advance Report), *available at* http://uneplive.org/media/docs/theme/13/EGR%202015_Technical%20Report.pdf.
[12] *See, e.g.*, President Obama, The Cost of Delaying Action to Stem Climate Change (July 2014), *available at* https://www.whitehouse.gov/sites/default/files/docs/the_cost_of_delaying_action_to_stem_climate_change.pdf.

The Center commends the ARB's decision to use the IPCC's Fifth Assessment Report's ("AR5") global warming potential ("GWP") values, but these must include carbon cycle feedbacks. Using the most current estimates for GWP is essential to ensure that climate impacts from greenhouse gases are accurate. We also fully support the choice to use 20-year GWPs as the 10 to 20 year time scale is most appropriate for comparing the effects of different greenhouse gases over the duration of the mitigation plan, as noted by the ARB.

Our concern, however, is that the methane GWP (value of 84)[13] selected by the ARB does not reflect the impact of carbon cycle feedbacks. One of the IPCC AR5 breakthrough insights is the discovery of a fundamental flaw in previous calculations of GWP: the climate effect of CO_2 intrinsically includes carbon cycle feedbacks, but the GWPs of other greenhouse gases historically did not. Thus, to compare "apples to apples," it is necessary to include these feedbacks in the estimates of all greenhouse gas emissions. The draft mitigation plan, however, perpetuates the error by employing a non-feedback value for methane. This omission will distort the comparison of the respective mitigation potential of methane versus carbon dioxide. Consequently, the draft mitigation plan should use a 20-year GWP of 87.[14]

E. The ARB Must Carefully Analyze Collateral Impacts of Certain Mitigation Options

The Center appreciates the ARB's multi-faceted approach to mitigation measures, but we have concerns related to some of the suggested mitigation options. The draft mitigation plan suggests that a fruitful area for mitigation is the agricultural and the waste sectors, given that together they represent the majority of California's methane emissions. We support this general emphasis, but we wish to highlight the need to proceed cautiously with regard to methane capture from landfills. The ARB has noted the questionable data related to efficiency of gas collection in its Draft SLCP Reduction Strategy.[15] A far more effective strategy is complete organics diversion from the landfill waste stream.[16]

Another point for caution is the mitigation of methane "hot spots." The Center generally agrees with the ARB that mitigation options should include methane sources that might not otherwise be addressed. We have significant concerns, however, with some of the example sources that were cited in the draft mitigation plan. First, we note that the draft mitigation plan refers to certain hot spots arising from "natural sources" of methane.[17] These could refer to natural processes in wetlands or other wild areas, for instance. Although a source of methane, the ecological significance of these processes could be undermined through human manipulation. In the interest of protecting the value of natural habitat to biodiversity, ARB must confine

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[13] Draft Mitigation Plan at 6.
[14] G. Myhre et al., *Chapter 8*: *Anthropogenic and Natural Radiative Forcing*, in CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE IPCC 714, Table 8.7 (Cambridge Univ. Press 2013) (note *b* to Table 8.7 indicates the higher values for fossil methane).
[15] ARB, Draft Short-Lived Climate Pollutant Reduction Strategy 49-50 (Sept. 30, 2015), *available at* http://www.arb.ca.gov/cc/shortlived/2015draft.pdf.
[16] For complete description, *see* Center for Biological Diversity, Comments re the ARB Draft Short-Lived Climate Pollutant Reduction Strategy (Oct. 30, 2015), incorporated by reference herein.
[17] Draft Mitigation Plan at 16.

mitigation to anthropogenic sources of methane. We also note that Program Concentration #2 ("Promoting Sustainable Energy Infrastructure") is rather vague as to what kinds of projects might qualify. Again, ARB must provide specific, enforceable parameters for qualifying projects, and must focus solely on verifiable, real, permanent, and additional reductions in anthropogenic greenhouse gas emissions rather than trying to manipulate emissions from natural systems. ARB must not use the Aliso Canyon disaster as a pretext for geoengineering.

In closing, the Center supports the ARB's plan to require complete mitigation of the climate impacts of the Aliso Canyon disaster. We have highlighted the features of the mitigation plan that we believe must be strengthened or re-considered to achieve the ARB's goals. These include stricter requirements for mitigation projects, re-evaluation of the financial structure of the plan, an accurate methane GWP and a cautious approach to identification of sources.

Thank you for the opportunity to provide input; please do not hesitate to contact us with questions.

Sincerely,

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