CENTER *for* BIOLOGICAL DIVERSITY

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Via Electronic Mail

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Re: Comments on Survey of CEQA Documents on Greenhouse Gas Emissions Draft Work Plan and Development of GHG Threshold of Significance for Residential and Commercial Projects

This letter provides comments from the Center for Biological Diversity ("the Center") on the "Survey of CEQA Documents on Greenhouse Gas Emissions Draft Work Plan" as well as SCAQMD's continuing efforts to develop a greenhouse gas (GHG) threshold of significance for residential and commercial projects.

SCAQMD's survey of the GHG emissions from residential, commercial, and mixed-use projects should yield valuable data on the range of emissions resulting from these types of Projects in the South Coast air basin. Under the Work Plan, SCAQMD will use this data "to determine the level of GHG emissions for residential and commercial projects that constitute the 90th percentile … or other percentile desired." (Work Plan at 1.) According to SCAQMD, a threshold based on the 90% capture of sector emissions is consistent with the long-term emission reduction objectives set by Executive Order S-3-05, which calls for emission reductions to 80% below 1990 levels by 2050, or 90% below current levels. (SCAQMD Interim GHG Significance Threshold Staff Proposal (revised), at 3-2.) Compliance with Executive Order S-3-05 targets is presumed to be sufficient "to contribute to worldwide efforts to cap GHG concentrations at 450 ppm, thus, stabilizing the climate." (*Id.*)

While the Center appreciates SCAQMD's recognition that a GHG threshold must be based on long-term climate stabilization objectives, the best available scientific data now indicates that the threats posed by even small increases in temperature are far greater than previously thought. Stabilization of greenhouse gas emissions at 450 ppm as contemplated under Executive Order S-3-05 is insufficient to minimize the risk of catastrophic outcomes. Therefore, the capture of 90% of emissions from the residential and commercial sectors, which is based on compliance with Executive Order S-3-05, is

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not a sufficiently stringent capture rate to sufficiently contribute to preventing dangerous climate change.

Importantly, while the emission reduction targets embodied in AB 32 and Executive Order S-3-05 can inform a significance determination, it is only to the extent that these targets accurately reflect scientific data on needed emissions reductions. Under CEQA, regulatory standards can serve as proxies for significance where they accurately reflect the level at which an impact can be said to be less than significant. *See, e.g., Protect the Historic Amador Waterways v. Amador Water Agency*, 116 Cal. App. 4th 1099, 1109 (2004).

To ensure that an adopted threshold of significant is an accurate reflection of scientific and factual data, this letter sets for the best available science on climate change. As set forth below, the best available science most strongly support a threshold of zero. The further a threshold is from zero, the more tenuous the evidence to support a determination that the threshold is effective at meeting the environmental objective of avoiding dangerous climate change. Framed in the context of SCAQMD's methodology, the future a threshold is from a 100% capture rate, the more tenuous the evidence to support a determination that the threshold is effective. Accordingly, in the event SCAQMD is unwilling to set a zero threshold, SCAQMD should consider increasing the capture rate beyond 90% and also require projects with emissions less than this threshold to adopt measures to reduce their GHG emissions before reaching a determination that project impacts are less-than-significant. A non-zero quantitative threshold – assuming it is sufficiently stringent – coupled with performance standards that projects under this threshold must adopt recognizes that all projects must be part of the solution to global warming and would seem to be more equitable and defensible than a bright-line non-zero threshold alone.[1]

Finally, with regard to the Work Plan itself, it would be helpful to included data on emissions from categorically exempt projects. In the debate over an appropriate threshold of significance for GHGs, arguments have been forwarded that a low threshold would eliminate the application of categorical exemptions. Whether or not this is the case, actual data on the emissions typically resulting from projects invoking a categorical exemption would better inform this discussion.

1. A GHG Threshold That Purports to Be Consistent with Executive Order S-3-05 Emission Reduction Targets Is Insufficient to Prevent Dangerous Climate Change

CEQA calls for the identification of "any critical thresholds for the health and safety of the people of the state." Pub. Res. Code § 21000(d). With regard to GHGs, this

[1] Were the District to adopt a non-zero threshold, a quantitative threshold that does not require projects under this threshold to take any action to reduce GHGs may also create an improper *de minimis* exception. *See, e.g., Communities for Better Env't v. California Resources Agency*, 103 Cal. App. 4th 98, 121 (2002) ("Focusing on the de minimis effect in absolute terms isolates the effect individually, and this runs counter to the combined approach that CEQA cumulative impact law requires.").

critical threshold is avoiding dangerous anthropogenic interference (DAI) with the climate system. Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC) calls for "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference (DAI) with the climate system."[2] With the United States and over 180 other countries as signatories, the UNFCCC's objective of avoiding DAI with the climate is widely viewed as the international regulatory standard for protecting the global climate. The environmental objective of avoiding DAI is recognized in ARB's Draft GHG Threshold Guidance. (ARB Preliminary Draft Staff Proposal, Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the CEQA ("ARB Draft GHG Threshold"), Oct. 24, 2008 at 3.) In its Policy Objective for the Interim GHG Threshold for Industrial Projects, SCAQMD seems to set a roughly analogous objective of "reducing GHG emissions to stabilize climate change." (SCAQMD Interim GHG Significance Threshold Staff Proposal (revised), at 3-2.)

The policy objectives of both ARB and SCAQMD's threshold proposals both state that reaching the emission reduction targets set forth by Executive Order S-3-05, whereby emissions are reduced to 80% below 1990 levels by 2050, would contribute to avoiding dangerous climate change because these reductions are consistent with a pathway to the stabilization of atmospheric concentrations of GHG emissions at 450 ppm. (ARB Draft GHG Threshold at 3; SCAQMD Interim Threshold Proposal at 3-2.) Stabilization of GHGs at 450 ppm provides a 50/50 chance of limiting mean temperature rise to 2°C above pre-industrial levels.[3]

A pathway toward stabilization of GHGs at 450 ppm presents two serious concerns. First, the best available scientific evidence now indicates that a warming of 2°C is not "safe" and would not prevent dangerous interference with the climate system. Second, because the consequences of overshooting a 2°C threshold could include the displacement of millions due to sea level rise, irreversible loss of entire ecosystems, and the triggering of multiple climactic "tipping points" wherein climate change begins to feed on itself and spin rapidly out of control, the risk tolerance for overshooting a 2°C temperature rise should be extremely low. Yet a stabilization target of 450 ppm seems content to, at best, flip a coin in the hopes that future generations are not left with few choices beyond mere survival. While the emission reduction targets set forth under Executive Order S-3-05 is a significant improvement from business-as-usual, because these targets are insufficient to adequately minimize the risk of DAI, compliance with Executive Order S-3-05 is not a sufficiently stringent objective from which to develop a threshold of significance.

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[2] United Nations Framework Convention on Climate Change, art. 2, May 9, 1992, *available at* http://unfccc.int/essential_background/convention/background/items/1349.php.

[3] Union of Concerned Scientists, *How to Avoid Dangerous Climate Change: A Target for U.S. Emissions* 3 (Sept. 2007); Malte Meinshausen, *What Does a 2°C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates* in AVOIDING DANGEROUS CLIMATE CHANGE 268 (Cambridge Univ. Press 2006).

Projected risks and damages from global warming are more serious than believed even a few years ago. In 2001, the Intergovernmental Panel on Climate Change (IPCC) used five Reasons For Concern (RFCs) in its Third Assessment Report (TAR) to illustrate the temperature range at which impacts may be considered dangerous.[4] Relationships between the impacts reflected in each RFC and increases in global mean temperature were portrayed in a "burning embers" diagram, which reflected the severity of risk from rising temperature through gradations in color from white (no or little risk) to yellow (moderately significant risk) to red (substantial or severe risk).[5] Depending on the RFC, substantial impacts or risks (transition from yellow to red) occurred with a temperature rise from 1°C to 4°C from current levels.[6]

Since the release of the TAR, scientific understanding of the vulnerability of the climate to temperature rise has evolved considerably.[7] Based on new findings in the growing scientific literature since the TAR was released, the burning embers diagram was revised in 2008 to reflect the dangerous risks posed by smaller increases in temperature than originally identified in the TAR.[8] In the updated burning embers diagram, substantial impacts or risks now occur at or near current temperature levels for a number of RFCs.[9] As reflected in the updated RFCs, a 2°C temperature increase from pre-industrial levels (or 1.4°C increase from 1990 levels) is well past the point where severe and irreversible impacts will occur.[10]

It is now estimated that a mean global temperature increase of 1.5°C above pre-industrial levels has the potential to trigger irreversible melting of the Greenland ice sheet, a process that would result in an eventual 7m sea level rise over and above that caused by thermal expansion of the oceans, and potentially causing an additional sea level rise of 0.75m, as soon as 2100.[11] Specific consequences of a 2°C temperature rise from pre-industrial levels include the loss of 97% of the world's coral reefs and the transformation of 16% of global ecosystems.[12] At a 2°C temperature rise, approximately one to three

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[4] IPCC, CLIMATE CHANGE 2001: SYNTHESIS REPORT, SUMMARY FOR POLICYMAKERS 11 (2001). The five RFCs identified in the TAR are: 1) Risks to Unique and Threatened Systems; 2) Risks of Extreme Weather Events; 3) Distribution of Impacts; 4) Aggregate Impacts; and 5) Risks of Large Scale Discontinuities. *Id.*

[5] *Id.*; Joel B. Smith et al., *Assessing Dangerous Climate Change Though an Update of the Intergovernmental Panel on Climate Change (IPCC) "Reasons for Concern,"* PNAS- PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES USA EARLY EDITION 1 (2008), *available at* http://www.pnas.org/cgi/doi/10/1073/pnas/0812355106.

[6] IPCC, *supra* note 4, at 11. The RFC's assessed impacts from a baseline of 1990 temperature levels rather than pre-industrial levels. Because pre-industrial warming until 1990 was 0.6°C, an impact resulting from a temperature rise of 1°C equates to a 1.6°C rise from pre-industrial levels.

[7] Smith, *supra* note 5, at 1, 5.

[8] *Id.*

[9] *Id.* at 5.

[10] *Id.* 3.

[11] Rachel Warren, *Impacts of Global Climate Change at Different Annual Mean Global Temperature Increases* in AVOIDING DANGEROUS CLIMATE CHANGE 95 (Cambridge Univ. Press, 2006). Unlike the IPCC's RFC, Warren assessed impacts from temperature rise from pre-industrial levels, not 1990 levels.

[12] *Id.* Indeed, given increased confidence that 1°C to 2°C increase poses significant risks to many unique and threatened systems, including many biodiversity hotspots, the updated burning embers diagram indicates substantial impacts and/or moderate risks from warming that has already occurred. Smith, *supra* note 5, at 5.

billion people would experience an increase in water stress, sea level rise and cyclones would displace millions from the world's coastlines and agricultural yields would fall in the developed world.[13] In the Arctic, ecosystem disruption is predicted upon expectations of a complete loss of summer sea ice, with only 42% of the tundra remaining stable. This would destroy the Inuit hunting culture, cause the extinction of the polar bear and result in large losses in global bird populations. Moreover, because Arctic ice functions to reflect heat back into the atmosphere, its loss would allow more sunlight to heat the Arctic Ocean and further accelerate the buildup of heat and the melting of the Greenland ice sheet. As the devastating and irreversible impacts resulting from a 2°C mean global temperature rise are far in excess of any reasonable definition of DAI, limiting mean temperature rise to 2°C above pre-industrial levels is not a sufficient environmental objective for the purposes of developing a GHG significance threshold.

Specific impacts to California are also more dire than previously estimated. For example, in its most recent report, the Climate Action Team determined that the latest scientific findings indicate that "prior estimates [of sea-level rise] likely have been too low."[14] Based on two recent models, "[b]y 2050, sea-level rise could range from 30-45 cm (11 to 18 inches) higher than in 2000, and by 2100, sea–level rise could be 60 to 140 cm (23 to 55 inches) higher than in 2000. As sea level rises, there will be an increased rate of extreme high sea-level events, which can occur when high tides coincide with winter storms and there are associated high wind wave and beach run-up conditions." [15] Moreover, the rise in sea-level may be much higher than even these models predict because they do not account for the ice-melt contributions from the Greenland and Antarctic ice sheets and assume medium to medium high emissions scenarios. [16]

Not only are the climate impacts expected from a 2°C temperature increase far in excess of what should be considered "safe", but policies which propose greenhouse gas stabilization levels of 450 ppm CO_2eq present substantial risks of overshooting this target, thus exacerbating the problem. Equating a particular atmospheric concentration of greenhouse gases with a specific temperature increase involves a significant degree of uncertainty. This is because climate sensitivity – the extent to which temperatures will rise as a result of increasing concentrations of heat-trapping gases – depends on Earth's response to certain physical processes that are not fully understood.[17] Thus, due to uncertainty in climate sensitivity, scientists estimate that the mean probability of exceeding 2°C where stabilizing greenhouse gases at a CO_2eq level of 450 ppm is 54% with a 30% probability that global average temperature would rise more than 3°C.[18] At

[13] Warren, *supra* note 11 at 98.
[14] California Action Team, Draft Biennial Report (Mar. 2009) at 1.9.
[15] *Id.* at 1.10.
[16] California Climate Change Center, The Impacts of Sea-Level Rise on the California Coast, CEC-500-2009-024D (March, 2009) at 1.
[17] *See, e.g.*, Luers, Amy, Cayan Daniel, Franco Guido, Hanemann Michael, Croes Bart, California Climate Change Center, *Our Changing Climate: Assessing the Risks to California* at 4 (2006) CEC-500-2006-077.
[18] Malte Meinshausen, *What Does a 2°C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates* in AVOIDING DANGEROUS CLIMATE CHANGE (Cambridge Univ. Press) (2006) at 268-69. Meinshausen operates under assumptions that do not roughly equate CO_2 eq with CO2 concentrations. In *What Does a*

400 ppm CO_2eq, the mean probability of exceeding 2°C is 28%.[19] If greenhouse gas emissions were stabilized at 350 ppm CO_2eq, the mean probability of exceeding 2°C would be reduced to 7%.[20]

Properly accounting for climate sensitivity in climate policy is critical because, as dire as the projected impacts resulting from a 2°C mean temperature increase, increases above 2°C would result in impacts of apocalyptic proportions. If a 2-3°C increase in mean global temperature occurred, feedbacks in the climate system would cause a shift in the terrestrial carbon cycle. Currently, land-based carbon acts as a sink for CO_2, buffering the effects of anthropogenic climate change. If CO_2 concentrations continue to rise, this sink will become a source, owing to increased soil respiration, further exacerbating climate change. The most dramatic impacts will be a widespread loss of forests and grassland, including the Amazon rainforest, which would undergo a transition to savannah, triggering wide spread implications for local population, global biodiversity, and the global carbon cycle.[21] At a global increase in temperature of 3°C above pre-industrial levels, many additional impacts in human and natural systems would occur in ways exponentially more devastating that those predicted for a 2°C temperature increase. Few ecosystems can adapt to such a large temperature rise: 22% would be transformed losing 7% to 74% of their extent.[22] An additional 25 to 40 million people would be displaced from coasts due to sea level rise, an additional 1200 to 3000 million would suffer an increase in water stress and 65 countries would lose 16% of their agricultural GDP.[23]

Based on the severe impacts already observed as well as future impacts and risks posed by additional warming to which we are committed due to inertia in the climate system, climatologists are increasingly concluded that current climate conditions already constitute DAI and that greenhouse gas emissions ultimately must be drawn down to net negative levels through the rapid phase-out of coal and improved forest and agricultural management.[24] Atmospheric concentrations of CO_2 have risen from a pre-industrial

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2°C Target Mean for Greenhouse Gas Concentrations?, Meinshausen notes that 550 $CO_{2\ eq}$ roughly corresponds to a stabilization of 475 ppm CO_2 only. *Id.* at 269. In a second paper that appears to utilize the same assumptions, Meinshausen notes that 500 $CO_{2\ eq}$ is approximately equivalent to 450 ppm CO_2 stabilization, 450 $CO_{2\ eq}$ is approximately equivalent to 400 ppm CO_2 stabilization, and 400 $CO_{2\ eq}$ is approximately equivalent to 350-375 ppm CO_2 stabilization*;* Union of Concerned Scientists, *How to Avoid Dangerous Climate Change: A Target for U.S. Emissions* (Sept. 2007) at 3.

[19] Malte Meinshausen, *What Does a 2°C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates* in AVOIDING DANGEROUS CLIMATE CHANGE (Cambridge Univ. Press) (2006) at 270.

[20] *Id*.

[21] Rachel Warren, *Impacts of Global Climate Change at Different Annual Mean Global Temperature Increases* in AVOIDING DANGEROUS CLIMATE CHANGE (Cambridge Univ. Press) (2006) at 98-99.

[22] *Id.* at 99.

[23] *Id.* at 96-97.

[24] James Hansen et al., *Target Atmospheric CO_2: Where Should Humanity Aim?* 2 OPEN ATMOSPHERIC SCIENCE J. 217, 226-27 (2008); *see also* Matthews H.D. & Caldeira, K., *Stabilizing the Climate Requires Near-Zero Emissions*, 35 GEOPHYSICAL RESEARCH LETTERS L04705 (2008) ("future anthropogenic emissions would need to be eliminated in order to stabilize global-mean temperature.").

concentration of 280 ppm to 383 ppm in 2007.[25] Annual mean global temperature has increased by 0.76°C relative to pre-industrial times and is increasing at a rate of 0.17°C/decade.[26] Impacts from this anthropogenic interference with the climate has already resulted in tens of thousands of climate-related deaths, species extinction, ocean acidification and loss of coral reefs, and the significant retreat of glaciers and sea ice. In addition to the impacts already observed, additional warming "in the pipeline" due to inertia in the climate system and their feedback loops will result in further increases in temperature posing significant risks of severe and irreversible impacts.[27] The climate is locked into anywhere from 0.3 to 0.7°C additional warming relative to late 20th century levels due to the eventual impacts of past historical emissions.[28] On account of additional warming to which we are committed, Ramanathan and Feng found that there is a "high probability that the DAI threshold is already in our rearview mirror."[29] Similarly, on the basis of paleoclimate evidence and ongoing climate change, James Hansen and other leading climate scientists concluded the present CO_2 levels of 385 ppm are "already in the dangerous zone" and that "[i]f humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO_2 will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that." [30] In looking at dangerous climate change though the lens of risk tolerance, Harvey concluded that, at a 10% risk tolerance, atmospheric CO_2 concentrations close to present levels "violates the UNFCCC" for a range of assumptions of climate sensitivity.[31] Accordingly, as the climate change to which we are committed is already dangerous, there is little scientific basis to conclude that any new source of emissions is innocuous.

2. Conclusion

The Center appreciates SCAQMD's continued work to develop a threshold of significance for GHGs. The Center urges SCAQMD to apply the data derived from the Work Plan in a manner that is consistent with the scientific and factual data on the emission reductions necessary to avoid DAI. *See* Guidelines § 15064(h). Given the

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[25] Global Carbon Project, *Carbon Budget and Trends 2007* (2008), *available at:* http://www.globalcarbonproject.org/carbontrends/index.htm.

[26] Kevin E. Trenberth et al., *2007: Observations: Surface and Atmospheric Climate Change in* CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 252 (Susan Solomon et al. eds., Cambridge Univ. Press 2007).

[27] V. Ramanathan & Y. Feng, *On Avoiding Dangerous Anthropogenic Interference With the Climate System: Formidable Challenges Ahead*, 105 PNAS 14245, 14249 (Sept. 23, 2008); James Hansen et al., *Target Atmospheric CO_2: Where Should Humanity Aim?* 2 OPEN ATMOSPHERIC SCIENCE J. 217, 226 (2008).

[28] Michael E. Mann, *Defining Dangerous Anthropogenic Interference*, 106 PNAS 4065, 4066 (Mar. 17, 2009).

[29] V. Ramanathan & Y. Feng, *On Avoiding Dangerous Anthropogenic Interference With the Climate System: Formidable Challenges Ahead*, 105 PNAS 14245, 14249 (Sept. 23, 2008)

[30] James Hansen et al., *Target Atmospheric CO_2: Where Should Humanity Aim?* 2 OPEN ATMOSPHERIC SCIENCE J. 217, 217-18 (2008).

[31] Danny Harvey, *Dangerous Anthropogenic Interference, Dangerous Climatic Change, and Harmful Climatic Change: Non-Trivial Distinctions With Significant Policy Implications*, 82 CLIMATE CHANGE 1, 20 (2007).

severe and irreversible impacts resulting from a 2°C mean global temperature rise and the significant risk that this temperature would increase beyond 2°C at GHG levels of 450 ppm, a stabilization objective of 450 ppm CO_2eq is far in excess of what can be considered safe. Accordingly, setting a threshold based on consistency with a 450 ppm stabilization target is inconsistent with CEQA's purpose to "identify any critical thresholds for the healthy and safety of people of the state." Pub. Res. Code § 21000(d). Because the 90% capture rate is based on the outdated presumption that compliance with Executive Order S-3-05 targets is sufficient to avoid dangerous climate change, SCAQMD should adopt a threshold for residential and commercial projects that captures a higher percentage of emissions and requires projects with emissions below this threshold to comply with performance standards.[32]

Thank you for your consideration. Please do not hesitate to contact Matthew Vespa at (415) 436-9682 x309 mvespa@biologicaldiversity.org if you have any questions or concerns.

Sincerely,

Matthew Vespa
Senior Attorney

cc: Steve Smith
Michael Krause

[32] The 90% capture rate used for SCAQMD's industrial threshold purportedly reflected the practical concern that minimal mitigation was available for the types of projects (such as boilers) that fell under this threshold. These concerns do not apply to residential and commercial structures, where any number of mitigation measures are available for all sizes of projects to reduce GHG emissions.