



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
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San Francisco, CA 94105

SEP 28 2010

Joan Denton, Executive Director  
Office of Environmental Health Hazard Assessment  
Sacramento Office  
1001 I Street,  
Sacramento, CA 95814

September 27, 2010

Dear Ms. Denton,

Thank you for the opportunity to provide comments on the public review draft "Cumulative Impacts: Building a Scientific Foundation" report. EPA Region 9 has appreciated the opportunity to participate and provide ongoing input as part of the State's Cumulative Impacts and Precautionary Approaches Workgroup (CIPA Workgroup). We believe this report represents a significant step in Cal/EPA and OEHHA's continuum of cumulative impacts assessment strategies. At its core, the strategies and findings of the report emphasize that the unique sensitivities, vulnerabilities and socioeconomic factors of a community are critical determinants of public health in that community, and further, those factors must be assessed when arriving at determinations of cumulative impacts.

In reviewing this document, we sought comments from EPA Region 9 scientists in our various programs, and the suggestions shared in this letter reflect collective input from scientists, toxicologists and managers across our Regional Office. Below are our main recommendations. Additional detailed comments are included in Enclosure.

- *Use of the tool:* EPA agrees that the screening methodology should be used to prioritize programmatic targeting and to identify and compare impacted communities relative to others. We encourage Cal/EPA and OEHHA to work towards developing a more robust cumulative impacts assessment tool capable of supporting actual environmental and regulatory decision-making. It is our hope that future efforts will focus on methods that can ultimately be incorporated into a more traditional risk analysis framework.
- *Groundtruth:* As the screening methodology is developed, it will be important to create maps and share them with the BDOs, CIPA Workgroup and the public to ensure that the tool accurately reflects the cumulative impacts communities are experiencing.
- *Multiplicative method:* Most other cumulative impacts tools have not used the multiplicative method. We suggest caution as the State moves forward in applying this multiplicative method, and a careful evaluation of the results to ensure they make sense.
- *Scale:* It is important that the cumulative impacts framework identify a geographic scale prior to obtaining data. Scale should be considered in collecting data to avoid the problems associated with bringing together data at different scales. For example, when county health data was aggregated down to the census tract in EJSEAT, specific communities experiencing the largest percentages of health

problems were masked. (See the NEJAC recommendations "Nationally Consistent Environmental Justice Screening Approaches, page 9).<sup>1</sup>

- *Additional Indicators:* We recommend considering additional datasets that could add value to the screening methodology. See Enclosure for more detail.
- *Flexible:* The framework should be flexible and allow for new data to be added as it becomes available. For example, in the early stages of the framework's implementation, it could make sense to include data from the 2000 census. At the release of the 2010 census data, the framework should allow for the new data to be included and the 2000 data to be removed. With flexibility, the framework will more accurately depict the cumulative impacts communities face.

In addition to commenting on the report, we would like to offer the following suggestions:

- *Continue CIPA workgroup:* As Cal/EPA and OEHHA move forward, we suggest that the CIPA Workgroup continue providing input into the process. We would gladly continue to serve and participate on the CIPA Workgroup.
- *EPA, Cal/EPA, OEHHA meeting:* EPA would like to offer to plan and host an open exchange of ideas among State and EPA scientists, and one of our senior regional toxicologists has agreed to help plan and facilitate this session. See Enclosure for suggested topics.

There is an urgent need to reduce pollution burden in vulnerable communities. We appreciate the thoughtful outreach to the CIPA Workgroup and the public in the development of this report and framework and encourage Cal/EPA and OEHHA to incorporate the feedback and begin implementing the framework in a timely manner to protect the environment and public health of communities most burdened by cumulative impacts. Finally, we recognize that this State-led effort has raised the bar for addressing cumulative impacts, and are happy to assist OEHHA and Cal/EPA as needed to move this process forward. Please feel free to contact Debbie Lowe at (415) 947-4155 or via email at [lowe.debbie@epa.gov](mailto:lowe.debbie@epa.gov) or her colleague Zoe Heller at (415) 972-3074 or [Heller.Zoe@epa.gov](mailto:Heller.Zoe@epa.gov) with any questions.

Sincerely,



Enrique Manzanilla, Director  
Communities and Ecosystems Division

Enclosure, Detailed Comments

<sup>1</sup> The NEJAC recommendations regarding EJSEAT:  
<http://www.epa.gov/environmentaljustice/resources/publications/nejac/ej-screening-approaches-rpt-2010.pdf>

ENCLOSURE

US EPA Region 9 Detailed Comments on the Public Review Draft  
“Cumulative Impacts: Building a Scientific Foundation” Report

**Cal EPA/OEHHA/EPA meeting:** We would like to offer the opportunity for a peer-to-peer detailed discussion about some of the emerging and critical issues related to cumulative impacts. Below is an initial list of potential topics for this in-person meeting. Please contact Debbie Lowe Liang or Zoe Heller to discuss this further.

- *Social Epidemiology:* Discussion on how the findings from social epidemiology can be used and applied in modifying and expanding traditional risk characterization paradigms to better support assessment of cumulative impacts and better understand the role of non-chemical stressors. The NAS Silver Book may provide some guidance on how to address non-chemical stressors in part by leveraging insight from social epidemiology.
- *Uncertainties, sensitivity, and vulnerability:* Discussion on what manner or to what degree current estimates of inter-individual variability inform our analysis of cumulative impacts in communities or sub-groups.
- *Ecological impacts:* Discussion on development of robust methods and procedures for increased consideration of ecological impacts into the proposed and future frameworks.
- *Integrated Science Assessments:* Discussion on the utility of integrated science assessments and problem formulation principles to better assess cumulative impacts.
- *Science and Regulatory Policy:* Discussion on the development of science policy and regulatory frameworks in which consideration of cumulative impacts can support decision making. The Environmental Law Institute’s document “Opportunities for Advancing Environmental Justice: An Analysis of U.S. EPA Statutory Authorities” might serve as a useful starting point for these discussions.<sup>1</sup> A similar analysis of the State’s statutory authorities and Civil Rights Act Title 6 obligations might be useful.
- *Social Determinants of Health:* Discussion of which social determinants of health should be prioritized for increased scrutiny and application in the consideration of cumulative impacts in communities and sub-groups.
- *Epidemiological Proxy Surrogates:* Discussion on putative mechanistic relationships between traditional toxicological endpoints and those endpoints used to measure the psycho-social stressors impacting the health of communities.
- *Cumulative Impact Tools to Support Risk Assessment:* There is a need to develop cumulative impact tools that can be used to support the risk assessments that are used for environmental decision-making. Region 9 toxicologists would welcome the opportunity to engage with Cal/EPA and OEHHA scientists on this issue.

In addition to the above topics, we would also be happy to engage in discussion on the other issues raised in our general comments, such as scale, indicator selection, groundtruthing, and the multiplicative method.

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<sup>1</sup> [http://www.elistore.org/reports\\_detail.asp?ID=41](http://www.elistore.org/reports_detail.asp?ID=41)

## Potential Indicators

In moving forward with the development of the screening methodology, we suggest sharing additional detail on the type and scope of indicators that might be used, the strengths of, and potential concerns with, each suggested indicator, and the basis for choosing that particular indicator and data source. While recognizing that Table 2 of the report suggests potential indicators rather than prescribing a complete set of recommended indicators, we recommend considering the following: providing a discussion on why percent population under age 5 is being recommended as the indicator for presence of children, rather than a greater age group; including additional environmental exposures as potential indicators of impacts, such as water quality, air toxics (for which the National Air Toxics Assessment could be used as a data source), and pesticide exposures; and including additional public health effects or indicators, such as:

- Preterm birth (in addition to low birth weight)
- Asthma Prevalence (in addition to asthma hospitalization rates)
- Blood lead levels
- Smoking rates
- Obesity rates

With regards to pesticides, researchers at the University of Washington and at UC Berkeley are learning a lot about children's exposure and susceptibility to pesticides. The literature coming from these research centers should be consulted in developing cumulative indices for pesticide exposure. Examples of pesticide exposure routes include: take-home exposure (clothing, shoes, etc from the field), breast milk from a mother who may also work or who may have worked in the fields, absorption of residues onto clothing, house dust, food, water, pesticide use in and around the home, either by professional or by homeowner, and pesticide use on pets.

### Detailed comments on specific pages:

**Page 1, Introduction:** This section states "...but can also be used by local governments and others who may consider cumulative impacts in their *decision-making* activities (emphasis added)." EPA agrees that the best use of the tool at this time is as a screening tool that can be used to support decisions about resources and prioritization. We suggest clarifying that the tool as yet, is not able to support *regulatory* decision-making. At the same time, we're mindful that some members of the CIPA Workgroup have expressed the need for a regulatory decision-making tool and we encourage Cal/EPA and OEHHA to continue to further the science on this issue.

**Page 3, The Need to Address Cumulative Impacts:** "*No proof of harm is not proof of no harm.*" The third paragraph in this section discusses the myriad of human factors which influence or exacerbate the impacts of pollutants on health. A subset of these factors remain amenable to direct measurement in the context of the exposure assessment component of traditional risk analysis, while many of the other factors identified are essentially quantifiable proxies or surrogates for the socioeconomic or psycho-social determinants of health. These distinctions should be clarified in the narrative of this section so that the more well-defined

components of traditional risk analysis can be used to support and supplement not only the current screening-level approach, but also Cal/EPA's efforts to develop more quantitative and robust methods and procedures to assess and characterize the entire range of cumulative impacts.

**Page 8, Types of Scientific Information Reviewed in this Chapter:** The narrative and bullet-points in this section detail the complementary lines of scientific evidence which suggest increased levels of impact associated with cumulative exposures. It may be useful to supplement the bulleted points in this section with a brief description of the manner in which more traditional chemical risk analysis either captures or misses the elements associated with cumulative impacts. For instance, bullet #1 addresses the relationship between environmental pollution and health effects. These relationships are frequently captured in traditional risk analysis by descriptions of the dose/response relationship between a chemical stressor and an identifiable toxicological endpoint. The other bulleted points detailing disparities in exposures and conditions, intrinsic and non-intrinsic sensitivities, and existing health disparities are, with notable exceptions, poorly characterized in traditional chemical risk assessments. A more comprehensive characterization of these differences may better inform stakeholders of the relative strengths and uncertainties associated with traditional forms of analysis, and further to provide opportunities where leveraging methods from traditional risk analysis may be used to better inform the entire range of cumulative impacts.

**Page 14, Chapter 1 on Sensitivity:** We suggest providing a discussion on the interaction of risk factors over the life of an individual that are important to health status. Each person has a unique set of risk factors. Risk factors include: protective genes, developmental risk, stress, smoking, current disease, SES, exercise, gender, behavior, nutrition/diet/obesity, bad genes, work-related chemical exposure, and chemical exposures. We also suggest providing a discussion on impaired body defenses and diminished response capacity.

**Page 14-16, Sensitivity Based on Intrinsic Factors:** We suggest adding a discussion on identifying Tribal cultural practices.

**Page 16, Sensitivity Based on Non-Intrinsic Factors:** The narrative in this section provides a focus on many elements of those non-intrinsic factors or social determinants which influence and attenuate public health. In addition, the narrative provides estimates for the range of impact that has been described and found in the social epidemiological literature germane to health outcomes and psycho-social factors. This section of the report also identifies several investigations which document an increased likelihood of morbidity or mortality associated with the social determinants of health - generally ranging from a factor of two to four (2 - 4x) times increased risk. The narrative in this section correctly emphasizes that the relationship between the social determinants of health and pollution exposure impact health outcomes via differing mechanisms. A good number of the measurable social economic factors which influence health outcome remain proxy surrogates for an underlying mechanism impacting physiology or health. It may be useful to supplement this section of the report with additional background regarding the methods used to assess inter-individual variability in the context of more traditional chemical risk analysis. By contrasting the methodological basis for assessing inter-individual variability in

traditional risk analysis with increased estimates of impact associated with the social determinants of health, stakeholders may gain a more complete appreciation for the uncertainties and limitations associated with traditional chemical risk analysis.

**Page 18, Health Disparities and their Relationship to Pollutant-Related Disease:** The narrative in this and its preceding section detail the relationship between those conditions with an environmental etiology and overarching health disparities. As Cal/EPA moves forward in refining and developing more robust methods to assess cumulative impacts, the limitations associated with traditional risk analysis should be consistently contrasted with more progressive approaches. The traditional reliance on exposure and toxicity assessment in predicting a level of impact (or risk) in communities is uncertain and may underestimate the full dimension of impact absent a more cumulative approach. This line of evidence may suggest that an expanded and modified risk characterization paradigm is requisite to support regulatory decision making. More precisely, the thresholds for acceptable cancer and non-cancer (systemically toxic) impact that are common in traditional chemical risk assessments may require supplementation with metrics developed by social epidemiology to better account for the full range of impact which is inclusive of the social determinants of health. In so doing, regulatory stakeholders and impacted communities may arrive at a more comprehensive understanding of the entire level of impact either in a defined community, or that associated with a regulatory decision.

**Page 22, Conclusion:** The fourth paragraph in this section alludes to the types or mechanisms of pollutant interactions which are traditionally associated with exposure to chemical mixtures. In addition to additivity and multiplicity, the section should be expanded to include other putative interactive mechanisms such as potentiation and antagonism.

**Page 24, Burden of Pollution: Exposures, Public Health Effects and Environmental Effects:** The subsection entitled **Exposures: Contact with Pollution** should be expanded to include the food-chain or food-web as a potential source of pollution transport in addition to air, water and soil. The narrative in the subsection detailing the traditional routes of human exposure to chemicals (inhalation, ingestion & dermal uptake) should be expanded to include those indirect pathways of human exposure germane to cumulative impact.

**Page 31, Chapter 3:** We suggest adding a discussion on uncertainties and a meta-analysis. As the methodology is developed also consider sensitivity analyses.

**Page 49, References:** Here are two documents that might be provide useful insight into cumulative impacts. Phthalates and Cumulative Risk Assessment: The Task Ahead<sup>2</sup> and Toxicity Testing in the 21st Century: A Vision and a Strategy.<sup>3</sup>

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<sup>2</sup> Document can be found at: [http://www.nap.edu/catalog.php?record\\_id=12528](http://www.nap.edu/catalog.php?record_id=12528)

<sup>3</sup> Document can be found at: [http://www.nap.edu/catalog.php?record\\_id=11970](http://www.nap.edu/catalog.php?record_id=11970)